Robert Coover. *Cave Writing: Noves aventures a Mot-Town*
Diumenge 19, 12.00h. Hall Proteu. Anglès, amb traducció simultània

Cave Writing: New Adventures in Mot-Town

Robert Coover

Text for the translator.

PROLOGUE

The impact of new technologies upon literature is both profound and negligible. Negligible in the sense that our oldest known narrative of any length, the Gilgamesh Epic, hacked out on clay tablets by the heirs to the inventors of writing itself, is still readable and can still touch us, and the same of course can be said of pre-Biblical, Biblical, and ancient Greek narrative and poetry, and of ancient Chinese literature as well. Indeed there are those who will argue that these great works have never been surpassed, and that all subsequent writing amounts to little more than footnotes to the original classics.

But it must also be said that changing technologies continually reshape the very nature of the artistic enterprise. The dominant narrative forms of recent times, the novel and the movie, for example, would not have been possible without the technologies that created, not so much the forms themselves, as the new audiences toward whom artists directed their endeavors, some translating the classic modes into the new technologies, others exploring the new technologies for new forms appropriate to them, Miguel de Cervantes being a classic examplar of the latter.

Now, once again, in this era of the digital revolution, the audience is moving on into new realms, and consequently so are the authors and artists. As with the previous technological transitions, the book lives on in a more or less recognizable form within the new computer-driven technology, and at the same time totally new forms are emerging. Whatever one might feel about these changes, they cannot be ignored. It was an awareness of the irresistible and irreversible power of the digital revolution that provoked me into creating the Brown University hyperfiction workshops a decade and a half ago, so that, together with bands of young graduate and undergraduate students, we might begin to explore and understand the new electronic media as creative writing spaces. In that respect, as, now, Cave writers, we are no

different from the cave artists of Altamira—a new medium presents itself: you see what you can do with it.

PART I: BEFORE THE INTERNET

What we did with it at Brown back in the late 1980s had something to do with the visit to campus a decade or so earlier of yesterday's speaker, the revolutionary computer innovator Ted Nelson. Brown is widely regarded as a world leader in developing humanistic uses of the computer, of which Nelson's visit was part, and Brown's Program in Literary Arts is *the* acknowledged world leader in the development of creative electronic writing—or what we are now calling "literary hypermedia." Brown is, literally, in the world of electronic literature, where it all began.

Manchester Baby/Alan Turing: Or, rather, perhaps *this* is where it all began, the first computer ever built, back in 1948, the University of Manchester's Small-Scale Experimental Machine, more commonly known as the Manchester Baby. It was essentially a very fancy calculator, but I cast out inquiries regarding early uses of creative text on the computer, predating our workshops and the era of hypertext, and learned that one of the Manchester Baby's key developers, Alan Turing, together with Christopher Strachey, produced in 1952, using a random number generator, what might be called the first "literature" on this mathematical instrument of ones and zeros: a love letter generator. One output *(translator: the following should be comically awkward, as in English; a very literal word-for-word translation should do it; "MUC" is Manchester University Computer)*:

> Darling Sweetheart,
> You are my avid fellow feeling. My affection curiously clings to your passionate wish. My liking yearns to your heart. You are my wistful sympathy: my tender liking.
> Yours beautifully, MUC

Ted Nelson at Brown: I joined the Creative Writing faculty at Brown University some 25 years ago, at a time when the world was still in its cybernetic infancy. It was the era of big mainframes with monitors and keyboards cabled directly to them; to work on the Brown computer you had to go to the basement of the building where it was housed, and you pretty much had to create your own editing and formatting tools. When I started using the mainframe there on a more or less daily basis, I was the first humanist on the entire faculty to do so. I'd been a print writer for the quarter of a century before reaching Brown and

indeed still am—will be—so at the outset the computer intrigued me mostly as a writing tool. Little did I foresee the seductions that awaited me, seductions prepared in part by Ted Nelson.

I knew from a professorial friend that Nelson, known to me for his mid-1970s revolutionary book *Computer Lib/Dream Machines,* had been on campus a little over a decade earlier working with our own resident computer guru Andy Van Dam on something called a "hypertext editor," my friend having attempted a poetry seminar in the mid-70s using the program. It was called simply the Brown University Hypertext Editing System, or HES, historically the first of its kind.

One reason I was fascinated was that I'd long been interested in "nonsequential writing," as Nelson calls it. Not only had I been experimenting with form and disrupting linear time from early on, I had actually been playing for 15 years or so with a mechanical hypertext system of my own using edgenotch cards, punch, and needles—directly inspired, I might add, by the publication of Julio Cortázar's *Rayuela* a couple of years earlier. Just as with the computer, I used it for research and for project development, and had begun work on a labyrinthine novel, which was to have been made up of a thick deck of such cards, punched in such a way that readers could, choosing their own routes, needle out sequences of stories all held together in what now I would call a loose webwork of nonlinear narrative. The project was abandoned when the coding and punching became excessively laborious, but the seeds had been planted.

Early pioneers visit Brown: Meanwhile a computers-in-the-humanities study group formed up on campus, and I became an irregular member, attending when topics seemed vaguely literary, and so was treated to the early experiments of such hyperfiction pioneers as Michael Joyce, Stuart Moulthrop and Nancy Kaplan, John McDaid and others, who were regular visitors in the 1980s.

Michael Joyce's *afternoon, a story*. This is Michael Joyce's famous *afternoon, a story* which I first saw demo'd, in a less sophisticated format, in the mid-1980s, and which was formally published by Eastgate in 1990. It is *the* original hyperfiction, and thanks to the quality of the writing and the subtlety of the links, it continues to be one of the two or three most widely read, quoted, and critiqued of all hypertext narratives. Michael not only had to compose a literary work, he had at the same time to introduce readers to hypertext itself, and how to read it. Here, at the outset, he invites us to consider the nature of our explorations of his text… What is perhaps its most famous line—"There is no simple way to say this"—has become identified with the effort to describe hypertext to the uninitiated, or indeed to explain to oneself the odd experience of reading in this unique environment. Of course, now everyone is completely familiar with hypertext, but in the early 1990s it was still a strange and mysterious concept. There is a

very high degree of intentional indeterminacy here, so it is not easy to pin down the "story" of *afternoon*, but it circles about a guilt-ridden poet/copy writer's worry that his ex-wife and son may have been killed this day in a carwreck: "I want to say I may have seen my son die this morning." It is the search to find out if that is true or not that lures the reader through the narrative.

Intermedia: In the mid-1980s, Brown's impressive history of innovation won the university a large grant from Apple to develop a sophisticated hypertext authoring system, which became known as Intermedia, the fancy successor to the early efforts of Nelson and Van Dam, and it was on Intermedia, at the urging of scholarly and pedagogical hypertext pioneer George Landow, that I taught the first hyperfiction or electronic writing workshop in 1990-91. Like Ted Nelson, I believed that a central purpose of education is to unlearn the false assumptions and misrepresentations we've been taught, and I found these hyperfiction workshops a good pedagogical tool for doing that, proving to be especially useful in exposing young readers and writers to the invisible meaning-making strategies of print, freeing them from dogmas derived from the technology of the book and pointing them in intriguing new imaginative directions. Intermedia was made obsolete by the upgrading of Apple to Operating System 7, pointing up one of the major weaknesses of the tightly structured Macintosh topdown software control, what Nelson calls a "prison-a-go-go," but by then Michael Joyce with a little help from his engineering friends had created Storyspace, the hypertext authoring system in which *afternoon, a story* is written. Designed specifically for writers by writers, it became our hypertext editor of choice.

Storyspace/Hypertext Hotel: That opening screen of all the boxes and arrows was a student Storyspace hyperfiction from that era, one of hundreds of individual works. This is a collaborative work begun in the first workshop, called "The Hypertext Hotel." It was created as a kind of group playground: students through succeeding workshops could enter the Hotel at will, open up new rooms or services, create characters, interact with characters introduced by others, launch events, meditate on the architecture, alter narrative trajectories begun by others, use the house phone or organize programs in the grand ballroom. In the early days the young authors tended to gravitate to the bars, though swimming pools, golf courses, hair salons, chapels, day care centers, and rooftop bordellos also opened up.

What's essentially new here is the linking mechanism. In hypertext, linkages become one of the central elements, the very place where narrative happens. These multiple links allow one to lay a story out spatially instead of linearly, inviting the reader to explore it as one might explore one's memory or wander a many-pathed geographical terrain. Consequently, any document or set of documents created in hypertext will tend to be nonlinear or multilinear, and, since such a webwork of material imposes choices

upon the reader, reading becomes, as they say, interactive. With its intimate layering and fusion of imagined spatiality and temporality, the hyperlink, I believe, remains the most radical and distinctive literary contribution of the computer, though now it is just part of the everyday grammar.

One of the great advantages of Storyspace is how visible this is. As one builds one's narrative, one can actually see just how it is being structured by way of these navigational overview maps, which look a lot like those early sketches of Nelson, something that is so far impossible when working directly in HTML on the Internet, although that is mostly where the new writing is being done now…

(Eastgate Systems): These pioneer narrative hypertexts were mostly discrete objects, like books, saved on low-density floppies (this was before the Web and its browsers, remember, before CD-ROMs), and distributed by small start-up companies like Voyager or Eastgate or else passed around among friends by hand. Voyager has passed away, but Eastgate is still alive and well. Eastgate is where you can find *afternoon, a story*, as well as such renowned works as (*list*) and…

Shelley Jackson's *Patchwork Girl:* One of the most intricate and elegantly composed of these pre-Internet hyperfictions was Brown University graduate student Shelley Jackson's classic *Patchwork Girl,* a kind of parody of Mary Shelley's *Frankenstein*. The very choice of the central metaphor of *Patchwork Girl*, the patching together of a new body, whether of flesh or text, from linked fragments of other bodies, also of flesh, also of text, once dead, now given new life, new form, if somewhat strange and "monstrous," was alone a stroke of genius. The work is divided into five linked sections, and one of these is the raiding of the graveyard for body parts—and for the stories attached to their previous owners. Thus, from the outset, this patching together of a physical body from disparate but harmonious parts was linked to a similar patching together of story materials, the body becoming text, text body, a traditional theme given its true hypertextual configuration with this multiply coded, larger-than-life patchwork girl. I have discussed this marvelous self-reflective work at length in "Literary Hypertext: The Passing of the Golden Age," which can be found at http://nickm.com/vox/golden_age.html, as listed on the Kosmopolis website.

Memory limitations. All this was happening back before the invention of Windows and the laptop computer in the days of slow modems tethered to the mainframe, back when hard-drive and floppy memory was still measured in kilobytes. That meant, since sound and graphics took up too much memory, the early experimental electronic writers, like those we've seen, worked almost exclusively in text. Moreover, most of the current software for generating sound and graphics had not yet been invented, the use for such tools being too limited for commercial development.

But then, suddenly, along came—not the Internet exactly, for it had been there all along—but the browsers and interfaces that made the Internet visible and widely accessible…

PART II: LITERARY HYPERMEDIA

Almost overnight it seemed, together with the new IBM Windows applications, the boom in laptop computers with expanded memory along with CD-ROMs and ZIP and JAZZ drives, the invention of Netscape and other browsers, the creation of HTML and Java and VRML and rapidly improving hypermedia, there came the sudden worldwide rush to the Web. The impact upon communication, expression, commerce, sex, politics, indeed all forms of human exchange, has been truly phenomenal, and one senses that that impact is only beginning to be felt.

Young-Hae Chang's *Dakota* intentionally avoids hypertext and interactivity, graphics and motion graphics, photos, illustrations, even color, leaving viewers simply with sound and black-and-white text (he writes in three different languages, by the way), but all those other elements are now available and many Net artists like to use them all.

Chang is based in Seoul, Korea, one of a multitude of Asian literary artists on the Web. Electronic writing has spread across the world with astonishing rapidity. It was just over a decade ago that I was able to persuade the *New York Times* to let me review every known published hypertext fiction in the world, something I predicted would only be possible that year, in the way that reviewing every book in print might have been possible three or four years after the invention of the Gutenberg press, but never thereafter. This was true, but even so, I proved a meager prophet, for I had not foreseen the Internet explosion which would happen within twenty-four months and overwhelm my little augury. There is now a vast worldwide community of electronic authors and far too many works for anyone to be able to experience them all, much less speak intelligently about them. There were hundreds of literary hypertexts; there are thousands of works of literary Net art.

There are a number of ways to locate these works, there are curators everywhere, but one good one is through the Electronic Literature Organization, created at Brown during a 1999 conference on literature and technology, and now based at UCLA in California. One service they provide is their directory of available works of digital literature.

Text Using Media.

The Unknown: I have chosen this one among the thousands in part simply because it is a hugely entertaining award-winning fiction of vast dimensions. I have visited the site many times and have rarely read the same page twice, always finding something new. *The Unknown* is about the imagined adventures of three supposedly rich and famous writers on a mock book tour all over the world. They meet famous local writers wherever they go and imitate their styles. It is genuinely multisequential and massively rich in story material, written collaboratively by three friends, William Gillespie, Scott Rettberg, and Dirk Stratton, and also starring them as characters in the fiction. Of course, just about every one in the writing world is a character—here's a link for a fictional visit to Providence on their book tour… You can learn more about hypertext and digital writing from this fiction than from most theoretical or historical pontifications, including my present one…

I have chosen it also because it links to the ELO website—remember, linkages are the important thing here—in that it steps out of its fictional mode to describe the actual visit of *The Unknown* authors to Brown in 1999 when ELO was created, partly through their participation. Scott Rettberg was one of its principal creators and became its first executive director. And, incidentally, the gifted Oulipean electronic writer William Gillespie will be receiving his MFA in literary hypermedia from Brown this spring.

And finally I have chosen it because it marks a transition from classical pre-Web hypertext and the 21st Century convergence of all the digital arts into an essentially new art form, loosely called Web or Net Art, in which writing, or text, plays many different roles from traditional literary ones as here in *The Unknown* through a complete integration with other art forms, to a kind of supporting-actor role. We'll see a bit of each of these.

Talan Memmott: Some of the most distinctive literary hypermedia projects on the Web are being composed by the man who coined "literary hypermedia," Talan does his own programming and consequently no other hypertexts out there, if we can still call them hypertexts, look quite like his. For many young writers now, learning to program is like learning to read and write—an elemental compositional tool. Though each individual work by Talan is relatively self-contained, they interlink in many ways, above all thematically, creating a larger ongoing opus of which they are each a part of a still developing whole. A vision of a sort, forming itself.

There are story lines and characters, some of which reappear from work to work, but these traditional narrative elements soon disappear into an embracing project of self-reflection and self–examination, the "self" here being more that of the form itself, than that of the author. It is as though Memmott is seeking to think as the machine thinks, his intricate and elegant designs, precise and

classical, being a way for that character, that ghost in the box, or beyond it, to dress itself up for spectators.

Structurally, I would describe Memmott's work as primarily theatrical: he brings text, immaculately costumed, on stage where it can strut its stuff, engage in rhetorical display, surprise the audience with various turns and tricks, then make, often with a deathly suddenness, its exit. This vision of the electronic writing medium as an imaginative theatrical space with the word itself as leading actor is, for me, one of the most promising and intriguing aspects of Memmott's art. In his "Lux: Bronzino 1540," we find ourselves literally—or at least virtually—onstage, but in a manner only possible in this medium.

Talan, who also edits and does all the creative programming for the brilliant online journal, *BeeHive*, received his electronic writing MFA at Brown last spring and is headed this fall to Georgia Tech. You will find the URL for *BeeHive* on the Kosmopolis website, along with a selection of other such e-publications.

Caitlin Fisher's "These Waves of Girls" which won the 2001 $10,000 ELO fiction award, the last given before the collapse of the dot.coms who were the prize's sponsors, is a kind of fictionalized memoir of childhood, blending short narrative texts, photographs, artwork, sound and voice over, in a seamless mix that invites a sustained engagement even while avoiding a sustained plot. Much that exists in print literature does not yet translate well into this electronic medium. But personal memoirs: are they any better in print? No, they certainly are not.

John Cayley's "What We Will": The year that Caitlin Fisher won the fiction award, British poet John Cayley won the electronic poetry award. While still driven by text, now as voice over, John used QuickTime Virtual Reality, or QTVR, to create his lyrical, if melancholic "What We Will." Is this a narrative, a movie, or a poem? Many have already answered this. It is both all and none of the above. It is web art. And, pursuing our own theme of the moment, it is certainly theatrical. John spent part of a semester heading up a Cave research team at Brown last spring and produced some very beautiful new projects, as yet undocumented.

Media Using Text.

Those of us who are writers and readers tend still to privilege the word, for, in our perversely archaic love of storytelling and poetry, we cherish still the peculiar qualities of text, its intimacy, subtlety, vast expressive range and, through its very transparency, its power to stimulate thought and imagination, and then to reflect upon what it has done. It is true that the whole world is a text to be read, but it is also true that written literary text, standing alone on the tablet, the parchment, the page, the screen, is a unique and wondrous thing, nor so fragile as one might fear. Indeed, after a rough time of it for awhile, lost in all the hot hypermedia inventions of early Web days, it is not only making a comeback on its own, but is invading media like fine arts and film, or what we now often call motion graphics. Here, quickly, are a few examples of the way artists in other media are using text in the digital world.

Camille Utterback's "Text Rain." First, Camille Utterback's *Text Rain*, an interactive installation which she explains in the little film. Some of her work is in the collection of the Caixa Foundation (Fundacio La Caixa) here in Barcelona.

Noah Wardrip-Fruin & Camille Utterback: "Talking Cure." Net artist and electronic writer Noah Wardrip-Fruin, who received his MFA at Brown a year ago and is now working on his Ph.D. in New Media Studies, collaborated with Camille on an interesting installation piece called *Talking Cure.* Noah is teaching the Cave Writing workshop this year in my absence, and has several other works, including *The Impermanence Agent*, that can be located with a web search. *Talking Cure* uses the story of Anna O, a patient of Joseph Breuer, who gave to Breuer and Freud that infamous idea of psychoanalysis, or talking cures. Anna's snake visions are interwoven with imagery from the Gorgon Medusa. The reader or viewer has a microphone into which she can speak and add further text. The sound environment is a collage of all of these. Reading is accomplished with bodily movement. The reader sits in front of a video camera that displays her image on the screen as text. There are three colors, three layers of text, and words spoken by the viewer replace one of these layers. The video clip was shot at a large symposium where other things were going on nearby, but it gives some idea of how the piece works

Jeffrey Shaw's "Legible City." In this groundbreaking work of 1989, the viewer rides a stationary bicycle through a simulated 3D representation of a city—the actual ground plans of Amsterdam, Karlsruhe, and Manhattan are used—in which the buildings have been replaced by letters, forming a readable text. Thus, cycling through these cities of words is a journey of reading. The handlebar and pedals of the interface bicycle give the viewer interactive control over direction and speed of travel. Shaw likes to move the physical real world into the virtual environment, and he does that here through the physical effort of cycling. A small monitor screen in front of the bicycle shows a simple ground plan of each city, with an indicator showing the momentary position of the cyclist. In the Amsterdam and Karlsruhe version, the

letters are scaled to the same proportion and location as the actual buildings they replace, resulting in a transformed but exact representation of the actual architectural appearance of these cities, or at least their skylines. The virtual Manhattan version does not have that feature, but is more interesting hypertextually, as it contains eight separate fictional storylines to cycle through.

PART III: IMMERSIVE VIRTUAL REALITY

The Brown University Cave: Which cycles us right into the full immersive virtual reality of Brown University's **Technology Center for Advanced Scientific Computation and Visualization**, known best as "The Cave," one of several in the world, but the only one so far invaded by writers. It is, as its homepage says, an eight-foot cubicle in which high-resolution stereo graphics are projected onto three walls and the floor to create an immersive virtual reality experience. Special hardware and software, including head and hand sensors, keep track of the positions and movements of a person entering that environment, changing the images in the Cave in a way that allows the visitor to feel wholly immersed in the virtual space. It is, in short, a wow experience.

There are of course many other ways to deliver virtual reality experiences, many of them less cumbersome and expensive than a Cave. There are computer screen VR displays of course and wall-sized single screen "power walls," table-top 3D, and Caves can have more or less than four walls. When I was in Barcelona three years ago, Roc Pares' group at the Fabra used a booth or kiosk format. There are also the various head-mounted display systems as used in Shaw's *Legible City*, the sort of VR you're most likely to experience in a public exhibition, though I personally find these more like blindfolds with televisions inside than the real thing. In fully immersive Caves you keep your body; in typical head-mounted displays, you lose it, though Shaw, aware of this, integrates body and display with the stationary bicycle. An intriguing use of head-mounted display is that of Augmented Reality (AR), which allows the user to see the environment, but with virtual elements added to it. You might for example sit at an empty table and when you put the headgear on, you see people sitting in the other chairs with whom you can interact. It is very theatrical and, as such projects aspire to be interactive, they amount to realtime hyperdramas.

The Cave Writing Workshop: Though a facility built by scientists for scientists, the Brown Cave presented itself as an exciting new medium for writers. Just as we tested the future of literature on the screen and the Internet in our hyperfiction workshops, the challenge here was to see how the literary

word might fare in immersive virtual reality, convinced that virtual reality would inevitably be recognized as a viable narrative medium, along with film, books, theater, and electronic writing.

We were at first, not being scientists, excluded from the facility. But we noticed that none of the projects underway used text in any way, that the sound system was installed but not being used, the speakers dangling behind the screens, and that almost all projects were of static spaces or objects to be explored, like that of the ARCAVE project, for example. So, to get our foot in the door, we proposed a kind of scientific project to (1) introduce the word, both as visual text and as voice over, (2) augment the sound potential and work to develop positional or directed sound, and (3), using our decade or so of experience in hypertext, construct sophisticated narrative movements to complement the spatial ones presently in use. This was accepted, we brought a lot of new ideas into the Cave as well as new life, and now we're an integral part of the facility. Over two dozen different projects have been launched during the three active semesters of the workshop and three shorter research periods. This little demo film shows only a handful of them.

Of course, the film cannot deliver the experience of immersive virtual reality. For one thing, so as not to get a double image, we have to run the Cave in mono while filming, which means you are simply looking at four films running simultaneously on the four flat screens. In the stereo scenes, shot during actual Cave demos, you will see double images, which the viewers in the Cave will be seeing through their glasses as single images at various distances and directions from them—including right in front of their noses, as you'll hear. In the opening sequence, showing one scene from "Hypertable," the user is confronted by a virtual wooden table and a number of virtual boxes; he literally picks up one of the little boxes with his glove and sets it on the table, whereupon it explodes around him…

The Cave Writing Workshop Video script:

The Cave Writing Workshop is an advanced experimental electronic writing workshop, moving off the screen to explore the artistic potential of text, sound, and narrative movement in immersive three-dimensional virtual reality—what might be thought of as adventurous experiments in spatial hypertext. It represents a new way of thinking about and working with language that has all the power of film and theater, the intimacy of screen and book, and the direct interactivity of real-life encounters.

The workshop projects, collaboratively developed by teams of writers, artists, 3D modelers, electronic music composers, and creative computer programmers, have ranged from playful exercises as simple as puns and riddles to intricate poems, dramatic theatrical events, and complex narratives. One finds oneself, in effect, inside the book or play, able to interact intimately with it, uncovering hidden texts and sometimes helping to create the poem, scene, or story one is reading and hearing.

Here, for example, in a piece called "Screen," presented at SIGGRAPH in 2003, a haunting meditation upon memory and the loss of memory, the reader, confronted with the disintegration of a series of remembered tales, is drawn interactively into the effort to save them, engaging in a direct kinesthetic language confrontation that is utterly different from anything that has been attempted before, and one that is important for scientific visualization as well as for the liberal arts.

And in this piece, an interpretive voice-over reading of a memorial poem by A. R. Ammons, the reader is swept along in an experience that incorporates all three of the primary objectives of the workshop: to introduce (1) text, both visual and audio, and (2) positional sound, and (3) to create navigational structures more akin to narrative than to traditional spatial exploration. It moves from the vastness of outer space through green forests, fractal spheres, and Petri dishes with animated microorganisms, to the quiet interactive engagement with old family photos with their ghostly presences from the past.

For the first time, the reader is literally immersed in literature.

[NOTE: Much of the following may get cut.]

Telephone Flat: One project not shown in the film is the "Telephone Flat," so-called, an experiment in group narrative, that was launched the first semester. Somewhat like the earlier Hypertext Hotel, it allowed for any number of separate mini-tales created by various authors in a variety of voices. We already had a simple house model installed in the Cave and needed only to give it some character and fill it out. One relatively easy and memory-cheap way to enhance a space is to paste images on the surfaces of geometric or modeled shapes, a process called texture-mapping. One of the programmers said he'd just been to a party at a wild student flat with crawl spaces, basketball hoops, trampolines, and Spiderman on the ceiling, and he'd take his digital camera along to the next party there. He did much more. He took along a gifted 17-year-old 3D modeler who measured up the flat and completely reproduced it. For some reason it was called by its inhabitants the "Telephone Flat," and thus the project name. It was so beautiful we hardly knew what to do with it, especially since it already used up so many polygons we couldn't really introduce modeled characters. Eventually we settled on turning it into a sound story and began working seriously on positional sound.

Jeffrey Shaw's ConFIGURING the Cave: Jeffrey Shaw, who created *Legible City*, also moved into a Cave, creating one of the most fascinating VR projects so far, using a near-lifesize wooden puppet right in the

middle of the cubicle to make things happen, thus continuing his experiments of mixing real-body experiences with illusory VR. The figure, formed like an artists' mannequin, can be handled by the viewers to control the imagery and sound generated by the computer. ConFIGURING the CAVE has seven different audiovisual sequences. Movement of the puppet's body and limbs alter what you see and hear, while moving the puppet's hands to cover and then uncover its eyes causes the transitions from one pictorial domain to the next. There is no textual content in this project, but there is no reason why there could not be.

At Brown, we have separated our sound server, which is a Mac, from our graphic servers which are IBMs, the sound server files being triggered by signals from the graphic servers. Macs are more flexible, and read the signals easily enough, but it took us awhile to figure out how to get the graphic servers to read signals from the sound server. Now that we've accomplished it, electronic music composers can create midi keyboard projects that generate imagery in the way that Shaw's puppet does.

"Screen": "Screen," which was presented at SIGGRAPH 2003, and which you caught a glimpse of in the short film, is an experiment in interactive Cave reading, using only text, voice over, and reader movement. It is, in effect, though brief and unlike anything ever seen before, literature as we've always known it. This is the whole film, with which this talk concludes.

[May fast forward through the three stories in the middle, saying something like:]

The three screens tell tales of virtual experiences triggered by memory. The first screen tells the story of a woman, waking, imagining that the lover who has left her is in bed with her; the back screen is told by a man who senses his dead mother's fingers in his hair, cutting it; the third screen is a woman's waking remembrance of a room at her grandmother's house.

[Script of frame narrative of "Screen":]

In a world of illusions, we hold ourselves in place by memories. Though they may be but dreams of a dream, they seem at times more there than the there we daily inhabit, fixed and meaningful texts in the indecipherable flux of the world's words, so vivid at times that we feel we can almost reach out and touch them.

But memories have a way of coming apart on us, losing their certainty, and when they start to peel away, we do what we can to push them, bit by bit, back in place, fearful of losing our very selves if we lose the stories of ourselves.

But these are only minds that hold them, fragile data, softly banked. Increasingly, they rip apart, blur and tangle with one another, and swarm mockingly about us, threatening us with absence…

[END] We stare into the white void of lost memories, a loose scatter about us of what fragments remain. No sense but nonsense to be found there. If memories define us, what defines us when they're gone? An unbearable prospect. We retrieve what we can and try again…