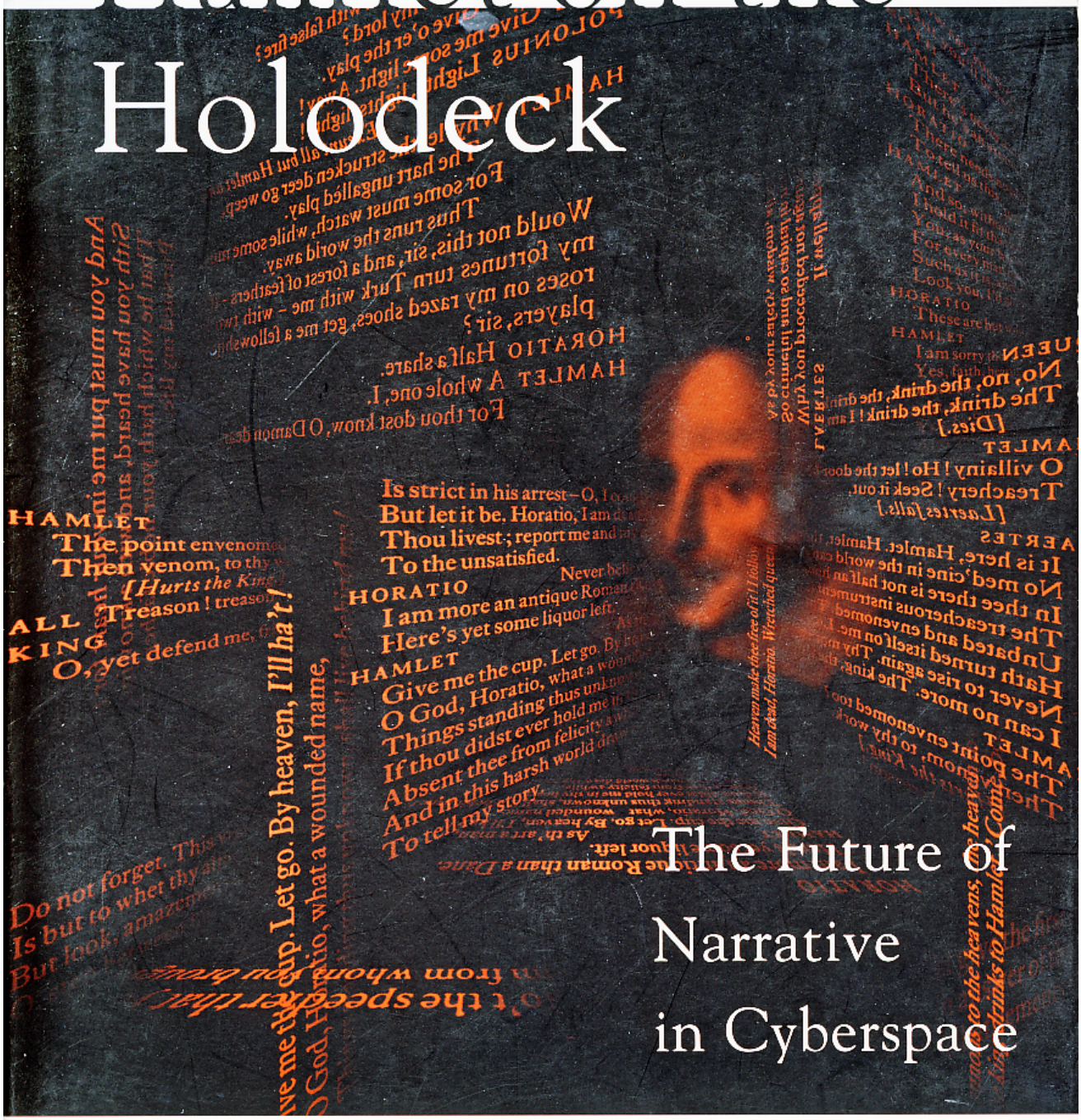
Hamlet on the Holodeck



The Future of Narrative in Cyberspace

Janet H. Murray

Chapter 4

Immersion

In short, he so buried himself in his books that he spent nights reading from twilight till daybreak and the days from dawn till dark; and so from little sleep and much reading, his brain dried up and he lost his wits. He filled his mind with all that he read in them, with enchantments, quarrels, battles, challenges, wounds, wooings, loves, torments, and other impossible nonsense; and so deeply did he steep his imagination in the belief that all the fanciful stuff he read was true, that . . . [h]e decided . . . to turn knight errant and travel through the world with horse and armour in search of adventures.

—*Don Quixote de la Mancha*

Don Quixote, living 150 years after the invention of the printing press, exemplifies the dangerous power of books to create a world that is "more real than reality." He still stands for the part of each of us that longs to leap out of our everyday life into the pages of a favorite book or, as the ride designers promise us today, to "go into

the screen" of a thrilling movie. A stirring narrative in any medium can be experienced as a virtual reality because our brains are programmed to tune into stories with an intensity that can obliterate the world around us. This siren power of narrative is what made Plato distrust the poets as a threat to the Republic. It is what made Cervantes' contemporaries fear the new fad of silent reading.[1] It is what made the advent of movies and television so frightening to the dystopian writers of the twentieth century. The same enchantment that sent Don Quixote tilting at windmills recently caused an Arkansas woman to show up for jury duty in the Whitewater case wearing a *Star Trek* uniform.[2]

The age-old desire to live out a fantasy aroused by a fictional world has been intensified by a participatory, immersive medium that promises to satisfy it more completely than has ever before been possible. With encyclopedic detail and navigable spaces, the computer can provide a specific location for places we long to visit. A few clicks on the World Wide Web and we are instantly in one of the feudal fiefdoms of the "current Middle Ages" set up by the Society for Creative Anachronism or in the sick bay of the starship *Voyager* being examined by the cranky doctor. Unlike Don Quixote's books, digital media take us to a place where we can act out our fantasies. With a telnet connection or a CD-ROM drive, we can kill our own dragons or fly our own starship; putting on a VR helmet or standing before a magic screen, we can do it all in 3-D. For the modern Don Quixote, the windmills have been preprogrammed to turn into knights.

The experience of being transported to an elaborately simulated place is pleasurable in itself, regardless of the fantasy content. We refer to this experience as immersion. *Immersion* is a metaphorical term derived from the physical experience of being submerged in water. We seek the same feeling from a psychologically immersive experience that we do from a plunge in the ocean or swimming pool: the sensation of being surrounded by a completely other reality, as different as water is from air, that takes over all of our attention, our whole perceptual apparatus. We enjoy the movement out of our familiar world, the feeling of alertness that comes from being in this new place, and the delight that comes from learning to move within it. Immersion can entail a mere flooding of the mind with sensation, the overflow of sensory stimulation experienced in the televisor parlor in Bradbury's *Fahrenheit 451*. Many people listen to music in this way, as a pleasurable drowning of the verbal parts of the brain. But in a participatory medium, immersion implies learning to swim, to do the things that the new environment makes possible. This chapter is about such digital swimming, about the enjoyment of immersion as a participatory activity.

Entering the Enchanted Place

The computer itself, even without any fantasy content, is an enchanted object. Sometimes it can act like an autonomous, animate being, sensing its environment and carrying out internally generated processes, yet it can also seem like an extension of our own consciousness, capturing our words through the keyboard and displaying them on the screen as fast as we can think them. As Sherry Turkle documents in her perceptive research on the psychology of cyberspace, working on the computer can give us uninhibited access to emotions, thoughts, and behaviors that are closed to us in real life.[3] MUDders and newsgroup members find it easy to project their deepest desires and fears onto people they have encountered only as words on a screen. People can fall in love very quickly over the Internet, and they also express their anger very easily (for example, by "flaming" one another in newsgroups). Some people put things on their home page (their site on the World Wide Web) that they have not told their closest friends. The enchantment of the computer creates for us a public space that also feels very private and intimate. In psychological terms, computers are liminal objects, located on the threshold between external reality and our own minds.[4]

Narrative is also a threshold experience. As we know from the work of child psychiatrist D. W. Winnicott, all sustained

make-believe experiences, from children's play to Shakespearean theater, evoke the same magical feelings as a baby's first teddy bear because they are "transitional objects." The teddy bear provides comfort because the child projects upon it both his memories of the soothing mother and his sense of himself as a small being who can be cuddled and hugged. But though it embodies these strong subjective elements, the teddy bear is also a real object with a physical presence outside of anything the child imagines about it. To the baby it has a richly ambiguous psychological location, shimmering with emotion but definitely not a hallucination. A good story serves the same purpose for adults, giving us something safely outside ourselves (because it is made up by someone else) upon which we can project our feelings. Stories evoke our deepest fears and desires because they inhabit this magical borderland. The power of what Winnicott called "transitional" experiences comes from the fact that "the real thing is the thing that isn't there."[5] In order to sustain such powerful immersive trances, then, we have to do something inherently paradoxical: we have to keep the virtual world "real" by keeping it "not there." We have to keep it balanced squarely on the enchanted threshold without letting it collapse onto either side.

Because the liminal trance is so inherently fragile, all narrative art forms have developed conventions to sustain it. One of the most important ways they have done this has been to prohibit participation. Suzanne Langer, in her classic study of aesthetics, *Feeling and Form*, describes the "terrible shock" she received as a child watching a performance of James Barrie's *Peter Pan:*

> It was my first visit to the theater, and the illusion was absolute and overwhelming, like something supernatural. At the highest point of the action (Tinkerbell had drunk Peter's poisoned medicine to save him from doing so, and was dying) Peter turned to the spectators and asked them to attest their belief in fairies. Instantly the illusion was gone; there were hundreds of children sitting in rows, clapping and even calling, while [the actress], dressed up as Peter Pan, spoke to us like a teacher coaching us in a play in which she herself was taking the title role. I did not understand, of course, what had happened; but an acute misery obliterated the rest of the scene, and was not entirely dispelled until the curtain rose on a new set. (Pp. 318–19)

Langer attributes her distress to the fact that art is dependent on establishing distance. To her mind, Barrie committed a theatrical sin by violating the fourth-wall convention that prohibits actors from acknowledging the spectators. The playwright's invitation to enter the circle of enchantment created by the stage is for Langer a shocking violation of the compact between playwright and audience. "To seek delusion, belief, and 'audience participation' in the theater is to deny that drama is art" (p. 319).

Whether or not it is destructive to art, audience participation is also very awkward. The literature of the twentieth century includes many concrete visions of the kind of boundary problems a truly participatory narrative would present. For instance, in Woody Allen's classic story "The Kugelmass Episode" a humanities professor at City College finds a magician with a kind of Don Quixote machine, a box that will allow him to jump into the pages of any novel he takes into it. Appropriately enough, Kugelmass chooses *Madame Bovary* and finds bliss with his fellow daydreamer by arriving just between her romances with Leon and Rodolfe. But students all over the country are confused: "Who is this character on page 100? A bald Jew is kissing Mme Bovary?" (p. 67). Kugelmass's problem is similar to the one I experienced standing in front of the magic mirror in MIT's Media Lab. When we enter the enchanted world as our actual selves, we risk draining it of its delicious otherness.

A simpler means to enchantment would be to bring to life a world that we wholly invent, a universal fantasy that is charmingly portrayed in Crockett Johnson's classic picture book, *Harold and the Purple Crayon.* Harold, a little boy drawn in black and white, carries a magenta crayon at arm's length as he walks across the pages of the book, drawing as he goes. Harold begins by improvising a sidewalk,

an apple tree, and then a dragon to guard the apples. But the dragon scares him. His hand shakes and creates waves. He starts to drown in his own immersive world—until he thinks to draw a boat. In Johnson's fantasy, Harold's fluid imagination keeps getting him into and then out of such scrapes. External reality is represented by a black-and-white crescent moon that follows him no matter what he draws. At the end of his journey Harold becomes panicky when he cannot find his own room no matter how many buildings and windows he draws. Then he remembers that his window is always around the moon and realizes that he knows how to draw his way back into his own bed.

The digitally equipped Harold faces an intensification of Harold's perils. In the British space comedy *Red Dwarf*, a TV series, three unheroic space travelers—a fun-loving slob named Lister, a narcissistic humanoid evolved from a house cat, and the uptight moralistic Rimmer—receive a state-of-the-art "total immersion video" system based on mind reading. The game is called *Better Than Life*, and it is designed to immediately concretize the users' fantasies, like a sort of instantly programmable holodeck.[6] Lister and Cat joyfully imagine a motorcycle, a plush resort, and glorious meals, but the neurotic Rimmer finds himself unable to sustain pleasurable fantasies and involuntarily injects into their virtual paradise a tax collector, a deadly tarantula, and a torture scene with killer ants. End of game.

Ursula LeGuin pursues the same problem with more seriousness in her multiform novel *The Lathe of Heaven*. Here George Orr, an ordinary man, discovers that he has the magical power to remake reality literally according to his dreams. Despite his best intentions to save the world from disaster, George repeatedly awakens from dreams of peace and plenty to find that he has accomplished these ends by inflicting worse and worse catastrophes—from plague to alien invasion—upon his society. When he falls in love, George is tortured by the possibility that he will accidentally imagine a world in which his beloved is never born. The possibility of a magical domain in which our dreams can come true also arouses our most anxious nightmares.

The more present the enchanted world, the more we need to be reassured that it is only virtual and the more we need to see Harold's moon reminding us that there is a way back to the external world.

Participatory narrative, then, raises several related problems: How can we enter the fictional world without disrupting it? How can we be sure that imaginary actions will not have real results? How can we act on our fantasies without becoming paralyzed by anxiety? The answer to all of these questions lies in the discovery of the digital equivalent of the theater's fourth wall. We need to define the boundary conventions that will allow us to surrender to the enticements of the virtual environment. We cannot pick up the magic crayon until we have a clear fix on Harold's moon.

Finding the Border

Part of the early work in any medium is the exploration of the border between the representational world and the actual world. It is commonplace in the twentieth century to point to elaborate simulations of reality (electronic and otherwise) as a new and dangerous thing, a distancing of human beings from direct experience. But part of our dismay at televised events, wax museums, and immersive theme parks, at what Umberto Eco identified as the "hyperreal" quality of much of American life,[7] derives simply from the fact that we need time to get used to any increase in representational power. During this time one of our main activities, as creators and audience, involves testing for the boundaries of the liminal world.

At the beginning of the second part of *Don Quixote*, published ten years after the first, Cervantes has Don Quixote and Sancho Panza discuss the reception of the first part and quarrel with the representation of some of their adventures. Cervantes shows them meeting people who have read about them, thus mingling readers and fictional characters in the same illusory space. In the same way, characters on Web serials answer public fan mail and invite fans to post their own opinions and experiences to common bulletin boards. We get

when he scolded her. At one point in the act McCay would take a prop cardboard apple, turn his back to the audience, and seem to throw it into the screen, where it appeared to land right in Gertie's mouth. At the dramatic climax of the act, McCay walked behind the screen and emerged as an animated drawing of himself. The animated McCay then stepped into Gertie's mouth so that she could lift him onto her back, where he took his bows while Gertie gracefully carried them both offscreen.[9]

The difference for the audience between the boundary experiments of earlier media and the ones that artists are now undertaking in the digital world is that this time *we* have also been invited into the mouth of the dinosaur.

Structuring Participation as a Visit

How will we know what to do when we jump into the screen? How will we avoid ripping apart the fabric of the illusion? Participation in an immersive environment has to be carefully structured and constrained. Ideally, the range of allowable behaviors should seem dramatically appropriate to the fictional world, just as ELIZA structured conversation in the format of a psychiatric interview and *Zork* constrained responses to the adventure game. For purposes of experiencing multisensory immersion, one of the simplest ways to structure participation is to adopt the format of a visit. The visit metaphor is particularly appropriate for establishing a border between the virtual world and ordinary life because a visit involves explicit limits on both time and space.

Amusement park fun house rides are a familiar model for an immersive visit that is also a narrative. The fun house has an entrance and an exit that mark the beginning and end of the story. As the visitor progresses on a moving platform, the dramatic tension builds from small surprises and hints of danger; then there are thrills and a mounting sense of threat or terror, which culminates in a big finish such as a free fall or an attacking beast. Like a movie set or

theatrical stage, the fun house ride is calculated to look as if it had a fuller existence, even though the illusion is meant to be seen only from a particular angle and in carefully timed momentary glimpses. A fun house is a movie made into a machine that you travel through.

Most amusement rides still assume that the visitor can do nothing more than sit and scream. But that does not mean that they are easier to make than movies. For instance, most of the dinosaurs in the movie *Jurassic Park* were part of a virtual set; computer models were drawn, rather than built, and then transferred directly to the film. Those that were built were only partial dinosaurs, meant to be photographed from one angle at a time. By contrast, the spectacular Jurassic Park attraction at the Universal Studios theme park has to be much more explicit. Its models are giant dinosaur-size robots that move realistically on special hydraulic cylinders designed to produce a smooth motion. They are made to be viewed from multiple angles and have special realistically textured skin that clings and flaps from the robot's metal frame. The amusement ride occupies five acres and accommodates three thousand visitors per hour on its twenty-five-person boats. The various events of the ride—the surprising appearances of the various dinosaurs, the flashing of warning lights, the glimpses of an overturned jeep, the attack of the dinosaurs, the destruction of the breeding lab—unfold as the boat passes the corresponding trigger point. Unlike the video-based *Back to the Future* ride or the graphics-based *Aladdin* ride (described in chapter 2), the Jurassic Park ride seems like a visit to a real place. The visitor even gets wet during the eighty-four-foot plunge that gives the ride its big finish. But Jurassic Park is not a place, any more than a theatrical stage is, since a visitor cannot step off the boat without destroying the experience. Jurassic Park is essentially a giant computer-driven machine for telling an immersive story, and the boat is the fourth wall, an enchanted threshold object that carries you into the immersive world—and then out again. Like Harold's moon, the Jurassic Park boat is both part of the illusory world and also a reminder of the

boundaries. Sitting within it, you are free to give way to terror without worrying about being able to find your way back.

Screen-based electronic environments can also provide the structure of an immersive visit. Here the screen itself is a reassuring fourth wall, and the controller (mouse or joystick or dataglove) is the threshold object that takes you in and leads you out of the experience. When the controller is very closely tied to an object in the fictional world, such as a screen cursor that turns into a hand, the participant's actual movements become movements through the virtual space. This correspondence, when actual movement through real space brings corresponding movement in the fantasy world, is an important part of the fascination of simple joystick-controlled videogames. Moreover, an electronic game that involves a maze and combatants is also very much like a fun house visit in that opponents keep popping out at you and obstacles keep appearing in your path in a randomized and therefore surprising fashion. This constant activity means that even if you move through the space without fighting, the world is still dramatically present; this is not a passive game board but a live-action stage.

By contrast, one of the limitations of the graphically immersive world of *Myst* is that it is dramatically static. Nothing happens of its own accord as the player wanders around in search of puzzles to solve. *Myst* sends us on a treasure hunt in a weirdly depopulated environment, a quest that is only partially motivated by the story. The lack of dynamic events reflects the simplicity of the underlying programming. *Myst* offers the interactor an elegant and seamless interface in which most of the activity of the game is moving forward through a space by mouse-clicking in the direction you wish to go. There are no enemies to encounter or people to bargain with. Few of the puzzles require any carrying of objects from one location to another. *Myst* is an unusually nonacquisitive and nonviolent game compared to most puzzle quests. The solution to the puzzles often depends on subtle aural cues, increasing the player's attentiveness to

the meticulous sound design. In short, there is almost nothing to distract you in *Myst* from the densely textured visual and aural environment, but this intense immersion in visiting the place comes at the cost of a diminished immersion in an unfolding story.

The visitor role is also exploited in the CD-ROM version of the starship *Enterprise*, a "technical manual" that promises to use "a subset of holodeck technology" to present the starship and that includes a voice-over tour from Commander Riker. The visuals are produced from video of the key sets from the TV series *Star Trek: The Next Generation* and processed with a virtual reality tool (QuickTime VR) that lets you rotate your onscreen position 360 degrees and step forward and backward within continuous space, a tremendous improvement over the discontinuities of still-frame representations like those in *Myst*. The movement is so fluid, the visuals have such authority, and the representation is so complete that our visit to the *Enterprise* has a magical quality; it is as if we are aboard the real starship, the canonical location of the fictional world of which the television and movie representation are just copies. But after we check out all the key places—the captain's ready room, the bridge, the lounge area on 10-Forward, the quarters of all the crew members—the visit to the *Enterprise* loses its immersive hold because nothing is happening there. In a digital environment we do not want to use a spaceship as a databank. The more we feel that we are actually there, the more we want to fly off on it and have adventures.

In environments based on the amusement park model, the story and the visit can be tightly meshed. Objects can perform for us as we pass in front of them, their performance triggered by our presence. But if the interactor is not allowed to step off the moving platform, the visit will have to be short and full of intense stimulation to hold our attention and keep us from wanting to go off to explore the space. A more exploratory visit, on the other hand, can feel very lonely without other characters to engage with or a drama that unfolds in real time. Because we experience ourselves as present in these im-

mersive worlds, as if we are on the stage rather than in the audience, we want to do more than merely travel through them.

The Active Creation of Belief

The pleasurable surrender of the mind to an imaginative world is often described, in Coleridge's phrase, as "the willing suspension of disbelief." But this is too passive a formulation even for traditional media. When we enter a fictional world, we do not merely "suspend" a critical faculty; we also exercise a creative faculty. We do not suspend disbelief so much as we actively *create belief.* Because of our desire to experience immersion, we focus our attention on the enveloping world and we use our intelligence to reinforce rather than to question the reality of the experience.

As the literary theorists known as the "reader response" school have long argued, the act of reading is far from passive: we construct alternate narratives as we go along, we cast actors or people we know into the roles of the characters, we perform the voices of the characters in our heads, we adjust the emphasis of the story to suit our interests, and we assemble the story into the cognitive schemata that make up our own systems of knowledge and belief. Similarly, when we watch a movie, we take the separate spaces of the various sets and merge them into a continuous space that exists only in our minds. We take fragmentary scenes and mentally supply the missing actions; if someone is seen with a grocery bag and then working over a stove, we understand the meal is effortful. If someone is wearing an Ivy League sweatshirt, we might assume they are intelligent and earnest or maybe spoiled and preppy. We bring our own cognitive, cultural, and psychological templates to every story as we assess the characters and anticipate the way the story is likely to go.[10]

In a complex narrative world we can reinforce our belief by writing scholarly analyses or fanzine articles that analyze the underlying assumptions of the world, whether they concern Irish history or matter replicators. Encyclopedic writers like James Joyce, Faulkner, Tolkien,

or Gene Roddenberry evoke this kind of response by the encyclopedic detail and intricacy with which they present their fictional creations. Such immersive stories invite our participation by offering us many things to keep track of and by rewarding our attention with a consistency of imagination.

In digital environments we have new opportunities to practice this active creation of belief. For instance, in an interactive video program set in Paris that my research group designed in the 1980s for language learners, we included a working telephone, represented by a photograph of a phone whose keypad could be clicked on. Students found the phone in an apartment they were free to explore by stepping through a photographed space. Near the phone were the numbers of people they had been motivated to telephone by the plot of the story (and whose answering machines they reached when they called). If they punched in a number outside the game, they heard the authentic out-of-service message used in Paris. The story was mostly told in well-directed video segments, which the students also found enjoyable, but the telephone was one of the most popular features of the story. This was because it behaved as a functional virtual object and because it became part of the accomplishment of a specific goal. In short, it became real through use.[11]

In the CD-ROM game *Star Trek: The Final Unity,* the player has to figure out how to free a woman scientist trapped under a pipe after an attack on a power plant. The pipe is too heavy to lift and it cannot be vaporized with the crew's phaser guns. The solution is to use a tricorder to record the coordinates of the pipe's location and then go down to the transporter room on the first floor to enter the coordinates into the transporter to "lock onto" the pipe and beam it off of her. If this is done right, the pipe appears in the transporter room, materializing to the accompaniment of the familiar tinkling transporter sounds. Operating the tricorder and the transporter in this way—which really only means clicking the mouse here and there on some unspectacular screen graphics—makes the world of the game seem much more present than does the same world on *Starship Enterprise,*

the more visually impressive CD-ROM. It is the experience of using the objects and seeing them work as they are supposed to in our hands that creates the feeling of being a part of the *Star Trek* world.

The great advantage of participatory environments in creating immersion is their capacity to elicit behavior that endows the imaginary objects with life. The same phenomenon occurs when a child rocks a teddy bear or says "Bang!" when pointing a toy gun. Our successful engagement with these enticing objects makes for a little feedback loop that urges us on to more engagement, which leads to more belief. As the digital art medium matures, writers will become more and more adept at inventing such belief-creating virtual objects and at situating them within specific dramatic moments that heighten our sense of immersed participation by giving us something very satisfying to do.

Structuring Participation with a Mask

Cyberspace gains much of its immersive power from spectacular effects—arresting visuals like the fast-moving, pulsating explosions of the videogame, the flashing billboards of the World Wide Web, and the hallucinatory apparitions of virtual reality landscapes. This visual pageantry links computer culture to ancient forms of entertainment. Spectacle has traditionally marked the descent into a gathering of ordinary mortals of a godlike being—Dionysus, a Hopi kachina, the pope during a papal procession, a royal bride and groom, or Santa Claus rolling down Broadway to Macy's department store every Thanksgiving Day. Spectacle is used to create exultation, to move us to another order of perception, and to fix us in the moment.[11]

Historically, spectacle tends to move toward participatory narrative in order to retain our attention, to lengthen the immersive experience. For instance, in the Middle Ages, the rituals of the church were extended into a folk dramatic form. Mystery, or miracle, plays were performed on wagons that rotated around the town; each episode was staged by an appropriate guild, with shipbuilders doing

the story of Noah and cooks using their pots and pans to simulate the clatter of the Harrowing of Hell. The tradition survives today in parade floats and in the Nativity pageants still popular at Christmas. Renaissance masques, a secularized form of pageantry, were often performed by aristocratic guests at celebrations that ended with an unmasking and general dance. In the twentieth century, Halloween is widely celebrated as a giant participatory costume pageant. True to the ancient origins of the holiday, there are processions of costumed figures and a large component of neighborly participation.

In all of these traditions, participation in the spectacular event begins with ordinary people, rather than professional entertainers, donning a costume or mask. The mask sets off the participants from the nonparticipants and reinforces the special nature of the shared reality. It creates the boundary of the immersive reality and signals that we are role-playing rather than acting as ourselves. The mask is a threshold marker, like Harold's moon or the Jurassic Park boat. It gives us our entry into the artificial world and also keeps some part of ourselves outside of it.

In digital environments we can put on a mask by acting through an avatar. An avatar is a graphical figure like a character in a videogame. In many Internet games and chat rooms, participants select an avatar in order to enter the common space. Even when avatars are crudely drawn or offer a very limited choice of personalization, they can still provide alternate identities that can be energetically employed. For instance, the inclusion of graphic avatars in the networked action game called *Quake* led players to organize themselves into clans. Each clan dresses its avatars in the same colors, and its members fight together against other clans. *Quake* players have created an array of clan web pages, which look like what the Crips and Bloods might create if they traded their semiautomatics for laptop computers.

Virtual reality technology can offer a new kind of costuming and pageantry. Brenda Laurel and Rachel Strickland have devised "smart costumes" for the virtual playground called *Placeholder* (described in chapter 2). In fact, the participants are doubly costumed, since they

are wearing actual helmets and body sensors that allow them to enter the virtual animal bodies that make up the smart costumes within the imaginary world. The virtual costumes are "smart" in that the interactor's vision, voice, and movement change appropriately as he or she changes, for example, from a swimming fish to a hissing, slithering snake. Since the system is designed for two players to inhabit the imaginary worlds together, they can enjoy the pleasures of a masquerade by showing off their costumes to one another and observing each other's displays. Participants are so present in the space that they sometimes think they have touched one another, even though they are actually physically isolated and unconnected by tactile sensors. Since *Placeholder* is based on a childhood model of play in which the interactors make up their own stories, the smart costumes are a kind of dress-up box, a set of enchanted story materials that provide a stimulus for improvisation.

There is a similar pleasure in embodiment in the Oz group's screen-based *Woggles* creatures at Carnegie Mellon University.[13] Here the user is invited to operate a cartoon figure with large eyes and an oval, stretchy body that can leap and slide and bow through a simple two-dimensional graphics world in the company of other creatures who behave autonomously. Since Woggles are programmed to play together and imitate one another, once you learn how to make your creature slide, another creature may slide after you. This world is engaging for people who do not like to operate the characters in fighting games; here the object is not to master a set of joystick twitches in order to destroy an opponent but to participate in a social world by taking on an intriguingly flexible body whose movements are also a means of communication. Entering a Woggle body is like becoming a citizen of Woggleland. It is as if you could put on a beret and start to shrug, gesture, and even speak like a Frenchman.

Smart costumes and social avatars are encouraging steps in the direction of a more expressive and less gun-crazy medium.

Structuring Collective Participation with Roles

The presence of other participants poses special challenges to immersion. For Suzanne Langer, the other children in the audience watching *Peter Pan* disrupted her immersion in a shocking way. But this is not a necessary effect. Like many baby boomers, I first experienced *Peter Pan* not in a theater but on television. I can vividly remember the thrill I felt, sitting on the floor in my living room close to the screen, when Mary Martin's Peter looked into the camera and asked us all to clap for Tink. I felt part of a vast effort that was truly healing her as I clapped away. But I also remember my self-consciousness in subsequent showings when my parents expressed amusement at my reaction. The problem for me was not with Peter Pan turning to the camera but with my awareness of unbelievers in the rest of the audience.

Clapping for Tinkerbell disturbed Langer in part because it is too explicit an enactment of the audience's role in sustaining the theatrical illusion. By gathering together in a theater, maintaining silence, and applauding in ritual ways, the audience creates the magic spotlight in which the actors move. But when Peter makes our applause a direct expression of belief in the imaginary, we are then reminded of the fact that Tinkerbell is only a trick of lighting on a stage. Perhaps the ideal way to clap for Tink is to do so alone in a room with a television set, aware of all the other people watching and clapping but not actually hearing them. This is the experience of the MUDs.

The power of a MUD is that the computer filters out the distraction of the actual appearance of the other players who are present. What is visible instead is their assumed identity, the role that everyone must choose in order to log on to the MUD. When you join a MUD, you assign yourself a sex and a physical description; if it is a very structured game, you acquire a set of attributes and skills represented by numerical values (e.g., magical powers = 10, strength = 8). As Sherry Turkle has pointed out, people do not so much play in MUDs as move into them.[14] They can sustain a role over a long pe-

riod of time, accumulating experience points in a structured game by killing trolls or finding treasure or by learning to pilot a starship. Or they can just accumulate social experience in role-playing a particular kind of character—a scheming necromancer or a hyperrational Vulcan. In very story-specific MUDs, crucial roles such as the role of the wizard Gandolf in a Tolkien MUD may only be available by audition, but most MUDs allow the players to invent their own characters within the conventions of the controlling fictional genre. The role is therefore a combination of personal fantasy and collectively recognized conventions.

One key to functioning in a MUD is the ability to flip back and forth between player and character, to remove the mask in order to adjust the environment and then to put it back on again. For instance, if a player becomes frustrated with someone who is being too intransigent in a negotiation, he or she might send the following double message:

> IN [in character]: Please consider withdrawing your ultimatum.
> OOC [out of character]: Just because you're a Klingon doesn't mean you have to act like a jerk.

Sharing an unscripted fantasy environment with other people entails a constant negotiation of the story line and also of the boundary between the consensual hallucination and the actual world. When things are going well, the players can provide one another with a collective creation of belief that is like the shared make-believe of childhood. But when it is going badly, the player is stuck with a sputtering story line from lack of consensus or is left stranded with no one logged on to play with.

In the view of some players, live-action role-playing games (LARP) offer more coherent stories than MUDs.[15] Because the players are visible to one another and clearly not in a spaceship or a medieval castle (but, probably, in the basement of a university or the cabin of a summer camp), live-action games rely on explicit mechanisms of participation to sustain the illusion of a fictional world. One

of the most powerful strategies, used by the role-playing group at MIT for instance, is the development of specific character profiles by the game masters to guide the individual players without rigidly prescribing their actions. The character profiles, provided to the players in advance of the game, are a combination of background story and game goals. In the hands of some game masters, they can be as elaborate as a short story.

For instance, in a LARP based on the world of Hamlet, the character sheet for Ophelia might go something like this:

> You are a beautiful but delicate young woman, and things have not been going well in your kingdom lately. For one thing, the king, whom you were very fond of, has died, and his wife, Gertrude, who has been a second mother to you since your own mother died, has married his brother very quickly. This seems to have upset your boyfriend, Prince Hamlet, who was very attentive to you before his father died but has been moping around ever since. Thank goodness your brother Laertes is on his way home. He always seems to understand you. And he will divert some of the attehtion of your dad, who is an old dear but can be so long-winded and bossy and is always nudging you to get back together with Hamlet. He keeps thinking of embarrassing things you should do to throw yourself at Hamlet, which drives you crazy since you are very obedient but you are too modest to enjoy flirting with someone who keeps rejecting you. If only Hamlet would return to his old self.

Such a character sheet would provide the player with ideas on how to act—docile and modest and lovesick—and guide her in how to relate to other characters. It would work as a kind of "smart costume," a ready-made set of behaviors to slip into that do not require much invention to sustain but that offer opportunities for elaboration if the player is so inclined.

In addition, the character might be given a set of small sealed envelopes, or "packets," marked with instructions on when to open them. Often these are "memory packets," things a character is not to

remember until an appropriate time in the game. For instance, running into Rosencrantz and Guildenstern might remind the Ophelia character of an occasion when Hamlet was particularly loving to her just before he left for college. Or she might have a packet meant to be opened after drinking a special kind of tea, a packet that might tell her that her infatuation is over and that she is now passionate about botany and has forgotten all about Hamlet. In this world, of course, her fate would be an open matter. Somewhere in her stack of packets might be written an instruction to go insane. Perhaps it would be triggered by the phrase "Get thee to a nunnery." But this would be only one of many possible paths her life could take.

In order to participate with focus in the immersive world, a character is usually given some goals to try to accomplish. For the Ophelia character, a major goal might be marrying Hamlet, and a minor one might be helping her brother get more money from their father. She would also need some hints about specific tasks that might help her achieve these goals. For instance, the overall design of the game might include a town witch and a meddlesome friar who each have potions that could affect Hamlet's behavior. Ophelia's character sheet might mention a rumor that the innkeeper knows where to get such potions. Ophelia could then set about finding out more about them, choosing which one would work, and locating and negotiating with the seller. Engaging in these activities could have repercussions for her relationship with her father. She might have to hide these activities from him or sneak off to look for them without arousing his suspicions.

A good character sheet provides a number of different plots for the player to get involved with, and a good game design would cue the various characters on how to relate to one another. The Polonius character would be told how anxious he was to make this sidetracked marriage happen. The town witch might be told to try enhancing her reputation by acquiring as clients important people who need a good herbal cure but to beware certain neighbors who will have her arrested if she is seen peddling her wares.

The person who plays Ophelia (like all the other players in the LARP) is thus supported by a world full of characters programmed to fit into her own character's plot, characters whose own intricate activities, even those that are completely unrelated to Ophelia's goals, add depth and variety to her world. The well-defined roles provide the means for each individual participant to actively create belief in the illusory world, and for all of them together to form a powerful circle of enchantment.

Regulating Arousal

According to Winnicott, "the pleasurable element in playing carries with it the implication that the instinctual arousal is not excessive"; that is, the objects of the imaginary world should not be too enticing, scary, or real lest the immersive trance be broken. This is true in any medium. If a horror movie is too frightening, we cover our eyes or turn away from the screen. If a romantic movie is too directly arousing, audience members may start necking instead of watching the characters. In the case of child's play, according to Winnicott, "instinctual arousal beyond a certain point must lead to: (i) climax; (ii) failed climax and a sense of mental confusion and physical discomfort that only time can mend; or (iii) alternate climax (as in provocation of parental or social reaction, anger, etc.)."[16] Similarly, if a participatory immersive experience is not to be pornographic and if it is not to lead to frustration or to inappropriate explosion (like the verbal tirades, or flaming, in MUDs), then the participant's arousal must be carefully regulated. The trance should be made deeper and deeper without the emotions becoming hotter and hotter.

Traditional narratives have clear conventions for regulating arousal so that it is strong enough to make the story compelling but not so strong as to render the viewer uncomfortable. Consider, for example, the filmic conventions used in the barn scene in the movie *Witness* (1985) between the Philadelphia policeman John Book (Harrison Ford) and the Amish woman Rachel (Kelly McGillis), one of

the most romantic scenes in recent films. Not only are the characters attractive, but their love is forbidden (since they belong to such different cultures) and goes unconsummated throughout the movie. In this scene they are sitting together in Book's car, which is hidden in the barn, and he is fixing something on the dashboard while she holds a lantern. The radio suddenly comes on, and it is playing Sam Cooke's "Wonderful World." The scene takes them out of the car and into a shy but exuberant dance. The moment at which they decide to dance is exquisitely staged. Book, moved by the nostalgic music, backs out of the passenger side of the car while the camera follows him from just behind the driver's side. He is facing the camera across the roof of the car and tapping on the roof to the beat of the song. The moment is fraught with desire, with Book's unspoken invitation to Rachel. Then Rachel is seen moving up into the frame, her back to the camera, and he smiles at her. The seduction is addressed both to the character and to the audience. In fact, in the first moment, before Rachel gets out of the car, it is aimed almost explicitly at *us*. But Harrison Ford is not looking directly into the camera, he is looking a little to the side.

This over-the-shoulder position of the camera is a standard film technique that keeps us identified with the characters while also distanced enough so that we are reminded of the presence of the other actor in the frame of the movie and of our own exclusion from it. This combination of tremendous immediacy with a clearly demarcated border maximizes our immersion in the dramatic action.

In the café scene of the IMAX movie *Wings of Courage* (discussed in chapter 2), there is a similar moment when Val Kilmer, playing the gallant pilot Jean Mermoz, gets up to dance. He has the same movie star attractiveness that Harrison Ford has in *Witness*, and, just as Huxley warned us, the three-dimensional display makes him appear extremely present before us, much more so than on a conventional movie screen. Sitting in the theater with the 3-D goggles on, I felt myself begin to blush, as if I were actually meeting his gaze. There is a discomfort in not knowing the limits of the illusion. What if he were

to come right up and ask me to dance? What if he were to extend his arms like Lord Burleigh? How far into seduction could he go without breaking the spell?

One solution to the need for boundaries and conventions in participatory narrative is to focus on exhibitionism rather than on simulated sex. Feminist critics have pointed out the pervasive use of film to linger over women's bodies. In this respect, *Witness* is unusual in that (for most of the picture) it is the male actor whose body is eroticized. When John Book takes a drink of lemonade and some if it runs down his virile neck, we see him through Rachel's eyes—as achingly attractive yet forbidden. Such a scene, in which the character is erotically displayed but made unavailable by the plot, is particularly well suited to a medium with such a riveting sense of presence. In a three-dimensional movie, the viewer is inherently placed in a situation of immobilized desire. The enticing images placed before us tease us into touching them and then evaporate in our fingers. When we have virtual reality environments with strong narrative interest, they may feel similarly poignant to us. If so, then virtual reality theaters will be a good place to stage the twenty-first-century version of the crypt scene from *Romeo and Juliet*, or any participatory story that centers on unattainable desire or tender longing for the dead. Perhaps the VR medium of the future will largely support a literature of nostalgia, full of shimmering visions of the preindustrial past.

The cyberpunk writers have offered a very different view. In Neal Stephenson's complex vision of a technological dystopia, *The Diamond Age*, "ractors," or professional interactive actors, operate avatar characters over a vast medianet, through sensors implanted in their faces and bodies. The expert ractor Miranda (named for the naïf in Shakespeare's *Tempest* who speaks of the "brave new world") takes a wide range of parts: Shakespearean heroines in role-playing adaptations (which are only pleasurable to her if done with a talented customer), a salesclerk whose image is customized to the sexual preferences of each particular customer, and even the "eternally elusive" Carmen Sandiego. Part of her job is handling the sexual improprieties

of "ractiv" entertainment. For instance, while playing the role of Ilse in the ractiv equivalent of *The Mousetrap* (a long-running murder mystery set on a train in World War II Europe), a performance in which paying guests and professional ractors interact from distant locations in a shared virtual space, she is distracted by a virtual masher:

> It was nearly ruined by one of the players, who had clearly signed up exclusively for the purpose of maneuvering Ilse into bed. He turned out to be the secret SS colonel too; but he was so hell-bent on fucking Ilse that he spent the whole evening out of character. Finally Miranda lured him into the kitchen in the back of the dining car, shoved a foot-long butcher knife in his chest, and left him in the fridge. She had played this role a couple of hundred times and knew the location of every potentially lethal object on the train. (P. 108)

Miranda's very professional solution to the problem of how to deal with instinctual arousal when it threatens to disrupt the illusory world was to provide an "in character" response to inappropriately "out of character" behavior.

In live-action role-playing games, the narrative conventions that control the boundary between the real world and the illusion are called "mechanics." LARP mechanics are a kind of abstract mimicry for behaviors that would otherwise require props, danger, or physical involvement. For instance, many role-playing games represent combat by elaborate arithmetical calculations of comparative strength, force, and vulnerability values. In such a game one might see a crowd of people standing in a college corridor in the middle of the night, shouting numbers at one another, doing the math in their heads, and then turning over the name tags of those players who have been calculated to be dead. There can also be mechanics for seduction. If two characters want to have sex, the mechanic might be that they go to a place separate from other players and remain there for a certain number of minutes. They then report to the game master that they have had sex. If they want to kiss, they might just say to one another "I kiss you" and "I kiss you back."

In some ways, these mechanics are the equivalent of the fade-out technique used in movies. They signal that something is happening that can only take place place in the viewer's or interactor's imagination. The abstractly represented action can be exploited for the immersive pleasure of role-playing as, for example, when two players improvise a love scene, complete with longing looks and poignant words but no necking. Or the mechanic can be exploited for its narrative consequences. For instance, in one simulation, sex with a particular woman served as a kind of truth serum. After making love she could ask one question, which her partner had to answer truthfully. This mechanic allowed sex to be used as a game strategy independent of the players' enjoyment of the scene.

In MUDs, which are on-line role-playing environments, players have created a similar repertoire of conventions for everything from weddings to virtual pie-making. Sometimes these conventions only involve navigating through the MUD to a particular virtual room and engaging in a ritualized conversation with other MUDders. For example, I might type in "south, west, south" until the program announces, "Wedding Chapel." The program would then tell me the names of those who are present, but it would be up to all the role players together to improvise the wedding scene. In other MUDs, players can program some objects and events into the system. The Wedding Chapel could contain an automated minister, who would lead the couple through their vows. After the ceremony the minister would remember they were married; he might be programmed to tell everyone he meets about each new marriage—perhaps even gossiping about what the bride was wearing and whether she looked pregnant.

The narrative strategies used in MUDs raise many questions about how to establish boundaries between private fantasy and public enactment. There is no single storyteller in a MUD; the computer program itself serves as narrator of the story, publishing the dialogue of the players to their computer screens and announcing entrances, exits, descriptions, and some events. The command structure by

which the players act in the fictional world establishes the narrative conventions. The most common conventions regulate the privacy of the dialogue: players can establish separate rooms, which function as private stages, or they can use the "whisper" command to one another, so that their conversation cannot be heard by others in the same room. If DarkBird whispers to WoodElf, "I kiss you," then the words "DarkBird whispers, 'I kiss you' " will appear only on the screens of these two players and no one else's. But if DarkBird "says" the words instead of whispering them, then everyone else in proximity to the lovers will see "DarkBird says, 'I kiss you' " on their screens. The privacy conventions allow the players to decide how much of their role-playing they want to share with the general group, but the digital stage does not always offer them complete privacy. A common grievance on MUDs is the presence of nosy wizards—the chief programmers or senior players in the virtual world who can eavesdrop on private conversations.

In other MUDs, *kiss* might be a command word; that is, if DarkBird types, "I kiss WoodElf" (or perhaps "kiss:WoodElf"), the system reports "DarkBird kisses WoodElf." The command convention gives the kiss the authority of a narrated event. Events that happen by command can change the state of the game (e.g., the command *Go north* changes who is where), and they can have hidden consequences. For example, if two people have virtual sex using command words, the result might be a virtual pregnancy, which would be generated by the system on the basis of a combination of random chance and the couple's virtual birth control practices. The system would then keep track of a character's pregnancy, remembering it at future sessions. It might offer an automated abortion service or provide some of the other role-playing characters with the ability to use specialized commands that allow them to perform virtual abortions or deliver virtual babies.

In some MUDs only the wizards can make up new commands; in others, all the players share this power. The issue of defining new commands becomes particularly sensitive in sexual matters. If, for example, BadTroll invents a rape command and then types in "rape: WoodElf," the system will report the action as objective reality to everyone in the room. The narration increases the victim's sense of violation. Often such events spill over into long out-of-character discussions on the social values of the virtual community. Sometimes they result in limiting the participants' ability to invent their own commands.[17]

Just as actors need conventions for staging fights and faking kisses, so too will interactors in a virtual world need specific mechanics for physical contact, mechanics that deepen the fantasy without disrupting the immersive trance. For instance, a holographic lover might offer a kiss by coming closer and then swirling away while music swells in the background. Such a "swirling" convention would emphasize the approach to the embrace and the long glance afterward rather than the kiss itself. Or an interactor wearing a special data glove might gently wave her hand, thereby signaling to her avatar figure within the frame of the virtual world that she should walk toward her lover and receive the kiss, which would be experienced through imaginative identification with the surrogate.

The computer is providing us with a new stage for the creation of participatory theater. We are gradually learning to do what actors do, to enact emotionally authentic experiences that we know are not "real." The more persuasive the sensory representation of the digital space, the more we feel that we are present in the virtual world and the wider range of actions we will seek to perform there. The ease with which MUDders and LARPers take on and cast off personas suggests that an audience is growing that has been trained in impersonation. We are all gradually becoming part of a worldwide repertory company, available to assume roles in ever more complex participatory stories. Little by little we are discovering the conventions of participation that will constitute the fourth wall of this virtual theater, the expressive gestures that will deepen and preserve the enchantment of immersion.

Chapter 5

Agency

The more realized the immersive environment, the more active we want to be within it. When the things we do bring tangible results, we experience the second characteristic delight of electronic environments—the sense of agency. Agency is the satisfying power to take meaningful action and see the results of our decisions and choices. We expect to feel agency on the computer when we double-click on a file and see it open before us or when we enter numbers in a spreadsheet and see the totals readjust. However, we do not usually expect to experience agency within a narrative environment.

Even in the rare circumstances when we are invited to participate in a traditional narrative form, our participation is circumscribed in a way that generally limits our sense of agency. For instance, if the audience at a performance of *Peter Pan* decided that Tinkerbell is a pest and refused to clap her back to life, the play would come to a halt. The participatory dinner theater plays that simulate an Italian wedding or an Irish wake or a Jewish funeral encourage audience participation by keeping the plot to a minimal level and the dialogue with the audience to social formulas appropriate to distant friends of the family. When the groom in such a play leans down to kiss me as a

guest at his wedding, I can congratulate him and warn him about staying away from his ex-girlfriend now that he is married, but I cannot really influence his behavior. When audience members are included in the story, they serve only as the butt of a joke. They may be accused of adultery by the priest or shot by a mafioso relative. The slender story is designed to unfold in the same way no matter what individual audience members may do to join the fun.

In fact, participatory theater performances become participatory by incorporating folk art forms and festival behavior such as singing, dancing, and sharing a feast. Striking up a familiar song or dance tune—"Que Sera Sera" or a tarantella—is a reliable way to get the audience involved. Musical participatory forms are successful because they rely on careful cueing and formulaic behavior: We sing along with the chorus and remain silent for the verse; we answer the singer's "call" with the appropriate response. And we do these things in unison as a single voice. In a square dance we perform whatever steps the caller announces because the repertoire of possible movements and the rules of combination are known to both parties before the music starts, and though everyone does not have to do exactly the same thing at the same time, all the square dancers do have to be part of a single overall pattern. Folk dancing in ballroom style offers a model of freer participation. In the Cajun two-step or the Brazilian samba, for instance, all the dancers share a repertoire of movements, and each set of partners has license to invent its own combinations and interpretations of these movements. Like jazz musicians, the dancers can improvise their own satisfying creations from these given elements. But the greater individual freedom in ballroom-style folk dancing means that the group as a whole has less coherence than at a square dance.

Electronic environments have similar formulas and rules for structuring participation. For instance, when users are merely asked to respond to a menu with a predictable begin/quit choice, they are performing a kind of response to the "call" of the machine. When we learn a complicated program, like a word processor, and run through

its familiar steps in order to do a difficult job, we are like participants in a square dance, repeating formulaic sequences, with the relevant manual page acting as caller of the dance. When we are placed within a simulation environment and allowed to experiment with changing a set of parameters as we see fit (more nitrogen, less algae), we are acting more like the leading partner in a Cajun dance. The crucial difference, however, between folk art rituals and computer-based interactions is that on the computer we encounter a world that is dynamically altered by our participation. On the ballroom dance floor, we can at most influence our partner, but the musicians and the rest of the dancers remain relatively unaffected. Within the world of the computer, however, when the right file opens, when our spreadsheet formulas function correctly, or when the simulated frogs flourish in the model pond, it can feel as if the entire dance hall is at our command. When things are going right on the computer, we can be both the dancer and the caller of the dance. This is the feeling of agency.

Because of the vague and pervasive use of the term *interactivity*, the pleasure of agency in electronic environments is often confused with the mere ability to move a joystick or click on a mouse. But activity alone is not agency. For instance, in a tabletop game of chance, players may be kept very busy spinning dials, moving game pieces, and exchanging money, but they may not have any true agency. The players' actions have effect, but the actions are not chosen and the effects are not related to the players' intentions. Although gamemakers sometimes mistakenly focus on the number of interactions per minute, this number is a poor indicator of the pleasure of agency afforded by a game. Some games, like chess, can have relatively few or infrequent actions but a high degree of agency, since the actions are highly autonomous, selected from a large range of possible choices, and wholly determine the course of the game.

Agency, then, goes beyond both participation and activity. As an aesthetic pleasure, as an experience to be savored for its own sake, it is offered to a limited degree in traditional art forms but is more com-

monly available in the structured activities we call games. Therefore, when we move narrative to the computer, we move it to a realm already shaped by the structures of games. Can we imagine a compelling narrative literature that builds on these game structures without being diminished by them? Or are we merely talking about an expensive way to rewrite *Hamlet* for the pinball machine?

The Pleasures of Navigation

One form of agency not dependent on game structure yet characteristic of digital environments is spatial navigation. The ability to move through virtual landscapes can be pleasurable in itself, independent of the content of the spaces. A friend of mine whose son is an avid *Nintendo* player complains that when he tries out the games he is annoyed at having to be fighting all the time, since the combat is an unwelcome distraction from the pleasure of moving around the unfolding spaces of the maze. For my friend, videogames are about exploring an infinitely expandable space. Similarly, new explorers of the World Wide Web find themselves entranced with the ability to leap around the world, following links from one home page or Web site to the next mostly for the pleasure of the repeated arrivals. The navigational pleasures are richly exploited by the many forms of labyrinths, from Zork-like dungeons to informational webs, that fill cyberspace. All of them allow us to experience pleasures specific to intentional navigation: orienting ourselves by landmarks, mapping a space mentally to match our experience, and admiring the juxtapositions and changes in perspective that derive from moving through an intricate environment.

This participatory pleasure is not unlike the enjoyment people find in the organized sport of "orienteering," where players follow a series of geographical clues across a large and complex terrain, such as a portion of the Maine woods or downtown Boston. Construing space and moving through it in an exploratory way (when done for its own sake and not in order to find the dentist's office or the right airport

gate) is a satisfying activity regardless of whether the space is real or virtual. Electronic environments offer the pleasure of orienteering in two very different configurations, each of which carries its own narrative power: the solvable maze and the tangled rhizome.

The Story in the Maze

Zork-like puzzle dungeons and maze-based combat videogames derive from a heroic narrative of adventure whose roots are in antiquity. It was Daedalus who built King Minos of Crete a labyrinth to contain the deadly Minotaur. The horrible beast required the yearly sacrifice of Athenian youths and maidens, whom it devoured, until the hero Theseus arrived to slay it. In the story, Ariadne, the daughter of the king, fell in love with Theseus and gave him a sword to kill the beast and a thread to find his way out again. Minos's maze was therefore a frightening place, full of danger and bafflement, but successful navigation of it led to great rewards.

The adventure maze embodies a classic fairy-tale narrative of danger and salvation. Its lasting appeal as both a story and a game pattern derives from the melding of a cognitive problem (finding the path) with an emotionally symbolic pattern (facing what is frightening and unknown). The maze story celebrates the combination of intelligence and courage, and it depicts romantic love as the element that provides the hope that brings the hero into the confrontation and back out again to safety. Like all fairy tales, the maze adventure is a story about survival. The maze is a road map for telling this story.

As a format for electronic narrative, the maze is a more active version of the immersive visit (as described in chapter 4). Maze-based stories take away the moving platform and turn the passively observant visitor into a protagonist who must find his or her own way through the fun house. A typical maze-based puzzle game sends you, the player, through a multitiered space vaguely resembling an *Arabian Nights* palace. You operate an avatar who walks through the palace rooms, whose tiled floors and ornately decorated corners often hide

treasures that are tricky to perceive. The palace is full of informants, who speak in text bubbles and whom you reply to from menus, and you must negotiate with them carefully, offering them icons representing money or other valuables. A mysterious peddler on one of the lower levels holds a talisman needed to get into the highest chamber. You must have it with you while you stand on a special spot that is hidden in the patterning of the floor. If you forget to get it, you must retrace your steps through many perils. The game is like a treasure hunt in which a chain of discoveries acts as a kind of Ariadne's thread to lead you through the maze to the treasure at the center.

This kind of narrative structure need not be limited to such simplistic content or to an explicitly mazelike interface. In the right hands a maze story could be a melodramatic adventure with complex social subtexts. For instance, instead of a fairy tale palace it could be set in a Kafkaesque city where the secret police are rounding up and deporting citizens with the wrong kind of papers. The protagonist's role would be to save them, a task that would require navigation through the corridors of power and through underground hiding places, elaborately conducted negotiations, clever manipulation of bureaucrats, and split-second timing. The characters in the menacing world could be subtly portrayed, in either graphics with text bubbles or in video segments. Saving people might involve horrifying choices, perhaps implicating the protagonist in the corruption of the violent world. The maze could be composed not only of spatial twists but of moral and psychological choices. Just as it is hard to see where a tangle of virtual corridors is leading, so too would it be hard to foresee the consequences of your actions and to determine what to value and whom to trust. Just as Kafka used the conventions of the fable to convey the profound depersonalization of modern life and Art Spiegelman used the format of the comic book to tell the story of his father's Holocaust experiences, a digital artist might use the structure of the adventure maze to embody a moral individual's confrontation with state-sanctioned violence.

Whether an adventure maze is simple or complex, it is particularly

suited to the digital environment because the story is tied to the navigation of space. As I move forward, I feel a sense of powerfulness, of significant action, that is tied to my pleasure in the unfolding story. In an adventure game this pleasure also feels like winning. But in a narrative experience not structured as a win–lose contest the movement forward has the feeling of enacting a meaningful experience both consciously chosen and surprising. However, there is a drawback to the maze orientation: it moves the interactor toward a single solution, toward finding the one way out. The desire for agency in digital environments makes us impatient when our options are so limited. We want an open road with wide latitude to explore and more than one way to get somewhere. We want the "pullulating" web that Borges described, constantly bifurcating, with every branch deeply explorable.

Rapture of the Rhizome

The second kind of digital labyrinth, which has arisen from the academic literary community, is the postmodern hypertext narrative described in chapter 2. Full of wordplay and indeterminate events, these labyrinths derive not from Greek rationalism but from poststructuralist literary theory and are unheroic and solutionless. Like a set of index cards that have been scattered on the floor and then connected with multiple segments of tangled twine, they offer no end point and no way out. Their aesthetic vision is often identified with philosopher Gilles Deleuze's "rhizome," a tuber root system in which any point may be connected to any other point.[1] Deleuze used the rhizome root system as a model of connectivity in systems of ideas; critics have applied this notion to allusive text systems that are not linear like a book but boundaryless and without closure. Stuart Moulthrop, a theorist and electronic fiction writer, states it this way:

> Seen from the viewpoint of textual theory, hypertext systems appear as the practical implementation of a conceptual movement that . . . rejects authoritarian, "logocentric" [i.e., truth-affirming] hierarchies of language, whose modes of operation are linear and deductive, and seeks instead systems of discourse that admit a plurality of meanings where the operative modes are hypothesis and interpretive play.[2]

The postmodern hypertext tradition celebrates the indeterminate text as a liberation from the tyranny of the author and an affirmation of the reader's freedom of interpretation. But the navigational software designed specifically for this purpose and celebrated by many proponents of literary hypertext is anything but empowering to the reader, even in comparison to the earliest Web browsers.[3] For instance, it offers the navigating reader no way to mark links as having been already taken, and no way to mark a lexia so it can be easily jumped back to. Many of the stories written in this framework do not even mark which words are hot links within the lexia text. Instead, the reader has to click on a pop-up display of cryptic link names. Moulthrop's own *Victory Garden*, which is perhaps the most coherently structured literary hypertext, contains a clever overview map of the major story clusters, which are arranged like a Borgesian garden labyrinth. But readers cannot easily return to the overview in order to get a sense of where they are or how much is left to read. In trying to create texts that do not "privilege" any one order of reading or interpretive framework, the postmodernists are privileging confusion itself. The indeterminate structure of these hypertexts frustrates our desire for narrational agency, for using the act of navigation to unfold a story that flows from our own meaningful choices.

But the unsolvable maze does hold promise as an expressive structure. Walking through a rhizome one enacts a story of wandering, of being enticed in conflicting directions, of remaining always open to surprise, of feeling helpless to orient oneself or to find an exit, but the story is also oddly reassuring. In the rhizome, one is constantly threatened but also continuously enclosed. The fact that the plot will not resolve means that no irreparable loss will be suffered. The narrator of *Afternoon* (discussed in chapter 2) will not have to confront the

fact of the morning's fatal accident so long as the afternoon's evasive wanderings continue, and the reader of *Victory Garden* does not have to accept the death of an appealing character so long as there are multiple paths to explore, including some that lead to alternate realities in which she comes back home from the war. In both stories the reader is protected from feeling the irreversibility of death by the fact that the stories do not have to end there.

The boundlessness of the rhizome experience is crucial to its comforting side. In this it is as much of a game as the adventure maze. In fact, it reminds me of a particular game my son William invented at about age five. At his own initiative he one day drew a large game board, assembled dice and playing pieces, and invited his father to join him in an inventively improvised game with ever-changing and ever more elaborate rules. After two hours of this surreal activity, my husband became restless and began asking every five minutes or so if the game was almost over. William responded by calmly walking into the kitchen, where I was sitting, and asking me to write his father the following note:

DEAR DAD—THIS GAME WILL NEVER END. WILLIAM

The rhizome has the same message. As we navigate its tangled, anxiety-laden paths, enclosed within its shape-fitting borders, we are both the exasperated parent longing for closure and separation and the enthralled child, lingering forever in an unfolding process that is deeply comforting because it can never end.

Giving Shape to Anxiety

Both the overdetermined form of the single-path maze adventure and the underdetermined form of rhizome fiction work against the interactor's pleasure in navigation. The potential of the labyrinth as a participatory narrative form would seem to lie somewhere between the two, in stories that are goal driven enough to guide navigation

but open-ended enough to allow free exploration and that display a satisfying dramatic structure no matter how the interactor chooses to traverse the space.

The key to creating an expressive fictional labyrinth is arousing and regulating the anxiety intrinsic to the form by harnessing it to the act of navigation. Suspense, fear of abandonment, fear of lurking attackers, and fear of loss of self in the undifferentiated mass are part of the emotional landscape of the shimmering web. Moving through the space can therefore feel like an enactment of courage and perseverance, like Gary Cooper's striding through the town in *High Noon*. Computer gamers often experience shivers of physical fear as they approach an unopened door in a text-based or graphics-based labyrinth. The drama of suspenseful approach does not have to be tied to combat or to jack-in-the-box effects. It can also have the feeling of a determination to face the truth, to stare directly at the threatening beast. It can be experienced by the navigating reader/viewer as well as by the player/protagonist.

One such use of the labyrinth as a means of evoking and controlling terror is a story format increasingly used by my fiction students, a story I have come to call the "violence hub." Writers will place an account of a violent incident, often a real or invented newspaper article, at the center of a web of narratives that explore it from multiple points of view. A helicopter accident near MIT, a robbery in a convenience store, a canoeing fatality—these are all examples of an act of sudden violence that have served as the center of such a story web. The incident account itself is usually bare but evocative. People have died in violent and surprising circumstances, we are told. The incident happened at a particular place and time involving a particular group of people. The names in the account or in a diagram of the site of the accident lead outward with hot links to the satellite files that tell us how the incident appeared to the various people involved—the perpetrator, the witnesses, the rescuers, the victims, the survivors.

The proliferation of interconnected files is an attempt to answer the perennial and ultimately unanswerable question of why this

incident happened. For instance, one convenience store robbery labyrinth follows the robber, the clerk, the owner, and the cop (who shoots the robber) back through the events leading up to the shoot-out and forward again into the moment of violence.[4] Reading it we feel sympathy with all of them, and we see how they appeared to one another. A web story of a teenager who drowned on a white-water canoeing trip describes the traumatic experience from the points of view of the friends he was traveling with, the operators of the canoeing company, the emergency medics, and the family members receiving the dreadful phone call. These violence-hub stories do not have a single solution like the adventure maze or a refusal of resolution like the postmodern stories; instead, they combine a clear sense of story structure with a multiplicity of meaningful plots. The navigation of the labyrinth is like pacing the floor; a physical manifestation of the effort to come to terms with the trauma, it represents the mind's repeated efforts to keep returning to a shocking event in an effort to absorb it and, finally, get past it. The retracing of the situation from different perspectives leads to a continual deepening in the reader's understanding of what has happened, a deepening that can bring a sense of resolution but one that allows for the complexity of the situation and that leaves the moment of shock unchanged and still central.

A linear story, no matter how complex, moves toward a single encompassing version of a complex human event. Even those multiform stories that offer multiple retellings of the same event often resolve into a single "true" version—the viewpoint of the uninvolved eyewitness or the actual reality the protagonists wind up in after the alternate realities have collapsed. A linear story has to end in some one place: the last shot of a movie is never a split screen. But a multithreaded story can offer many voices at once without giving any one of them the last word. This is a reassuring format for encountering a traumatic event because it allows plenty of room for conflicting emotions. It lets us disperse complex, intense reactions into many derivative streams so that we do not have to feel the full flood of sorrow all at once. The multithreaded web story achieves coherent dramatic form by shaping our terror into a pattern of exploration and discovery.

The Journey Story and the Pleasure of Problem Solving

The navigational space of the computer also makes it particularly suitable for journey stories, which are related to mazes but offer additional opportunities for exercising agency. Journey stories date back to oral storytelling, from the fairy-tale convention of setting out from home to find one's fortune to the voyages of Odysseus and Sinbad. It is a universal archetype recognizable across all the variations of culture, author, and medium. After the invention of the printing press, the journey story was reinvented as the picaresque novel, exemplified by *Don Quixote*, *Moll Flanders*, *Tom Jones*, *Huckleberry Finn*, and *Catcher in the Rye*. With the invention of the movie camera, the journey story was again revived, and its variations include everything from the comic (e.g., Buster Keaton's *The General*) to the cowboy melodrama (e.g., *Stagecoach*, *The Searchers*) and the feminist buddy film (*Thelma and Louise*). When television came along, journey stories (*Wagon Train*, *Route 66*, *The Fugitive*, and, of course, *Star Trek*) were among the most successful series.

Moving the journey story from the fairy tale to the novel meant moving it from a symbolic realm of universal actors (a king, a wicked stepmother) to a particularized social world and a particular time and place. In the novel the cruel things that happen to the hero are often treated as instances of a specific social injustice, like the English Poor Laws, rather than as the work of a generic antagonist like a big bad wolf. Moving the journey to the movies opened up the visual dimension of the archetype. Journey films often emphasize exotic landscapes, foreign cultures, and the lure of open spaces. Since television is best at portraying interior dramas and family-size social units,[5] journey stories on TV generally focus on a succession of small communities or even replace the hero and sidekick with an entire traveling

community, as on *Star Trek*. On the computer the journey story emphasizes navigation—the transitions between different places, the arrivals and departures—and the how-to's of the hero's repeated escapes from danger.

One of the consistent pleasures of the journey story in every time and every medium is the unfolding of solutions to seemingly impossible situations. We watch each new situation along the road and wonder how the hero will escape a beating or a hanging or a forced marriage or jailing. When Odysseus foolishly allows himself to be captured by the Cyclops, a huge, one-eyed man-eater, he is presented with a life-and-death riddle. The situation is carefully described so that it seems that he has no chance of getting out. The Cyclops is a brutal and heartless creature who brags that he is unafraid of Zeus and therefore free to do what he pleases. Every night two more of Odysseus's men are eaten; the survivors know they must get out soon or die. They could kill the monster as he sleeps, but the cave is barred with a stone too heavy for them to move; if they kill him, they will never get out again. The Cyclops's routine is unvaried: he goes off with the sheep in the morning, closing the cave behind him, and comes back at night with the sheep, ready for a dinner of Greek sailors. Then Odysseus (who is narrating the story) tells us how he solves the problem. He prepares some wine. He prepares a battering ram and gathers a group of strong helpers. He tells the giant his name is "Nobody" and gets him very drunk. When the Cyclops falls asleep, Odysseus and his men heat the battering ram in the fire and thrust it into his one terrible eye. Now the giant is blinded, but how will the Greeks get out? While the Cyclops is raging, Odysseus separates the sheep into groups of three and places each of his men under the middle sheep and himself beneath the strongest ram in the flock. Finally, the Cyclops lets out his sheep, as Odysseus has seen him do every morning, and out go all the Greeks with them. And when the wounded Cyclops cries out for help from his neighbors, whom does he say is tormenting him? "Nobody." Odysseus's description is constructed so that we can enjoy each individual step and gain increasing

pleasure as the overall plan becomes clear. The story is as much a riddle as Oedipus's, but the answer to the riddle is not in a single word; it is in a series of beautifully orchestrated steps, an elegant algorithm for defeating giants.

Computer-based journey stories offer a new way of savoring exactly this pleasure, a pleasure that is intensified by uniting the problem solving with the active process of navigation. On the computer the dramatic situation of capture and escape can be simulated by keeping the player within a confined space until the solution to a puzzle is found. These puzzles are most satisfying when the actions have a dramatic appropriateness, when they serve as a way of increasing our belief in the solidity and consistency of the illusory world. For instance, in *Myst* the wizard's island includes an elevator hidden in a giant tree and operated by a nearby control panel. In addition to solving the puzzle of the panel, the interactor must move efficiently through the space to get to the elevator at just the right moment in its descent. The concreteness with which the space is detailed makes the sequence feel not like a test of coordination but like a dramatic moment. By contrast, in the computer game *The Seventh Guest*, the player is asked to cut up a cake into enough segments to match the number of murder victims. The puzzle is a satisfying one, but since there is no one there to eat the cake, the action takes us outside the immersive world instead of reinforcing our belief in it.

The most dramatically satisfying puzzles are those that encourage the interactor to apply real-world thinking to the virtual world. For instance, a computationally sophisticated MIT student who is also an expert gamer instanced a particular dramatic moment from the text-based *Zork II* as among his lifetime favorites: The story involves a dragon that is slow to rouse but always lethal if you persist in fighting him. Elsewhere in the dungeon is a wall of ice that is impossible to pass. What you must do is attack the dragon enough to get his attention—but not so much that he "toasts" you—and then run and head for the wall of ice. The dragon follows, sees his reflection in the ice, and thinks it is another dragon. He rears up and breathes fire at his

enemy; as he does so, the ice melts, drowning the dragon and eliminating the obstructing wall.[6] Like Odysseus in the Cyclops's cave, the player escapes by outsmarting a ferocious monster using only the materials at hand.

Games into Stories

Games seem on the face of it to be very different from stories and to offer opposing satisfactions. Stories do not require us to do anything except to pay attention as they are told.[7] Games always involve some kind of activity and are often focused on the mastery of skills, whether the skill involves chess strategy or joystick twitching. Games generally use language only instrumentally ("checkmate," "ball four") rather than to convey subtleties of description or to communicate complex emotions. They offer a schematized and purposely reductive vision of the world. Most of all, games are goal directed and structured around turn taking and keeping score. All of this would seem to have nothing to do with stories.

In fact, narrative satisfaction can be directly opposed to game satisfaction, as the endings of *Myst*, widely hailed as the most artistically successful story puzzle of the early 1990s, make clear. The premise of the *Myst* story is the confinement of two brothers, Sirrus and Achenar, in magical books that serve as a dungeon. Through a video window we can see them in their imprisonment and hear them talking to us in short, staticky segments. Each one warns us about the wickedness of the other and asks us to rescue him. The brothers can only be freed by heroic labors of problem solving by the player, who must journey to four magical lands or ages and bring back a single page from each of them for either Sirrus or Achenar. Each time the player gives one of the brothers a magic page, he responds with a slightly clearer video segment. At the end of the game, when most of the puzzles have been solved, the player has most likely gone to each land twice in order to gather both sets of pages and to hear all of the messages from both brothers. At this point we are faced with a dramatic choice. The last magic page will release one or the other of them from the book. Which is it to be?

The game is well designed in that all the evidence on which to base a decision is, as in any good detective story, available to the player. Exploring the various lands reveals—through accusatory notes, hidden corpses, imperial furnishings, desolated landscapes, and multiple instruments of torture and destruction—the villainy of both brothers. The secret of the game is that although both brothers are evil, their father, Atrus, is alive and—with some more puzzle solving—can be found and rescued. The "winning" ending involves locating the good wizard Atrus and remembering to bring with you the magical item that will free him from captivity. This is a satisfyingly fair yet challenging mystery plot.

Yet surprisingly, the "losing" endings of the game are much more satisfying than the winning ending. In the winning ending one finds a beautifully rendered but dramatically inert video cutout of Atrus superimposed on a backdrop of a very shallow fantasyland. Unlike all the other lands visited during the game, this one is not really explorable and offers no pleasures of manipulation. It is a dead end. The ending in which you get to the wizard but forget to bring him the means of escape is more dramatic, because he gets quite angry at you. But the most dramatically satisfying endings are the near-identical losing branches, which are the result of choosing to rescue either of the evil brothers. The moment you release either Achenar or Sirrus from imprisonment, he will mockingly turn on you and lock *you* in the very same dungeon from which he has escaped! The visual effect is simple but brilliantly effective because it reverses your perspective. Throughout the game you have peered into each brother's dungeon through a static-ridden, credit-card-size window embedded with the parchment page of an enchanted book. The brothers' immobility has been marked by the fact that you could see little more than their faces. Now you are looking out through a similarly staticky window set into a totally black screen. Through the window you can see the evil brother now exultantly standing and moving around while look-

ing down at you, just as you had looked down at him. A game that marked a breakthrough in ease of navigation appropriately ends by immobilizing the player.

The superiority of the losing endings of *Myst* suggest a basic opposition between game form and narrative form. How can we tell significant stories in a form that always has to end happily? How can we impose endings that yield complex story satisfactions on a form that is based on win/lose simplicity? Many would argue that computer-based narrative will always be gamelike and that such dissatisfactions are therefore inevitable. But when looked at more closely, games and stories are not necessarily opposed.

Games as Symbolic Dramas

A game is a kind of abstract storytelling that resembles the world of common experience but compresses it in order to heighten interest.[8] Every game, electronic or otherwise, can be experienced as a symbolic drama. Whatever the content of the game itself, whatever our role within it, we are always the protagonists of the symbolic action, whose plot runs like one of the following:

- I encounter a confusing world and figure it out.
- I encounter a world in pieces and assemble it into a coherent whole.
- I take a risk and am rewarded for my courage.
- I encounter a difficult antagonist and triumph over him.
- I encounter a challenging test of skill or strategy and succeed at it.
- I start off with very little of a valuable commodity and end up with a lot of it (or I start off with a great deal of a burdensome commodity and get rid of all of it).
- I am challenged by a world of constant unpredictable emergencies, and I survive it.

Even in games in which we are at the mercy of the dice, we are still enacting a meaningful drama. Playing purely luck-based games is captivating because we are modeling our basic helplessness in the universe, our dependence on unpredictable factors, and also our sense of hopefulness. The people who line up at my neighborhood convenience store for lottery tickets can be seen either as dupes or as risk takers engaging in a playful ritual of faith in the benevolence of forces beyond their control. In fact, even when we lose, we are still part of the symbolic drama of the game. In that case the plots might go like this:

- I fail at an important test and suffer defeat.
- I decide to try again and again until I finally succeed.
- I decide to win by cheating, that is, by acting outside the rules, because authority is meant to be flouted.
- I realize that the world is rigged against me and others like me.

In games, therefore, we have a chance to enact our most basic relationship to the world—our desire to prevail over adversity, to survive our inevitable defeats, to shape our environment, to master complexity, and to make our lives fit together like the pieces of a jigsaw puzzle. Each move in a game is like a plot event in one of these simple but compelling stories. Like the religious ceremonies of passage by which we mark birth, coming of age, marriage, and death, games are ritual actions allowing us to symbolically enact the patterns that give meaning to our lives.

Games can also be read as texts that offer interpretations of experience. For instance, the board game Monopoly can be read as an interpretation of capitalism, an enactment of the allures and disappointments of a zero-sum economy in which one gets rich by impoverishing one's neighbors. Or it can be read as a patterned expression of our knowledge that success in life is always the result of both planning and chance. When we play Monopoly, we are taking part in a structured drama that offers, in addition to its win/lose ending, moments in which we give expression to our ambition, greed, and benevolence and our tendencies to take risks and exploit others. Even a game with no verbal content, like Tetris, the wildly popular and powerfully ab-

sorbing computer game of the early 1990s, has clear dramatic content. In Tetris irregularly shaped objects keep falling from the top of the screen and accumulating at the bottom. The player's goal is to guide each individual piece as it falls and position it so that it will fit together with other pieces and form a uniform row. Every time a complete row forms, it disappears. Instead of keeping what you build, as you would in a conventional jigsaw puzzle, in Tetris everything you bring to a shapely completion is swept away from you. Success means just being able to keep up with the flow. This game is a perfect enactment of the overtasked lives of Americans in the 1990s—of the constant bombardment of tasks that demand our attention and that we must somehow fit into our overcrowded schedules and clear off our desks in order to make room for the next onslaught.[9]

If the same spatial ideas behind the movement of the colored shapes in Tetris—relentless activity, misfits and tight couplings, order and chaos, crowding and clearing—are represented in a dance, we automatically associate them with ordinary human experience, because we see human beings enacting them. In the computer game the interactor is the dancer and the game designer is the choreographer. The screen objects are like a symbolic language for inducing our activity. So while we experience the game as being about skill acquisition, we are drawn to it by the implicit expressive content of the dance. Tetris allows us to symbolically experience agency over our lives. It is a kind of rain dance for the postmodern psyche, meant to allow us to enact control over things outside our power.

Games are recreational because they offer no immediate benefit to our survival. Yet game-playing skills have always been adaptive behaviors. Games traditionally offer safe practice in areas that do have practical value; they are rehearsals for life. Lion cubs roughhouse with one another in order to grow to be predators. Small children still play hide-and-seek, a good way of training hunters, and ring-around-a-rosy, a good way of practicing cooperation and coordinated behaviors. Older children in our society are understandably drawn to pitting themselves against machines. The violence and simplistic

story structure of computer skill games are therefore a good place to examine the possibilities for building upon the intrinsic symbolic content of gaming to make more expressive narrative forms.

The Contest Story

The most common form of game—the agon, or contest between opponents—is also the earliest form of narrative. This is not surprising since opposition is one of the most pervasive organizing principles of human intelligence and language.[10] Just as we automatically organize the temporal and spatial world into opposing characteristics (night/day, up/down, right/left), so too do we look at the things that happen in the world in terms of struggles between opposites (God/Satan, male/female, Cain/Abel, Jews/Gentiles). The Greek word *agon* refers to both athletic contests and to dramatic conflicts, reflecting the common origin of games and theater. A simple shoot-'em-up videogame, then, belongs to the extremely broad dramatic tradition that gives us both the boxing match and the Elizabethan revenge play.

Most of the stories currently told on the computer are based on the structure of a contest of skill. The interactor is given the role of a fighter or detective of some sort and is pitted against an opponent in a win/lose situation. From their beginnings in the 1970s, computer games have developed multiple representations of the opponent, who may be another human player (as in the first videogame, *Pong*), a character embedded in the story (as in *Pacman*), and the programmer or game designer implicit in the game (as in *Zork*). Contest games have also developed at least three different ways of situating the player: we can watch from a spectator perspective while operating our own avatar character or spaceship (as in *Mortal Kombat*); watch from a situated perspective while operating a character (as in *Rebel Assault*, where we see the vehicle we are operating as if we are following just behind it with a movie camera); or, most immersively, watch and act from a situated first-person viewpoint, as in *Doom*,

where we see the landscape of the game and our opponents coming toward us as if we are really present in space. These gaming conventions orient the interactor and make the action coherent. They are equivalent to a novelist's care with point of view or a director's attention to staging.

Fighting games have also developed a sure-fire way of combining agency with immersion. The most compelling aspect of the fighting game is the tight visceral match between the game controller and the screen action. A palpable click on the mouse or joystick results in an explosion. It requires very little imaginative effort to enter such a world because the sense of agency is so direct. The imaginative engagement is even stronger with an arcade-style interface that lets you sit in a brightly painted model of a spaceship or fire a toy gun. My own surprising immersion in the *Mad Dog McCree* arcade game (discussed in chapter 2) depended heavily on the heft and six-shooter shape of the laser gun controller and on the way it was placed in a hip-height holster ready for quick-draw contests. As soon as I picked up that gun, I was transported back to my childhood and to the world of TV Westerns. When my son brought home the videogame version, based on a multibutton controller, I could not get interested in the game at all (although he liked it better that way, since it was the skill mastery that interested him rather than the story). For me, the six-shooter was an ideal threshold object, a physical device I could hold in my hand that was also an imaginary device in the world of the story. I only had to put my hands around it to enter the immersive trance. Ideally, every object in a digital narrative, no matter how sophisticated the story, should offer the interactor as clear a sense of agency and as direct a connection to the immersive world as I felt in the arcade holding a six-shooter-shaped laser gun and blasting away at the outlaws in *Mad Dog McCree*.

Because guns and weaponlike interfaces offer such easy immersion and such a direct sense of agency and because violent aggression is so strong a part of human nature, shoot-'em-ups are here to stay. But that does not mean that simplistic violence is the limit of the form.

Though violent games have dominated computer entertainment sales, there are some signs of a more complex approach. In many fighting games, like *Mortal Kombat,* the player can switch sides and play through the same confrontation from opposing positions. The *Star Wars* series of computer games offers a particularly dramatic change in player position. Most of the games, like the popular *Rebel Assault* CD-ROMs, put the player in the position of a fighter in the forces led by the heroes, Luke Skywalker, Han Solo, and Princess Leia, but the *Tie Fighter* game casts the player as a member of the Empire forces. As one adult player, a pony-tailed programmer from San Francisco, told me, this recruitment into the forces of the Empire can be a source of intense fascination. "I got totally identified with the Empire and its goals of maintaining order. I found myself hating the rebels because they brought disorder. It really freaked me out. I could see right away how I could become a great fascist." Of course, it is possible to play the game purely for the thrill of flying the Empire's planes, but the moral impact of enacting an opposing role is a promising sign of the serious dramatic potential of the fighting game.

The success of the fighting contest games poses a challenge to the next generation of digital artists. The contest format is open to expressive expansion in many ways once we move the protagonist beyond the role of a simple fighting machine. We need to find substitutes for shooting off a gun that will offer the same immediacy of effect but allow for more complex and engaging story content. We need to find ways of drawing a player so deeply into the situated point of view of a character that a change of position will raise important moral questions. We need to take advantage of the symbolic drama of the contest format to create suspense and dramatic tension without focusing the interactor on skill mastery.

Constructivism

An MIT freshman recently confided to me that he was spending a lot of time on a MUD even though he was bored with the dragon slaying

that formed its main focus of activity. He continued to log on because he had figured out a way to hold parties there. He no longer used the commands for moving around and for killing, carrying, and eating beasts to build up his score as a player. Instead, he had organized other members of the MUD to use these same commands to gather provisions and bring them to a common place at a prearranged time. Dragon slaying had become an electronic form of catering.

The student's ingenuity is typical of the MUD culture. He was taking the materials at hand and repurposing them for his own uses. The notion of reassembling a fixed set of materials into new expressive form was inherent in the original *Zork*, the ancestor of the MUDs, which provided the interactor with a large vocabulary of commands and a rich array of objects that could be combined in multiple ways. MUDs began as collective games of *Zork* (hence their original name, Multi-User Dungeons). But for many people, like my student, the pleasure of sharing a virtual space in which they could chat with one another over the Internet was greater than the pleasure of the game. In the late 1980s, James Aspnes, then a graduate student at Carnegie Mellon University, created a new kind of MUD that emphasized typed conversation among the interactors and offered participants access to the programming language itself.[11] Instead of playing to increase their score, MUDders now indulged in more intense role-playing. And with the increase in immersive involvement came a desire to construct their own virtual worlds.

Since objects in a text-based MUD are made out of programming code and words, there is no limit to what can be called into being within the virtual world. An expert MUDder might have his own private castle, with hidden pathways and working drawbridges; he could recruit other people to come live in it and swear fealty to him, or he could amuse "newbie" visitors with puzzle rooms or frighten them off with ferocious trolls. Even a very uncertain programmer can create objects with personal resonance, like a Chinese dancing fan that only looks graceful in the hands of its creator. Most of all, the power to create objects procedurally (by specifying not just their appearance

but their behavior) has led to an outpouring of whimsy and practical jokes: a plate of spaghetti "squirms uneasily" whenever someone says they are hungry; a bucket of water falls on people who try to enter a player's room; magic spells turn fellow players into frogs or make them invisible to one another. MUDders relish one another's ingenuity in stretching the representational powers of the environment. This constructivist pleasure is the highest form of narrative agency the medium allows, the ability to build things that display autonomous behavior.[12]

The goal of the MUDders seems to be to be able to represent every activity from real life and fantasy fiction within the virtual world. Not everyone would enjoy the fantasy content of MUDs or the role-playing activities they support, but the changing emphasis of MUDs suggests a general trend in the exercise of agency in digital environments. The current constructivist MUD culture was built by an academic community that has enjoyed twenty years of consistent access to computers. It may well be a predictor of future trends in the larger population, which is just starting to come on-line. As computer access spreads, it is likely that more and more people will turn from win/lose game playing to the collective construction of elaborate alternate worlds.[13]

Virtual reality researcher Brenda Laurel has argued that VR environments should be reserved for constructivist adult make-believe:

> If . . . the goal is to create a technologically mediated environment where people can *play*—as opposed to being entertained—then VR is the best game in town. When children play, they typically use their imaginations quite actively and constructively to invent action and assign meaning to materials (or make or find new ones) as the need arises. In VR as in children's play there is no sharp distinction between "authoring" and "experiencing." With [Laurel's VR environment] Placeholder, we learned that adults can play in the same way—when their imaginations are booted up by a rich virtual environment.[14]

But Placeholder is just a demonstration environment, and its interactors are very dependent on the suggestions of a goddess figure who proposes things for them to do and actively discourages all attempts at shooting games. We have a lot more to learn before we can reliably "boot up" the adult imagination enough to provide a completely constructivist digital environment.

One essential component of such an environment would be a repertoire of expressive gestures beyond the current staples of navigation and attack movements. The graphics-based environment of *Myst* offers a wonderful range of concrete actions made real by the textured graphics and the careful sound design. But it is a completely depopulated world. The Woggles world of greetings and imitative gestures (discussed in chapter 4) suggests that designers can use movement as a social language. The most expressive gesture I have yet experienced on the computer is petting my digital dog, Buttons, who lives on my home Macintosh screen and growls and pants appreciatively as I move a hand-shaped cursor over him by rolling the mouse. Certainly we could have stories in which we rock a baby's cradle or cover a sick person with a blanket or open a door to offer shelter to someone fleeing from a mob. It may be hard to picture such gestures in the game interfaces of today, which are often no more expressive than pushing buttons on a bank machine. But there is no reason why gestures could not be animated in a way that very closely matches the visual display with the interactor's movement and heightens the dramatic impact of the story.

Such constructivist stories will probably evolve out of the current MUD environment. The MUDs now offer a wide repertoire of commands, objects, and ritualized scenes. Soon they may feature 3-D landscapes and graphical avatars with typed-in dialogue appearing in bubbles over their heads. These developments could make it easier for a wider audience to participate in collective fantasy.

But collective fantasy can be fraught with problems. MUDders tend to fight with one another both in and out of character. They resent the power of the wizards and gods who can eavesdrop, reassign

treasure, and kill or revive players. They have difficulty settling disputes over when it is acceptable to kill another player or who is entitled to the treasure left on the virtual corpses of dead adventurers. Because of the improvised nature of MUDding, a lot of time is spent in negotiating appropriate behavior rather than in story making. MUDders often tell me how much they enjoy being in character and performing the routine actions of the parts they play (recruiting squires, negotiating treaties, casting spells), but they also complain that a good MUD story is hard to sustain. They miss the sense of drama they enjoy in the fantasy literature that inspired these on-line fantasy worlds.

Perhaps the most successful model for combining player agency with narrative coherence is a well-run LARP game. Live-action role-playing games are guided by a clear aesthetics that divides plot responsibility between the game master (GM) and the players. The GM is responsible for inventing an enticing world with many things to do in it, a world populated by clearly drawn characters and offering a good dramatic mix of challenges and surprises. In a successful game the players have a great deal of constructive freedom in improvising the story and multiple ways of accomplishing their goals. If a player wants his or her character to take an action that will change the plot tremendously (say, for example, that a player wants her character to poison her husband, who also happens to be the head of the rebel army), the GM cannot prevent the player from proceeding merely because the action was unforeseen. But if the GM were to introduce a sudden hurricane or a nonplayer character in the middle of an ongoing game in order to enhance the plot, this would be considered unfair. The rule of successful game mastering is to set the world in motion, or wind up the clock, and then step back and let the plot unfold at the will of the players. However, part of what keeps live-action games cooperative is the fact that people interact face-to-face and often have continuing relationships with one another beyond the events of a game session.

Computer-based role-playing stories aim for the same degree of

player freedom as the LARPs, but they often depend upon the ongoing intervention of the MUD "wizards" to avoid lapsing into plotless socializing or repetitive vignettes. There is a growing demand among MUDders for computer-based games that will maximize both dramatic structure and player freedom. Producing such systems will require the union of computer science expertise with participatory storytelling artistry. Perhaps the next Shakespeare of this world will be a great live-action role-playing GM who is also an expert computer scientist.

The Interactor as Author

One of the key questions that the practice of narrative agency evokes is, To what degree are we authors of the work we are experiencing? Some have argued (with either elation or horror) that an interactor in a digital story—not just the improvising MUDder, but even the navigating reader of a postmodern hypertext—is the author of the story. This is a misleading assertion. There is a distinction between playing a creative role within an authored environment and having authorship of the environment itself. Certainly interactors can create aspects of digital stories in all these formats, with the greatest degree of creative authorship being over those environments that reflect the least amount of prescripting. But interactors can only act within the possibilities that have been established by the writing and programming. They may build simulated cities, try out combat strategies, trace a unique path through a labyrinthine web, or even prevent a murder, but unless the imaginary world is nothing more than a costume trunk of empty avatars, all of the interactor's possible performances will have been called into being by the originating author.

Authorship in electronic media is procedural. Procedural authorship means writing the rules by which the texts appear as well as writing the texts themselves. It means writing the rules for the interactor's involvement, that is, the conditions under which things will happen in response to the participant's actions. It means establishing the properties of the objects and potential objects in the virtual world and the formulas for how they will relate to one another. The procedural author creates not just a set of scenes but a world of narrative possibilities.

In electronic narrative the procedural author is like a choreographer who supplies the rhythms, the context, and the set of steps that will be performed. The interactor, whether as navigator, protagonist, explorer, or builder, makes use of this repertoire of possible steps and rhythms to improvise a particular dance among the many, many possible dances the author has enabled. We could perhaps say that the interactor is the author of a particular performance within an electronic story system, or the architect of a particular part of the virtual world, but we must distinguish this derivative authorship from the originating authorship of the system itself.

Interestingly enough, the question of authorship in formulaic media is one that students of ancient oral narrative have considered at length. In the 1930s, Greek scholars were distressed when literary analysis revealed that Homer (and other epic preliterate poets) created through a process that involved fitting stock phrases and formulaic narrative units together. Critics at that time resisted the thought that the great artist Homer was not original in the same way that modern print-based writers are expected to be. Now, with the advent of computer-based authorship, we are experiencing the opposite confusion. Contemporary critics are attributing authorship to interactors because they do not understand the procedural basis of electronic composition. The interactor is not the author of the digital narrative, although the interactor can experience one of the most exciting aspects of artistic creation—the thrill of exerting power over enticing and plastic materials. This is not authorship but agency.

Chapter 6

Transformation

The third characteristic pleasure of digital environments is the pleasure of transformation. Computers offer us countless ways of shape-shifting. Using "morphing" software, we can transform faces so seamlessly that a grinning teenage boy melts into a haggard old woman, as if under a magic spell. Putting on a virtual reality helmet, we earthbound interactors find ourselves transmuted into soaring crows. The computer captures processes, and it therefore is always suggesting processes to us even when it is just displaying information. Anything we see in digital format—words, numbers, images, moving pictures—becomes more plastic, more inviting of change.

The transformative power of the computer is particularly seductive in narrative environments. It makes us eager for masquerade, eager to pick up the joystick and become a cowboy or a space fighter, eager to log on to the MUD and become ElfGirl or BlackDagger. Because digital objects can have multiple instantiations, they call forth our delight in variety itself. The digital Barbie doll has fifteen hundred possible outfits. A fight in *Mortal Kombat* can be between any two of sixteen distinct opponents, with the interactor taking either side of any combat. MUDs compete with one another over the variety of roles they

support (elves, hobbits, Magi, thieves, enchanted animals, etc., each category having its own possible powers and abilities). In computer games we do not settle for one life, or even for one civilization; when things go wrong or when we just want a different version of the same experience, we go back for a replay.

As the medium matures, this same love of variation can be exploited for more subtle effects. Borges anticipated the pleasures of a multivariant world when he offered this glimpse of two parallel scenes in the labyrinthine novel imagined in "Forking Paths":

> In the first, an army marches into battle over a desolate mountain pass. The bleak and somber aspect of the rocky landscape made the soldiers feel that life itself was of little value, and so they won the battle easily. In the second, the same army passes through a palace where a banquet is in progress. The splendor of the feast remained a memory throughout the glorious battle, and so victory followed. (P. 98)

The juxtaposition of these two different experiences of the same winning battle reminds the reader that life itself is simultaneously desolate and splendid. By varying the texture of their experience in this way, Borges makes the doubly winning soldiers seem all the more vulnerable.

But such constant shape-shifting is also disconcerting. How can a writer tell a connected story in so fluid an environment? How will the interactor know when it begins and ends? Just as we need to define new narrative conventions for entering the immersive world and for exercising agency within it, so too do we need a new set of formal conventions for handling mutability. These conventions will arise as we get a clearer understanding of what kinds of pleasures we will seek from a literature of transformation.

Kaleidoscopic Narrative

One way to understand the new narrative environment is through the metaphor of the kaleidoscope. As Marshall McLuhan pointed

out, the communications media of the twentieth century are mosaic rather than linear in structure, as compared to the printed book. Newspapers are made up of many stories calling for our attention on a single page, films are mosaics of individual shots, and television is even more mosaic in the age of the remote control than it was when McLuhan wrote about it. These mosaic informational formats have created mosaic patterns of thought that we now take for granted. We are now used to viewing the front page of a newspaper without being overwhelmed, because we have learned to take in multiple kinds of information in one quick snapshot. Similarly, years of viewing films have allowed us to automatically assemble their discontinuous images into larger patterns of continuity. We can do this because we know how to read the conventions of these media. We are guided by headline size and story placement to find our way among the many different kinds of stories in the newspaper. We know how to construct continuous space in a film by matching an exterior shot with an interior shot, and we know that a change in lighting or focus signals a flashback or a subjective memory. Mosaic organization is valuable because it gives us the overview of the front page and the faster narrative pace of the movie. We also savor the juxtapositions that these mosaic forms make possible: the shots of the Mafia godfather at the baptism intercut with shots of the murders he has ordered, the liberal op-ed column side by side with the conservative op-ed column, the cheery 1950s sitcom one click of the remote away from the lurid 1990s talk show.

The computer presents us with the spatial mosaic of the newspaper page, the temporal mosaic of film, and the participatory mosaic of TV remote control. But even while it combines the confusing multiplicity of these mosaic media, the computer offers us new ways of mastering fragmentation. It gives us "search engines" and ways to "tag" the fragments so that we can find things that are related to one another. It can preserve the history of our particular path through a web so that we can retrace it. It can generate Web pages on the fly that display exactly the kinds of things we want we to see. It offers us

a multidimensional kaleidoscope with which to rearrange the fragments over and over again, and it allows us to shift back and forth between alternate patterns of mosaic organization.

This kaleidoscopic structure has many possibilities for narrative, but one of the most compelling is the ability to present simultaneous actions in multiple ways. In a novel, simultaneous actions are presented consecutively. Whether we are taken to opposing camps on a battlefield or into different minds around a dining table, the simultaneous events are often described in overlapping rather than in completely parallel time segments; the action of the story keeps moving forward as our point of view shifts. In a film or TV show, we can cut back and forth between several simultaneous events during a brief sequence (as in the baptism–murder sequence in *The Godfather*) or between two or three narrative threads over a longer time period (as in different patient crises in various parts of the hospital on *ER*), but the longer the segments, the more likely it is that the time of the story is advancing with each scene rather than being retraced in different locales. On the computer we can lay out all the simultaneous actions in one grid and then allow the interactor to navigate among them. We can have the expansiveness of the novel with the rapid intercutting of the film.

How do we do this without overwhelming the interactor? We will need a coherent set of conventions for signalling interactors when they can move from one simultaneous action to another and for helping them keep track of where and when the various actions are taking place. We can start by building upon the theatrical conventions of exits and entrances, but in a digital story the stage of the narrative may have multiple sets, that is, many separate places that are within the scope of the dramatic action. Whenever characters move among these sets, the reader/interactor should be able to follow them, in just the way a camera might follow an actor from room to room. The story line of such a multistage narrative will have to be structured in such a way that it arouses readers' curiosity, enticing them from one set to the next.

There have already been a few live theatrical presentations that have moved toward such a dramatic structure. One concrete model for such a story is the comical trilogy by Alan Ayckbourn, collectively called *The Norman Conquests,* which was originally performed in London and New York on three successive nights.[1] The trilogy revolves around three couples: Annie, an unmarried woman who is taking care of her cranky bedridden mother, and her overly shy suitor, Tom, a veterinarian; Ruth, Annie's businesslike sister, and her womanizing husband, Norman; and Reg, brother to Annie and Ruth, and his overcontrolling wife, Sarah. The farcical action takes place in Annie's house and involves Norman's flirtation with both Annie and Sarah while trying to placate his wife, Ruth; Tom's slow movement toward courtship with Annie; and everyone's quarrels with everyone else. This inventive romantic farce is made more intriguing by its unique spatial organization: all three plays cover the same time period and involve the same characters, but each one covers the events in a different part of the house (the dining room, the living room, or the garden). An exit in one play is an entrance in one of the others. The acts of the plays are carefully labeled with the date and time, and the action is exquisitely coordinated so that all three can be assembled (in the viewer's mind) into a single multistage dramatic presentation.

Even though each of the plays makes sense in itself, the actors' frequent exits and entrances arouse our curiosity about what has been going on in the other spaces. For example, the actors enter laughing or express horror at something that has happened in the next room. This is a dramatic structure that cries out for a navigating viewer, but it also suggests the difficulty of telling a story with simultaneous actions. Part of the charm of each play comes from not letting the viewer know things, from showing us effects before we see the causes. At breakfast in the dining room (Play No. 1), everyone is furious with Norman for something he has done the previous night in the living room (Play No. 2). If we had been permitted to follow the characters into the living room, the breakfast scene would lose some of its tension for us. Furthermore, there are times in each of the plays when a

character is alone in the space and has to do some bit of stage business to pass the time before the next actor's entrance. A little of that goes a long way. A digital playwright would have to be even more clever than the extremely clever Ayckbourn in order to arrange the dramatic action with such precision that it could sustain suspense over multiple pathways.

A narrative world with such extraordinary spatial depth and temporal continuity is more immersive, more reinforcing of our belief, than a conventional play. However, we will have to develop clear conventions for navigating it. Do we allow movement backward as well as forward in time? Do we allow movement across the same moment of time? Since these will be artistic choices dictated by the story material, there will not be a single answer, but every narrative will have to signal the reader very carefully about what is allowed in order not to raise inappropriate expectations.

The kaleidoscopic stories written by students in my interactive narrative course offer some interesting approaches to this question. In one the reader is placed in a restaurant, and the waiters serve as the means of moving the reader from one group of characters to another. Since no one goes out the door in the course of the story, the fictional world has clear boundaries and does not raise any expectations it cannot meet. In another story, the reader is on a bus that moves forward in screens of text that wipe from right to left across the screen. People get on and off the bus, and the reader can enter their thoughts (including their observations of one another), which form the action of the story. The story offers readers a chance to do something that most bus riders fantasize about: find out who that odd person across the aisle actually is. It enhances its readers' curiosity by not allowing any backward movement. They must follow the bus forward in time, but at each stop they can change their point of view if they wish. In order to find out the whole story, they have to take the trip again, making different choices.[2]

A third student story works like a multidimensional Robert Altman film, focusing on intersecting stories all happening in Manhattan

on the same day. A bus driver is having trouble with his eyes, a limo driver is picking up a movie star, a high school couple is going climbing, a young girl is going out with her young aunt. At the points where these stories converge—the bus and the limo are in an accident, the teenagers see the little girl throw up on the subway—the reader can move into the other narrative, much in the way that a movie might use a curious glance from one character to cut into the story of another. Since all the characters are moving around, their stories can be represented on a map of New York, with each scene in the narrative tied to a specific place. The image of the intersecting lines—something like a subway map—tells readers where they are and what they can choose to see.[3]

As the art of digital storytelling develops, authors will gain more skill in fulfilling the possibilities for interesting juxtapositions. Film is an important model for this technique. In the 1920s the Russian film pioneer Lev Kuleshov demonstrated that audiences will take the same footage of an actor's face as signifying appetite, grief, or affection, depending on whether it is juxtaposed with images of a bowl of soup, a dead woman, or a little girl playing with a teddy bear. Using the computer, we can make use of the Kuleshov effect to create juxtapositions that are intentionally open to multiple meaningful interpretations. In a kaleidoscopic story with multiple points of view, any shared event can take on different meanings, depending on whether the same moment is approached in the context of one character's life or another's. The discovery of an infidelity, for instance, might be represented by a neutrally dramatized scene—perhaps a wife reaching for the playback button on an answering machine in the presence of her guilty husband—that would gain in narrative significance when reached from different paths. One sequence might involve the comic recklessness of the husband; another the narcissistic self-absorption of the wife; a third the future devastation of the child, observing this pivotal moment unseen from the doorway. Told in this way, the story would be about the intersecting emotional planes of family experience.

By experiencing such interwoven stories as one unit, we can enhance the kaleidoscopic capacity of our minds, our capacity to imagine life from multiple points of view. One moment in a student story particularly illuminates for me the potential of the medium for capturing delicate dramatic moments with new immediacy. In Rachel Molenaar's "Evening," which takes place in a small apartment, the reader is able to move into the minds of a working mother, her son and daughter, and their pet cat and dog as they go through their nightly routine a few months after the death of the father of the family. At one point they are all relaxing together in front of the TV, parent and children sharing a fragile communion after a tense meal. The mother, increasingly refreshed as the sitcom continues, has a rush of sympathy for her daughter, with whom she had been quarreling earlier in the evening; she silently moves the dozing cat from her own lap to her daughter's. We see this tiny moment of connectedness from three points of view: the mother's, the daughter's, and the cat's. This is an intimate moment that might be presented in linear fiction, as a domestic stream-of-consciousness narrative in the style of Virginia Woolf. It could also be done as a telling dramatic gesture on the stage or on film. But in digital form it takes on a different power. The act of navigating from one consciousness to the other reinforces the separateness of the three fragile creatures and reenacts the gesture of connection. We are in the apartment with them; we see them with the exterior clarity of a film and the interiority of a novel. Such an expressive moment marks the emergence of a new narrative convention, which we might call a panoramic close-up (building on film techniques) or a composite epiphany (building on short-story aesthetics). By rotating our point of view at a single moment of dramatic illumination, we capture both the shared reality and the separate experiences that compose it.

The kaleidoscopic power of the computer allows us to tell stories that more truly reflect our turn-of-the-century sensibility. We no longer believe in a single reality, a single integrating view of the world, or even the reliability of a single angle of perception. Yet we retain the core human desire to fix reality on one canvas, to express all

of what we see in an integrated and shapely manner. The solution is the kaleidoscopic canvas that can capture the world as it looks from many perspectives—complex and perhaps ultimately unknowable but still coherent.

Morphing Story Environments

Another kind of narrative experience that takes advantage of the shape-shifting digital medium is one in which interactors are invited to enact or construct their own stories out of a set of formulaic elements. We can think of such an environment as not so much a story as a narrative world that is capable of supporting many possible stories. Brenda Laurel has suggested that virtual reality is not for passive entertainment but for active free-form play and that adults are capable of such play if their imaginations have been "booted up" by an environment with rich narrative possibilities. In chapters 7 and 8 we will look at some of the computational and literary techniques that might allow us to build such environments. For now, let us assume that we have a kind of animated doll's house with characters who are as interesting to adults as the characters on the TV series *NYPD Blue* or *ER* or *One Life to Live*. Suppose we could enter such an environment not merely as players in a MUD but as a god in control of assembling all the characters. Suppose we could set the story of our choice in motion and then observe or participate in it, slipping in and out of whichever roles appealed to us. What would such narrative play be like? Where would it lead to?

Virtual Reality in Haworth Parsonage

It is only the relatively few adults who are gifted storytellers who can spend many waking hours a day in imaginary worlds of their own creation. Perhaps the best-documented example of prolonged imaginative play beyond early childhood is the Brontë family. Left motherless when they were under five and then deprived of their motherly older

sisters, who both died of consumption a few years later, the four surviving Brontë children (Charlotte, Branwell, Emily, and Anne) amused and sustained themselves by making up stories. They started with a box of wooden soldiers, which they divided up, named, and imagined in an African city they called Verdopolis. They played with the soldiers in the usual way of children, and they made believe that they were the characters. Soon they started writing a newspaper and a chronicle of Verdopolis.[4]

Because their older sisters, Maria and Elizabeth, took sick at school, the Brontë children imagined nightmare schools where children were tortured. When Charlotte was thirteen she wrote down one such precocious gothic fantasy:

> In the hall of the fountain, behind a statue, is a small door over which is drawn a curtain of white silk. This door when opened discovers a small apartment, at the farther end of which is a very large iron door to a long passage. At the end is a flight of steps leading to a subterranean dungeon, a wide vault dimly lighted by a lamp which casts a death-like melancholy luster over a part of the dungeon, leaving the rest in the gloomy darkness of midnight. In the middle is a slab of black marble supported by four pillars. At the end of it stands a throne of iron. In several parts of the vault are instruments of torture.
>
> At the end of this dungeon are the cells which are appropriated to the private and particular use of naughty children. These cells are darkly vaulted and so far down in the earth that the loudest shriek could not be heard by an inhabitant of the upper world. In these, as well as in the dungeon, the most unjust torturing might go on without any fear of detection, if it were not that I keep the key of the dungeon and Emily keeps the key of the cells and of the huge iron entrance which will brave any assault except with lawful instrument.[5]

The Brontë children invented their own *Zork*, a dungeon world to which they held the key. They were not merely adventurers in this macabre world, they were the dungeon masters in control of the

instruments of torture and death, masters of the graveyard. The documentation of such a world, the explicitness of its physical dimensions, is reassuring in the same way the solving of a dungeon maze is reassuring. But unlike Zork, Verdopolis was not a single-use toy. It was an open-ended fantasy that changed as the children's emotional needs changed.

When Charlotte went off to school at age fifteen, the game was rearranged to suit the siblings' new obsessions. Emily and Anne, the younger children, rebelliously seceded and invented their own fantasy kingdom of Gondal, ruled by an imperious queen with whom Emily was closely identified. Charlotte and Branwell continued to collaborate on variations of the original story, variations in which Branwell invented a civil war between the main Verdopolis (now Glass-Town) hero, Arthur Wellesley (now Zamorna, King of Angria), and his foil, an ex-pirate and rebel named Percy, Earl of Northangerland, with whom Branwell identified very strongly.

Charlotte, for whom going off to school revived memories of the mistreatment and patient suffering of her sister Maria, invented docile and doomed wives for Zamorna whose names echo her idealized sister's. Marian Hume and Mary Henrietta Percy are beloved daughters and adoring wives who (like Griselda of medieval legend) sweetly submit to their husbands' authority, give up their children without a murmur, and die when Zamorna grows tired of them. Reading about these Mary figures is like watching a child play with a doll so beautiful that she has to be careful not to wrinkle its clothes. They are avatars operated at a distance, repeating a rigidly limited, frightening story.

At this point in the collaborative creative efforts of the Brontë siblings, Branwell was intensely involved with the military strategy of his heroes and their ever-repeating, never-resolved combat, much like a twentieth-century teenager playing videogames, while Charlotte was doing the equivalent of playing with cutout dolls or Barbie dolls, an occupation that has also been transferred into digital form. The difference between the Brontës' play and these less creative activities is

that the Brontës had strong narrative imaginations and could assimilate formulaic patterns and appropriate them to their own use. There is nothing original in the Mary doll figures, but they are intensely Charlotte's because she constructed them. The exercise of constructive agency on external, formulaic materials invests the character or toy with the power of a threshold object, the power to create the immersive trance. Charlotte was a young adult with a writer's gift for shaping her make-believe into coherent stories. Her skillful activity is therefore similar to what an unskilled adult might do with a romance novel that is presented not as a paperback but as an electronic construction kit.

Having set a predictable pattern in place, Charlotte began to experiment with variations by inventing foils for her passive heroines. Zamorna's first wife, Marian Hume, has a foil and enemy in Zenobia Ellrington, an accomplished musician and a learned and articulate woman who, as her name indicates, shares with Zamorna an aggressive sexuality.[6] In creating this character, Charlotte raised the question of whether another kind of woman might fit into a world where desire is given free rein. But she kept herself very distant from her creation, treating Zenobia as a clear villain and having Zamorna repeatedly humiliate her.

After trying out these characters and juxtaposing them, Charlotte created a heroine with whom she could identify more closely—Mina Laury, who becomes Zamorna's mistress. Like Zenobia, Mina is characterized by her masculine accomplishments: she can run an estate, counsel political ministers, and travel with the hero in wartime. But she manages to be both assertive and loved. She is overtly rivalrous with Mary and is allowed to shine at Mary's expense, as in this argument between them over who best loves Zamorna:

"I would die for him." [boasts Mina]

"You would not," said [Mary]. "I could not do more and I am confident there is not a woman on earth would do so much for him as I myself!"

"Delicate soft-bred, brittle creature," returned she with kindling eyes, "that is an empty boast. The spirit might carry you far but the body would break down at last . . . it is not for an indulged daughter of aristocracy . . . to talk of serving Zamorna. She may please and entertain him and blossom brightly on his smiles, but when adversity saddens him . . . I warn you, he will call for . . . one . . . who knows the feel of a hard bed and the taste of a dry crust, who has been rudely nurtured and not shielded like a hothouse flower from every blast of chilling wind. . . . With what morbid delicacy would you shrink from scenes that I have looked upon unmoved."[7]

Although she was offering to die for Zamorna, Mina's speech is in fact a declaration of survival. She was saying that it is better to be coarse and passionate and alive (as Charlotte thought of herself) than to be delicate and docile and dead (as she thought of her sister Maria). Mina was a clear step in the direction of the defiant and sturdy Jane Eyre, the woman who ministers to the rough and surly Rochester and copes with fire, stab wounds, and secret midnight errands. As Charlotte matured, she transformed her doll-like heroines into the shape of women she could grow into. Her stories were her way of rehearsing for the emotional hardiness she would need in her adult life.

The regressive, violent, overheated emotional universe of the young Brontës is very like the narrative world of many electronic games. *Myst*, for example, is also the result of a long sibling collaboration (between Rand Miller and Robyn Miller) and has the same Napoleonic echoes, the same bloodthirsty playacting quality, and the same emphasis on betrayal and power struggles as the Brontë juvenilia, though it is set in magical worlds with sentient monkeys and a science fiction veneer. One element that renders both the Brontë juvenilia and the Miller brothers' fantasies so claustrophobic is the undisguised nature of their wish fulfillment. *Myst*'s primitive vision of evildoing and rich rewards is appropriate to the current early stage of electronic fiction development. In fact, part of the reason the "winning" ending of *Myst* is so dull is that it does not partake of this

gothic, violent undercurrent that runs through the rest of the game. In order for electronic narrative to reach a higher level of expressiveness, the medium as a whole must make the shift that Charlotte made, that is, away from adolescent rehearsal fantasies and toward the expression of more realistic desires. In Charlotte's case we have a record of how she made the shift, one that suggests how constructive interactors might use such overheated participatory narratives.

Charlotte was the only one of the four Brontë children to end her childhood fantasy life when she reached adulthood. Branwell continued to sign himself *Northangerland* to the end of his life. Emily and Anne played at their fantasy kingdom until their late twenties (when Charlotte disrupted it so that they could all write for publication). But Charlotte abandoned Zamorna and his world at age twenty-three. She was able to do this because she had taken her Angria fantasy as far as it could go in exploring her feelings of sexual longing and guilt. In one of her last Angrian stories, *Caroline Vernon*, the deepest level of wish fulfillment within the fantasy comes to the surface in very explicit terms, and the protagonist is as closely identified as possible with the author. Not only is *Caroline* a variant of *Charlotte*, but Caroline, like her author, has a "delicious" obsessive daydream of a fantasy lover, "a hero, yet nameless and formless, a mystic being, a dread shadow . . . [who] haunted her day and night when she had nothing else useful to occupy her head or her hands." Charlotte is here confronting the absurdity of her own infatuation with the imaginary Zamorna and is allowing herself to look at the boundary between her immersive world and her ordinary life. She is getting ready to leave her make-believe kingdom.

In *Caroline Vernon* the underlying sexual content of the Zamorna/Percy/Mary plot becomes clear: the wish to supplant the mother/sister in the regard of the father/lover. Caroline is the illegitimate child of Percy and is rivalrous with her legitimate sister Mary for their father's love, as well as for the romantic attention of Zamorna, who is Caroline's "guardian" and Mary's husband. Caroline's mother, the actress Louisa Vernon, is romantically involved with both Percy

and Zamorna. The sexual rivalry of mother and daughter and the mother's antagonism toward the daughter's sexuality—both classical oedipal configurations—are presented in *Caroline Vernon* in much more explicit terms than in any of the Brontës' earlier stories. They are magically resolved in favor of the daughter, as in this scene in which Louisa threatens to tell Percy that Caroline has been flirting with Zamorna:

> "I'll tell you all!" almost screamed her ladyship. "I'll lay bare the whole vile scheme! your father shall know you, Miss, what you are, and he is. I never mentioned the subject before, but I've noticed, and I've laid it all up and nobody shall hinder me from proclaiming your baseness aloud."
>
> "Good heaven! this won't do," said Caroline, blushing red as fire. "Be silent, Mother. I hardly know what you mean, but you seem to be possessed. Not another word now. Go to bed—do. Come, I'll help you to your room."
>
> "Don't fawn; don't coax," cried the infuriated little woman. "It's too late. I've made up my mind. Percy, your daughter is a bold, impudent minx; as young as she is, she's a———"
>
> She could not finish the sentence. Caroline fairly capsized her mother, and took her into her arms and carried her out of the room. She was heard in the passage calling Elise and firmly ordering her to undress her lady and put her to bed. She locked the door of her bedroom and then she came down stairs with the key in her hand.[8]

The scene has the clarity and absurdity of a dream, a simple fulfillment of an infantile wish to change places with mother, to pick up the "little woman" and put her to bed. Now it is the hostile and punishing mother who is locked up in the dungeon, and the daughter is free to do what she pleases. The story ends with Caroline seduced by Zamorna, and civil war opening all over again between Zamorna and Percy. The story cannot go any further. It has come clear. At this point Charlotte bids farewell to Angria and turns her attention to writing realistic fiction.[9]

Charlotte's departure from Angria is one model for achieving closure in a shape-shifting story world. The experience of the underlying fantasy coming to the surface is not merely an exhaustion of narrative possibilities; it is more like the solution to a constructivist puzzle. Projection of highly personal (but universally felt) emotional content onto the figures of the formulaic story moves the content into a field where it is safe to think about it. It is putting your most dangerous fantasies in a dungeon to which you hold the keys. Because the fantasy has been externalized, it can be manipulated. If the external structure is too rigid and too literal (like Branwell's endless military campaigns or the endless combat of the video arcade), the externalized fantasy can serve as a safety valve but the plot does not progress and the experience does not reach closure. But if the imaginative environment is more plastic and more ambiguously evocative, the fantasy can progress. We can sustain our engagement in such a constructivist world, bring our deepest emotional conundrums into it, and then play them out in multiple ways until they come clear. The experience of closure here may not be in the beauty of the particular story but in the completeness of engagement with the whole range of story possibilities.

D. W. Winnicott described a similar process of imaginative "saturation" in children's play. Children play with a certain toy or play out a certain imaginative experience until it has absorbed all the emotional ambivalence they feel about the subject, and then they are ready to transfer their feelings to the world at large, to what Winnicott called the "whole cultural field."[10] As a society we use television series in much the same way, asking them to present us with situations that are particularly frightening or appealing (crime, emergency rooms, family life, women in the workplace, sexually active single people) and that we have not yet assimilated into our national consciousness. The programs assemble formulaic characters and situations that express our anxieties and desires and then offer variations on the patterns. When every variation of the situation has been played out, as in the final season of a long-running series, the underlying fantasy

comes to the surface. Thus, the Miami cop suffers amnesia while doing undercover work and becomes a criminal, the crusty newsroom boss imagines he is actually sleeping with the perky producer, the mismatched couple who have resisted one another finally get together. These episodes are often embarrassing in the same way that *Caroline Vernon* is embarrassing. Robbed of the elaboration of sublimation, the fantasy is too bald and unrealistic, like the child carrying the mother up to bed. The suppressed fantasy has a tremendous emotional charge, but once its energy has saturated the story pattern, it loses its tension. We can look at it directly, with less anxiety, but we also find it less compelling. Nevertheless, such formulaic stories can also be very insightful and well written before they run out of steam. In fact, their exhaustion can be an indication of the fact that we have assimilated their patterns into our general understanding of the world, that there is no longer a story for us in the core situation, whether it be people dying in a hospital room full of strangers or aggressive women in the work world or frighteningly dysfunctional child rearing. The shifting patterns of the formulaic story have expressed our ambivalent feelings, absorbed our excitement, and made the threatening or alluring situation into something familiar.

Enactment as a Transformational Experience

As Scheherazade and Jesus both knew, storytelling can be a powerful agent of personal transformation. The right stories can open our hearts and change who we are. Digital narratives add another powerful element to this potential by offering us the opportunity to enact stories rather than to merely witness them.

Enacted events have a transformative power that exceeds both narrated and conventionally dramatized events because we assimilate them as personal experiences. The emotional impact of enactment within an immersive environment is so strong that virtual reality installations have been found to be effective for psychotherapy. Psychologists in several research centers are treating phobic patients by exposing them to virtual environments that simulate the situations that trigger their anxiety attacks. The desensitizing process is in essence a participation in a fictional world. Researchers in California and Atlanta have relieved patients' long-standing fear of heights by having them "walk" over virtual bridges and ride in virtual elevators. Patients initially respond to the virtual environments with terror, just as they would to the real-world experience. The therapist then accompanies them through the experience, helping them practice self-calming behaviors. Essentially, the patients are practicing coping behaviors in the virtual environment; they are like actors at a dress rehearsal. The inner changes brought on by such experiential learning then allow them to apply the same behaviors to the real world. Patients who can ride a virtual glass elevator in a virtual hotel lobby can then go to dinner on the seventy-second floor of the Peachtree Plaza in Atlanta, and patients who cross a virtual Golden Gate Bridge can then cross the real one.[11]

This virtual reality therapy falls between two other therapeutic techniques: actually accompanying the patient in the real-life frightening situation and talking the patient through an imaginary experience under hypnosis. The virtual world is more external than the hypnotic experience but artificial enough to make it possible for patients to approach it at a much earlier stage than they could if facing the actual situation. It is a threshold environment. Those patients who do not find VR therapy helpful are those who complain that it is either too real or not real enough. The key to the success of the treatment, then, is the establishment of the world as a fictional space.

These results echo the processes observed in some MUD participants who use their imaginary personas to practice social skills they are trying to cultivate in the "real" (i.e., nonelectronic) world. For instance, one woman recovered her sexual confidence after an amputation by enacting the part of a similarly handicapped character on a MUD.[12] As in the case of the phobic patients, the virtual experience

worked because it was enough like the real one to raise the same anxieties but safe enough to allow for imaginative rehearsal.

The transformational power of enacted narratives holds both promise and danger for the future. On the one hand, it may make digital environments as important as television currently is for the presentation of problem plays, stories about social injustice or intolerance that are meant to broaden the audience's sympathies. Electronic narratives are already being used to teach such skills as language learning, military medicine, and corporate decision making. They could also be used to teach ways of being in the world, to teach, for example, how to resolve conflicts, how to be a successful job applicant, how to be a nurturing parent, how to be a nonabusive spouse or parent. If these issues are embedded in interactive narrative that is fictionalized just enough to be compelling but not threatening, such narratives might be as effective in changing behavior as an acrophobic's walk across a virtual bridge.

On the other hand, computer enactment may also reinforce violent or antisocial behaviors. Already a college student in the Midwest has been disciplined for publishing on the Internet a rape fantasy in which he names an actual fellow student. We may be moving toward a situation like that depicted in the *Star Trek* episode, aptly named "Hollow Pursuits," in which a withdrawn and awkward crew member becomes addicted to holodeck programs that allow him to outfight or seduce the people he is intimidated by in his actual life.[13] Just as psychologists are considering scanning in images of their patient's actual family members for VR therapy, there is no reason why people could not scan their boss's image into a customized version of *Doom* and blast away. Would this exercise make it more or less likely that they would actually shoot their boss?

Whatever the answer, it is clear that literal wish-fulfillment fantasies would not help a person cope with the actual situation. The difference between immersive environments that are escapist and those that are progressive may lie in the difference between the repetitive stories of Branwell Brontë and the progressive stories of Charlotte Brontë. The more fully constructivist the story environment, the more opportunities it will offer to move beyond the enactment of destructive patterns. The goal of mature fictional environments should not be to exclude antisocial material but to include it in a form in which it can be engaged, remodeled, and worked through. Therefore, an environment in which we can only kill dragons, no matter how many different ways we can transform their appearance, is less desirable than one in which we can also domesticate them, worship them, ally with them against other monsters, or perhaps even take them for a ride in a multistory atrium elevator.

Refused Closure

In a shape-shifting world, stories often do not come to a clear end point. Electronic narrative teases us, holding back its gifts. The labyrinth is tricky, full of dead ends, uncertainties, questions that do not resolve. Adventure games demand hundreds of hours of play, of mostly frustrating trial and error, to discover the way forward. Sometimes their secrets must be discovered outside the game, from magazines or by trading information with fellow players or perhaps by finding one's way over the Internet to the right Web site or newsgroup. In the solutionless rhizome or the solvable maze, we are confronted with a world that lures us in with the promise of treasures but that is chiefly designed to resist our efforts.

Perhaps this is a virtue. To be always in search of secret information, in pursuit of refused reward, can be emotionally riveting. Because we are aware that this is a created world, we can experience its resistance to our efforts as a dramatic contest with the programmer or writer over a gift that is purposely withheld. We may experience this withholding presence as a demanding parent, a challenging teacher, a coy lover, or a secretive boss, and be all the more engaged by the contest. Or we may experience it as a sustained arousal, a prolonged lovemaking with the climax always a little out of reach. Because of its ability to both offer and withhold, the computer is a seductive

medium in which much of the pleasure lies in the sustained engagement, the refusal of climax.

The question of confused extent and refused closure is explicitly posed by Michael Joyce in his hypertext novel *Afternoon,* which has no overview of contents and no clearly marked ending. Instead, Joyce tells his readers to decide for themselves when the story is over. In a lexia entitled "work in progress," he states plainly: "Closure is, in any fiction, a suspect quality, although here it is made manifest. When the story no longer progresses, or when it cycles, or when you tire of the paths, the experience of reading it ends." This is closure as exhaustion, not as completion. Not satisfied with this formulation, others have described closure in *Afternoon* in terms akin to the solution to a maze. For example, it is said to be achieved when "having assigned particular sections to particular sequences or reading paths, many, though not all, of which one can retrace at will, one reaches a point at which one's initial cognitive dissonance or puzzlement disappears, and one seems satisfied. One has reached—or created—closure!"[14]

In other words, electronic closure occurs when a work's structure, though not its plot, is understood. This closure involves a cognitive activity at one remove from the usual pleasures of hearing a story. The story itself has not resolved. It is not judged as consistent or satisfying. Instead, the map of the story inside the head of the reader has become clear. Such a map does not necessarily feel inevitable or appropriate, the way the solution to a puzzle does. It may not be beautiful or shapely in any way. There is no emotional release or perception of fittingness, just a sense of going from the unknown to the known. This is very different from and far less pleasurable than our more traditional expectations of closure, as arising from the plot of the story and marking the end point of an action.[15]

Of course, closure can be feared as well as desired. This is so not only because of disturbing story content, as in *Afternoon,* but also because it is painful to break the immersive trance, to come up from an enveloping medium into the chilly air of reality. In encyclopedic narratives in particular—a three-decker novel, a television series, a

months-long puzzle game—the ending can be painful to the creators and to the audience. Dickens and his audience both cried when the last number of one of his two-year serials was finished. When the television series *Cheers* ended, it provoked an orgy of public nostalgia, as if the actual neighborhood bar of millions of people were closing.

The refusal of closure is always, at some level, a refusal to face mortality. Our fixation on electronic games and stories is in part an enactment of this denial of death. They offer us the chance to erase memory, to start over, to replay an event and try for a different resolution. In this respect, electronic media have the advantage of enacting a deeply comic vision of life, a vision of retrievable mistakes and open options. The never-ending, ever-morphing cyberspace narrative is a place to revel in a sense of endless transformations, but in order for electronic narrative to mature, it must be able to encompass tragedy as well.

Tragedy in Electronic Narrative

How do we express the irreparable losses of life with appropriate solemnity within a shape-shifting world? How can we have catharsis in a medium that resists closure? Since no hypertext story or simulation narrative in this early stage of genre development offers a satisfyingly tragic story, we can only imagine them. In my use of the word *tragic,* I am relying on Aristotle's definition, as it is most commonly and somewhat loosely understood. I mean a story of a single worthy individual's fall from a worthy life to a desperate ending through some choice or flaw of his own, a story that focuses on this irretrievable loss, arousing our feelings of pity and terror and leaving us at the end in a state of purged emotion and heightened understanding.

Let us consider the representation in electronic form of the tragic event of a young man's suicide. I want to propose three possible suicide stories, each about the same fictional character, whom I'll call Rob. Each story exploits the multiform nature of electronic narrative while still giving expression to the tragic heart of the story.

The Mind as Tragic Labyrinth

Suppose someone were to write an electronic portrait of Rob's mind on the night of his suicide, like a stream-of-consciousness novel but in the form of an animated web. Each lexia, or unit of the story, would capture one haunting thought and would link to one or more others. Rob's mind would run obsessively, from recent events (a bad performance review, a lost promotion) to past disasters (his father's praising his younger brother for beating him at chess, his ex-girlfriend Linda's decision to move out). Some thought patterns would lead to grandiose hopes for money and fame or to ambitions of perfection. All these chains of thought would eventually converge on the idea of killing himself. Thoughts of going for help could be represented by false links; you could click on them, but the screen would not change (they would lead nowhere). Rob might experience short flashes of remembered moments in which life was good, but these would be followed by dead-end beliefs that such moments of happiness have been lost forever or have all been invalidated by later failures or betrayals. Perhaps the navigating reader would feel impelled to return to a good memory or to trace it more deeply but would find those associations closed off, blocked by unpleasant thoughts, or too difficult to hold on to. Perhaps the accounts of good memories would fade quickly from the screen, or perhaps other, destructive, thoughts would intrude involuntarily, as represented by images or scenes that would arise by themselves without any action from the reader. All these phenomena—the obsessive rumination on failure, the doomed grandiosity, the destructive thoughts coming unbidden—would provide the reader with the opportunity to enter the consciousness of the desperate man.

By charting the thoughts of such a complex person, the writer could take as her subject matter the actual process of rumination—the repeated return to associational paths that lead to closed loops of thinking or the poignancy of a single moment of experience, a single act of perception that becomes lodged in the mind, like a roadblock

on the path to hopefulness. A labyrinthine hypertext might be the ideal medium for capturing the interior monologue as a sort of snapshot of the mind itself. It could potentially offer the equivalent of Hamlet's "to be or not to be" soliloquy, not as a translation of it but as a similarly affecting universal portrait of paralysis and self-awareness.

How would the interior monologue reach climax and closure? The paths of the mind could change as these simulated last hours of Rob's life progressed, so that thoughts of suicide would arise more quickly each time regardless of which paths the reader followed. Perhaps the computer would allow the process to continue only until a set number of lexias of suicidal ideation have been selected by the reader or until a certain frequency of access occurs. Suddenly, the screen darkens. The suicide occurs in "real" time. The reader would have both enacted and witnessed the decision and would feel the sense of understanding, inevitability, and sorrow that we call catharsis.

The Web of Mourning

Another way of representing the same story might be as a three-dimensional presentation of the wake, with Rob's devastated parents, his coworkers, his ex-girlfriends all trying to understand how such a tragedy could have happened. Each would try to explain the suicide, and by moving around the room from one mourner to another, we could follow their memories and see events from the past from their perspectives as people engaged in the inevitable but futile attempt to fix a cause for an irrational act. We would be drawn to see the whole story, since no one version would account for the event but each would add to our understanding.

In navigating this kaleidoscopic story, we would realize that each individual version includes elements that do not quite fit or that point us away from the teller's version to other explanations. We would experience the loss in all of its resonance and have a sense of all the worlds of caring and trust that are torn apart by a violent death. Going through such a story would be an enactment of mourn-

ing, because the interactor's search for an explanation would parallel the efforts of the people at the wake. Perhaps we would be given only a set number of scenes to witness at any single viewing. Then we would see the burial, with the program perhaps taking us through that final scene from the perspective of whichever mourner we had spent the most time with. Each separate viewing would provide its own experience of catharsis, but no single one would feel complete. Only after viewing all the stories, after repeating the mourning process from each of the several viewpoints, would we feel a larger catharsis: not an acceptance of Rob's death, not an understanding of a single consistent composite explanation, but a pervasive sense of an interrelated community with multiple truths. After tracing the multiple contexts for a single act of suicide, we would be left with a tragic vision of the many Robs who had been lost.

Simulation and Destiny

These stories take the events of the story as fixed. We can trace them in multiple ways, but we cannot act within them or change the plot. Could a digital narrative offer a higher degree of agency while still preserving the sense of tragic inevitability? Can we have an interactive story that still retains what Umberto Eco calls its sense of destiny?[16] One test of the limits of electronic narrative to provide agency and destiny would be to consider whether we could frame the story of Rob's suicide in the form of a simulation.

In the simulation treatment of Rob's suicide, the interactor would be put in the position of a god over Rob's social world but a god with a limited power of intervention. The presentation of the world would make clear the limits of our powers, would specify what elements in Rob's world the author is taking to be immutable. These immutable elements would be an important literary choice, for they would characterize an implicit interpretation of the "why" of Rob's death. Would it be his neurochemistry? His family history? A particular historical

moment or political situation? A single tragic love affair? Varying the other factors would allow Rob's life to play out in Borges' "pullulating" time, with the fascinating diversity of possibilities that any life is open to. As deity interactor, we might guide Rob to a different job with a manager who would be more appreciative of his particular skills. Or we might send an old girlfriend to a restaurant just as Rob arrives there, to see if they could restart their relationship. Maybe we would arrange for a friend of Rob's mother to encourage her to confront her husband about his constant put-downs of their son. One by one we could change all of the contingent conditions that seem to contribute to Rob's self-destruction. Seeing how his life would play out in different ways would add to our sense of his vulnerability, of what little influence external factors have. We would also see how changing Rob's life would dramatically alter the lives of the people around him. Perhaps he would have been more miserable rather than more hopeful if his old love affair had resumed. In that alternate world we might see his girlfriend blaming herself for his death, not knowing that it was inevitable. Or we might reach some ambiguous ending in which it is possible to believe that Rob will be revived in time to survive or even that he might not go through with the suicide attempt. The story would still have a sense of completion despite this variation because it would focus not on a single continuous action (as Aristotle described Greek plays) but on the whole system of subtle interrelationships that give meaning to one person's action. This narrative system would reveal itself through its range of variation as well as through what remains constant. The tragedy of the situation would arise from a demonstration of the ways in which people unwittingly play into destructive patterns, sometimes from the best of intentions.

Of course, the success of any of these possible tales would depend on the writer's skill and on the particulars of storytelling that I am just crudely sketching. But there is no reason why a story like this could not be as expressive as tragic stories in any other medium. What is more, a digital narrative could capture something we have

not been able to fix as clearly in linear formats: not just a tragic hero or a tragic choice but a tragic process.

The Multipositional View

Whether we are talking about a simulation story, a rhizome hypertext, a navigable movie, or an electronic construction kit for never-ending stories, we cannot bring to a transformative, shape-shifting medium the same expectations of static shapeliness and finality that belong to linear media. But that does not mean that we will forgo a sense of completeness and emotional release. Instead, we will learn to appreciate the different kinds of closure a kaleidoscopic medium can offer.

Simulation exercises offer a good model for kaleidoscopic closure. When a live-action simulation ends, the participants hold a wrap-up session in which the god of the machine—the game master or controller of the simulation—describes what has happened and solicits experiences from all the players, who now have the opportunity to see how their individual parts fit into the overall story and to understand the many processes that make up the microworld of the simulation. For instance, in a training situation that models a foreign affairs crisis, the participants would learn what their opponents' motives were, what other options they had been considering, and what information was known to whom at various stages of the game. In a narrative game, much of the drama of the story is not apparent until the wrap-up, when there are important plot revelations, such as who actually committed which murders, which players were long-lost secret brothers, and where the magic sword really was at 11:00 P.M. on Saturday night. At the end of the game players are able to see the whole action of the story, including their own part in it, not from the stage but from the perspective of a spectator at the top of the arena.

It is satisfying to switch positions in this way, to act in a patterned event and then later view the general pattern, like a synchronized

dancer in one of the old Ziegfeld dance movies watching footage of an overhead shot of her number. But a computer simulation offers a new extension of this pleasure. On the computer we can reenter the story and experience more than one run of the same simulation. We can play all the parts, exhaust all the possible outcomes. We can construct a composite view of the narrative world that does not resolve into any single story but instead composes itself into a coherent system of interrelated actions. Because we increasingly see the world and even our own identities as such complex, centerless, open-ended systems, we need a story environment that allows us to make sense of them by enticing us into exploring a dense narrative world from every possible perspective.

One of the results of such an exploration will be a more immediate appreciation of process. Whereas novels allow us to explore character and drama allows us to explore action, simulation narrative can allow us to explore process. Because the computer is a procedural medium, it does not just describe or observe behavioral patterns, the way printed text or moving photography does; it embodies and executes them. And as a participatory medium, it allows us to collaborate in the performance. Using the computer, we can enact, modify, control, and understand processes as we never could before. We can also appreciate them aesthetically for the first time, savor the complex patterns of processes just as we savor patterns of color and shape. We do not yet have story systems that exploit this potential by describing a complex world in the procedural terms, but we are moving steadily in that direction.

The three aesthetic principles described in this section—immersion, agency, and transformation—are not so much current pleasures as they are pleasures we are anticipating as our desires are aroused by the emergence of the new medium. These pleasures are in some ways continuous with the pleasures of traditional media and in some ways unique. Certainly the combination of pleasures, like the combination of properties of the digital medium itself, is completely novel. To

satisfy our desire for this new combination of pleasures, we will have to invent techniques of authorship that are similarly eclectic. The next section deals with the merger of literary and computational techniques of composition. It explores how we might go about writing for a process-centered medium and what stories and characters such procedural authorship will bring us.

PART III

Procedural Authorship

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For my son, William