# Cyberspace Textuality

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# Cyberspace, Virtuality, and the Text

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As computers took over our lives, two words invaded our vocabulary: "cyberspace" and "virtual." The first is a brash neologism, coined (out of two venerable roots) by a science fiction writer: William Gibson in *Neuromancer*. The second carries the prestige and load of a philosophical tradition dating back to the Middle Ages. Yet despite their strikingly different origins, "cyberspace" and "virtual" have come to be almost interchangeable, especially if "virtual" is appended to "reality." To the popular imagination, computers take us into cyberspace, and cyberspace is a virtual reality. The language fundamentalist may object to the semantic slippage that has led to this convergence of originally distinct signifiers. But the historian of the imagination, of culture, and of ideas should find an intriguing field of investigation in the powerful magnetism of these strange attractors. In the present essay, I propose to explore the nexus of ideas that have been associated with cyberspace and led to its merging with virtual reality. For this purpose, I will distinguish VR (the technology) from virtual realities (creations of the imagination), and from the philosophical concept of virtuality. My purpose in trying to unravel these threads is threefold: to give an overview of the intellectual climate that favored the emergence of the forms of textuality discussed in this volume, to prevent the association of VR and cyberspace from being taken for granted, and to gain a better understanding of the significance of the concept of virtuality for theories of textuality.

The entanglement of cyberspace with virtual reality took place in various forms of discourse: literature, technological speculation, and mass media. After its celebrated debut in William Gibson's *Neuro-*





*mancer* (1981), cyberspace served as the inspiration for the label of a literary movement (Cyberpunk). A few years later it became a leitmotiv in the prophecies of developers of computer technology and theorists of computer culture. By the mid-nineties, it was solidly established in popular media, advertisement, and common parlance, and "cyber" was on its way to becoming a standard English prefix (cyberculture, cyberchat, cybersex, cyberporn). Through these successive recontextualizations, the connotations of the term have swung from dystopic to wildly utopian to an ambiguous blend of fear and excitement. This is a remarkable career for a word whose referent is neither a palpable thing, nor a scientific or philosophical concept, nor even a technology—a word which seems in fact to have been deliberately created to bring support to the non-referential theories of language favored by the latter-day disciples of Saussure. As William Gibson wrote ten years after coining the word: "Assembled word *cyberspace* from small and readily available components of language. Neologic spasm: the primal act of pop poetics. Preceded any concept whatever. Slick and hollow—awaiting received meaning" ("Academy Leader" 27). Born without meaning, cyberspace is born without essence. Free of cultural tradition, the empty vessel of the neologism is pure potential. From its very beginning, cyberspace embodies the virtual.

When cyberspace enters literature on the third page of *Neuromancer*, however, it designates something reasonably precise: the function of a (computer) deck. This function is to connect the user to a system named the matrix: "He'd [Case] operated on an almost permanent adrenaline high, a byproduct of youth and proficiency, jacked into a custom cyberspace deck that projected his disembodied consciousness into the consensual hallucination that was the matrix" (5). The interdependency of cyberspace and the matrix is confirmed fifty pages later, when cyberspace makes its second (and last) appearance:

> "The matrix has its roots in primitive arcade games," said the voice-over, "in early graphics programs and military experimentation with cranial jacks." . . . "Cyberspace. A consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts. A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding." (51)

This definition of the matrix ties together two themes: the idea of a world-spanning computer network functioning as meeting place for

billions of users separated by physical space; and the idea of being immersed in a graphic display projected by computer data. One idea prefigures the Internet, the other VR technology. A mystical experience highly charged with eroticism (the metaphor of the matrix is used to describe orgasm during real-world love-making), Gibson's cyberspace realizes the Platonic dream of a reality fully accessible to the mind because bodies and their "meat" are recreated by the computer as intelligible patterns of information. The user "jacked" into cyberspace is inside a "sea of information" experienced not as information about something (the real world) but as the very texture of a more-than-real reality. In this hyperreality, the mind reaches fulfillment in a state of total knowledge:

> And there things could be counted, each one. He knew the number of grains of sand in the construct of the beach (a number coded in a mathematical system that existed nowhere outside the mind that was Neuromancer [an AI system]). He knew the number of yellow food packets in the canisters in the bunker (four hundred and seven). He knew the number of brass teeth in the left half of the open zipper of the salt-crusted leather jacket that Linda Lee wore as she trudged along the sunset beach. (258)

Despite its mystical overtones, however, the cyberspace experience of Gibson's fiction remains clouded by dystopic connotations. The matrix is less a space of salvation than an escape from a world made unlivable by technology. When the natural world disappears under the clutter of made-made objects (there is virtually no outdoors in *Neuromancer*), when organic life dies out (horses have long vanished), when physical space is compartmentalized to the point of offering no breathing room (Case lives in a three-meter coffin in the "cheap Hotel"), when individuals are mere pawns in the market wars of ruthless multinational corporations, seeking survival in a flight from a world conquered and plundered by technology into one entirely created by it can only be regarded as a pact with the devil.

## Cyberspace as Virtual Reality

The ambiguity of Gibsonian cyberspace vanishes in the early nineties, when the term is appropriated by the speculative discourse of developers, promoters, and other prophets of the nascent VR technology. VR, it will be reminded, is an immersive and interactive experience of a world generated by the computer. It places the user inside data itself, in a three-dimensional space projected by digitally encoded information.



The user's interface to the computer-generated world is her own body, enhanced through such prosthetic equipment as head-mounted displays, datagloves, and bodysuits. In 1988, the creators of a software called Autodesk chose the term "cyberspace" to name their research division (Rheingold 184). The term not only avoided the oxymoron of virtual reality, it also seemed particularly well-suited to designate the "substance" of the three-dimensional space projected by the computer: bits of information, rather than physical territory. The name (or nickname) of "cyberspace technology" gave an identity to the products of the VR industry and facilitated their marketing. [1]

In 1990, the first Conference on Cyberspace was held at the University of Texas at Austin. The text of the papers, together with some other essays written later, were gathered in an influential volume titled *Cyberspace: First Steps*. An interdisciplinary cocktail of lyrical effusion, technical discourse, philosophical reflection, and oracular pronouncements, the collection ratifies the marriage of cyberspace to virtual reality. The following sample of opening sentences—quoted from the papers by Heim, a philosopher, Tomas, an anthropologist, Wexelblatt, an engineer, and Meredith Bricken, an educator—should give the reader an idea of the mandatory, but rather vague character of the association (all italics mine): "With its *virtual* environments and simulated worlds, *cyberspace* is a metaphysical laboratory, a tool for examining our very sense of reality" ( Heim, "Erotic" 59). "The computer-generated interactive *virtual* environment of *cyberspace* has recently engaged the creative imagination . . . of researchers from various disciplines" (Tomas 31). "*Cyberspace*, or *virtual realities*, provide us with a number of powerful tools" (Wexelblatt 255). "In a *virtual world*, we are inside an environment of pure information that we can see, hear and touch . . . *Cyberspace* technology couples the functions of the computer with human capabilities" (Bricken 363).

A much more elaborate definition opens the contribution of the architect Marcos Novak:

> Cyberspace is a completely spatialized visualization of all information in global information processing systems, along pathways provided by present and future communication networks, enabling full copresence and interaction of multiple users, allowing input and output from and to the full human sensorium, permitting simulations or real and virtual realities, remote data collection and control through telepresence, and total integration and intercommunication with a full range of intelligent products and environments in real space. (225)

Get it? Novak admits (253) that his definition concatenates six different cyberspaces: Gibsonian, Barlovian (from John Perry Barlow, lyricist for the Grateful Dead, who offers this formula: "cyberspace is where you are when you are on the telephone" [180]), VR, simulation, telepresence, and "making reality a cyberspace," i.e., real-world uses of computer simulation. The definition would be a lot easier to read if the listed components were presented as the diverse applications of computing power and not as the facets of a global experience. Let's replace "cyberspace is" with "computers can do these things," and we will realize that the territory of cyberspace covers nothing less than all recent, future, or merely conceivable applications of electronic technology. Taken apart phrase by phrase, Novak's cyberspace definition offers a comprehensive overview of this territory:

1. *Spatialized visualization of information.* Graphs and tables generated by computer programs; also the three-dimensional visual displays of VR applications.
2. *Global information processing systems.* A universal database, such as the mythical universal electronic library.
3. *Pathways provided by present and future communication networks.* No need for a paraphrase here: the Internet is it.
4. *Co-presence:* What VR developers call telepresence. Users separated in physical space being made present to each other through the encoding and transmission of sensory data emanating from their bodies.
5. *Interaction of multiple users.* The creation of communities through the universal network. MOOs, user-interest groups.
6. *Input and output from and to the full human sensorium.* The ambition of VR technology to provide a multisensory experience. "Output from the full human sensorium" could mean a computer's ability to scan bodies for visual, auditive, olfactory, and tactile data, to digitize this information, and to reconstruct the (illusion of) the body for the user on the other end of the line. The phenomenon is limited so far to science fiction (in *Neuromancer*, Case making love to the reconstructed body of Linda Lee), but Howard Rheingold has a name for its eventual implementation: teledildonics.
7. *Simulations of real and virtual realities.* Notice here the partial dissociation of cyberspace from virtual realities. But this does not necessarily loosen the connection between cyberspace and VR, since VR technology can simulate the real world as well as imaginary ones. Examples: flight simulators (real realities); theme park rides using electronic displays (virtual realities).



8. *Remote data collection and control through telepresence.* VR systems operating on physically remote objects by manipulating their digitized representation. This technological form of voodoo is exemplified by medical uses of VR.
9. *Total integration and intercommunication.* All the threads of life, knowledge, and experience tied together by computers. The dream of a global intelligence synthesizing and linking all information. Examples: Gibson's matrix; Borges's Aleph.
10. *A full range of intelligent products and environments in real space.* The use of AI resources to facilitate access to and manipulation of the data stored in the system. Example: searching algorithms for the Internet; mail scanners, and devices blocking access to censured materials.

For most of the contributors, however, cyberspace is much more than a portmanteau term for applications of electronic technology. It is foremost a catalyzer of dreams. True to Gibson's definition, the cyberspace of *Cyberspace: First Steps* is a collective hallucination of unlimited dimensions, since their number is determined by the imagination. Further down in Novak's text we read: "Cyberspace is poetry inhabited, and to navigate through it is to become a leaf on the wind of a dream" (229). Nicole Stenger, an artist and poet using VR technology, chimes in: "Without exaggeration, cyberspace can be seen as the new bomb, a pacific blaze that will project the imprint of our disembodied selves on the walls of eternity" (51). In the introduction to the volume, Michael Benedikt proposes a poetic meditation on the word that explores its thematic range and imaginative value as fully as Novak's definition covers its technological interpretations. In the net of its two roots, cyberspace captures:

1. A separate reality, reminiscent of the alternate possible words of semantic logic and of the theoretical constructs of speculative physics: "A parallel universe, created and sustained by the world's computers and communication lines" (1).
2. A gigantic archive, constantly updated, serving as the depository of the known and as the incubator of knowledge, "where nothing is forgotten and yet everything changes" (1).
3. An ever expanding territory, whose frontiers are continually pushed back by the forward momentum of the inquiring mind: "Its horizon recedes in every direction; it breathes larger, it complexifies, it embraces and involves" (2).
4. A place of circulation, trading, speculation, and relentless activity—the dynamics of capitalism turned into a spectacle: "money

flowing in rivers and capillaries; obligations, contracts, accumulating" (2).

5. A common market of knowledge where information falls into the public domain, and intellectual property dissolves into an unrestricted exchange of ideas: "everything informational and important to the life of individuals will be found . . . for the taking, in cyberspace" (2). (Benedikt also mentions the alternative "offered for sale," suggesting a new form of intellectual capitalism.)
6. A solution to the degradation of the environment in the real world: "[a] realm of pure information . . . decontaminating the natural and urban landscapes, redeeming them, saving them from the chain-dragging bulldozers of the paper industry, from the diesel smoke of courier and post office trucks, from jet fuel fumes and clogged airports" (3).
7. "An extension of our age-old capacity and need to dwell in fiction" (6), joining so many conscious and subconscious, culturally sanctioned and forbidden activities in the pursuit of another reality: dreams, drug-induced hallucinations, myth, ritual, and the arts.
8. A new art medium, marking the last stage in the development of writing technologies: "the tablet become a page become a screen become a world, a virtual world" (1).

## From VR to the Internet

The various interpretations proposed by Benedikt confirm the polarization of the Gibsonian concept of cyberspace into a virtual reality and a networking component. At times cyberspace strikes the imagination as an enveloping space, an immersive substance, a cozy habitat; at other times, it is conceptualized as a dynamic environment, a slick surface, a force to catch in order to be transported elsewhere. The VR theme invites plunging into the depth of cyberspace, the networking theme surfing on top of a wave. In recent years, the emphasis has clearly switched from the VR to the networking theme. When the word began to spread into common language, virtual reality was perceived as the hot new thing in electronic technology, "soon coming to an arcade near you." Compared to AI, formerly the most publicized field in computer science, VR represented an entirely different philosophy of the relations between human and machine: whereas AI sought to replace the human mind, VR placed the human element at the center of the stage. Computers were no longer supposed to run the world for us—their purpose was to help create a world in an interactive relation with a human partner. But for all the publicity that heralded its advent, VR has



not (yet) had a significant impact on our daily lives. Few people have ever visited state-of-the-art displays, such as what can be experienced at SIGGRAPH conferences on the West Coast, or at the Computer Museum in Boston. Medical and scientific applications of VR technology are not accessible to the general public. For those interested, teledildonics is still years away (and this is being optimistic). The label "virtual reality" has been attached to some computer games using goggles to improve the life-likeness of the visual display, but these applications are a far cry from the interactive, immersive environment described in the VR literature. In short, VR is not much more accessible to most of us in 1997 than it was in 1991. As VR went into a stall, however, telecommunications through computer networks began to monopolize the headlines. The Internet has made a much greater difference in our lives than the simulated worlds of VR technology. This explains why the media have made cyberspace into a second name (nickname? metaphor?) for the Internet. Subscribers to the network are commonly referred to as "cyberspace users" and time spent on-line is time in cyberspace. In the language of the press, cyberspace has become to the Internet what solons are to senators, gridders to football players, and nimrods to hunters.[2] "Jump into cyberspace, get Internet access," a radio ad urges us (heard on 10/12/1996). But as the Internet became the primary referent of cyberspace, the term maintained the connotations inherited from its VR connection. Through these connotations, the label of "cyberspace" has shaped the public perception of the Internet experience, favoring the global assimilation of the network to a virtual reality.

In a strict sense, of course, there is no reason to regard the Internet as a VR system. It exists for the exchange of information, and this exchange can be a way of doing the business of the real world. Do we flee into some other reality when we use on-line services to check the stock market, buy or sell products, find out the amount of new snow at our favorite ski resort, browse the catalog of some remote library, or retrieve a text we need for research purposes? Are we playing roles, building imaginary bodies, and performing on the stage of a fantasy world when we exchange e-mail for professional reasons? Admittedly, there are other uses of the network than doing the real world's business: cruising around for the fun of it, playing games, conversing with strangers, reading the on-line soaps, visiting the genuinely fictional worlds of the MOOs. If a virtual reality is an imaginary world in which we play a role, there are countless pockets of virtuality on the Internet. To the imagination nourished by the discourse of mass media, these pockets threaten to spill over the entire network.

The metaphor of the Internet as cyberspace replaces the idea of mo-

bile information with the idea of a mobile user: the experience of using the Internet is not one of receiving data through the telephone lines but one of being transported to a site functioning as host, heart, and mother lode of the data. In the old regime of the imagination, telecommunication was conceived on the model of epistolary exchange: in a telephone conversation the voice traveled over the lines, as the letter traveled on mail carriers. In the paradigm created by the cyberspace metaphor, Internet and telephone users meet in a common virtual place. As a "cybernaut" told Mark Dery: "One of the most striking features of the WELL [Whole Earth 'Lectronic Link] . . . is that it actually creates a feeling of 'place.' I'm staring at the computer screen. But the feeling really is that I'm 'in' something; I'm some 'where' " (*Escape Velocity*, 7). On-line services and MOO designers did their best to promote the feeling, by naming their services chatrooms, electronic cafés, and hypertext hotels.

As an imaginary country nowhere to be found on the map (also known as Cyberia or Cyberelia), cyberspace presents several properties not shared by physical space. It is traveled by jumps and seemingly instantaneous transportation (known as teleporting) rather than being traversed point by point like Cartesian space. It is not finite, but infinitely expandable: claiming a territory as one's own (for instance, by creating a home page on the Net) does not diminish the amount of cyberspace available to others. Being non-physical, it is equidistant from all points in the physical world: as Benedikt observes, cyberspace is equally accessible (theoretically at least) "from a basement in Vancouver, a boat in Port-au-Prince, a bar in Kyoto, a laboratory on the Moon" (1). Since it expands and changes continually, it cannot be mapped. The path that took you to that fascinating Internet site one day may be gone the next day (in fact, the site itself may be gone). In cyberspace, objects lose their unity: a message sent through the Internet is broken up into packets, and put back together at the end of the trip, after each packet has traveled through a different route. Rewriting the geography of the real world, cyberspace alters physical distance: a user located on the other side of the planet may be easier to reach than your next-door neighbor. It is not continuous but made of gaps and holes: as Nunes argues in this volume, if you are not connected to the Net, you are not part of it. All in all, the Internet and its metaphorical space are the closest approximation of the mystical circle whose center is everywhere and circumference nowhere: every user regards his home site as the heart of the system, and there is no limit on how far the system can reach.[3]

The sense of the virtual nature of the "reality" made accessible by the Internet is intensified by the wide use of the label of "virtual" technologies to refer to the products of the software industry. This use is due to the importance of the concept of virtuality in computer architecture. A computer, it will be remembered, is a machine able to execute sets of instructions, or programs, designed to solve a variety of problems. The electronic circuits that make up the physical machine can recognize and execute a very limited repertory of instructions, known as machine language. This makes programming a very tedious and difficult affair. The task can be facilitated by using higher-level languages with a wider repertory of more powerful instructions, such as BASIC or C, and translating them into machine language through a program (written in machine language) known as a compiler or interpreter. Since the physical machine is unable to execute the commands of the higher-level language, the C or BASIC programmer interacts with a virtual machine. If the language of level 2 is still too difficult to handle, the process can be repeated by creating a level 3 language and translating it into the level 2 language: there is no limit to the number of virtual machines that can be stacked upon the physical machine. At the top of the stack we may find some day a virtual machine that understands spoken natural languages. The idea of virtuality has also been applied to memory management, time-sharing systems, and the problem of portability (making a program run on different types of hardware). Still another use of the concept of virtuality refers to the versatility of the computer. As a machine, a computer has no intrinsic function. Through its software, however, it can simulate a number of existing devices and human activities, thus becoming a virtual calculator, typewriter, record player, storyteller, baby-sitter, teacher, bookkeeper, or adviser on various matters. Or even, as VR suggests, a virtual world and living space.



In a double metonymic transfer, the term "virtual" has been extended from the technical vocabulary of computer science to the technology developed by this science, and from the technology to any of its uses. A romance conducted on the MOO is commonly described as a virtual romance, a group of people connected by the net is known as a virtual community (though old-fashioned pen pals who never meet in reality would never have been called virtual friends in the pre-networking days), universities offering on-line courses are virtual universities, and a political campaign conducted through a home page on the Internet has been recently labeled a virtual campaign.[4] (Will the candidate be a virtual governor if he gets elected?) The titles of recently founded journals confirm the metonymy: *The Journal of Virtual Relations* (meaning electronically mediated) and *The Electronic Journal of Virtual Culture*. The tendency to regard all products of electronic technology as virtual has also affected the textual domain. According to George

Landow, "[s]ince electronic text processing is a matter of manipulating computer-manipulated codes, all texts that the reader-writer encounters on the screen are virtual texts" (19). In the same vein, Katherine Hayles calls writing with the help of a word processor "virtual writing," in part because the signs are "flickering signifiers," lacking any solid materiality. Richard Lanham does not use the word "virtual," but he comes very close when he ascribes to electronic texts a property of potentiality: "[t]he electronic word has no essence, no quiddity, no substance [of the sort embodied by books]. It exists *in potentia* as what it can become, in the genetic structures it can build" (19). It could further be argued that electronic texts are stored in a virtual location, because their material support is not a volume of space (and a volume in space), but invisible silicon chips virtually (I mean almost) deprived of extension. Taken to its limits, the metonymy could even affect the concepts of the self and the real: if technologies construct subjects, then cyberspace users become virtual selves; if they construct the real world, this world becomes another virtual reality. Virtual technologies thus become virtualizing technologies.

## The Two Faces of the Virtual

This metonymic extension of "virtual" to describe all computer-mediated activities and all aspects of electronic culture threatens a weakening, or even loss, of semantic substance. If "virtual" becomes simply synonymous with "computer mediated," it will not tell anything of interest about the phenomena it refers to. For the word to capture significant features of electronic culture, it must retain something of its traditional kernel of meaning. To see what may be virtual about electronic texts and culture, let us therefore go back to pre-technological definitions.

Etymology tells us that "virtual" comes from the Latin *virtus* (strength, manliness, virtue), which gave to scholastic Latin the philosophical concept of virtus as force or power. (This sense survives today in the expression "by virtue of.") In scholastic Latin, *virtualis* designates the potential, "what is in the power (virtus) of the force." The classical example of virtuality, derived from Aristotle's distinction between potential and actual existence (*in potentia* vs. *in actu*), is the presence of the oak in the acorn. In scholastic philosophy "actual" and "virtual" exist in a dialectical relation rather than in one of radical opposition: the virtual is not that which is deprived of existence, but that which possesses the potential, or force of developing into actual existence. Later uses of the term, beginning in the eighteenth and nineteenth centuries, turn this dialectical relation to actual into a binary opposition to real: the virtual becomes the fictive and the non-existent. This sense is activated in the optical use of the term. According to Webster's dictionary, a virtual image (such as a reflection in a mirror) is one made of virtual foci, that is, of points "from which divergent rays of light seem to emanate but do not actually do so." Modern uses of "virtual" exploit the idea of fake and illusion inherent to the mirror image. A virtual dictator is a ruler functioning as dictator, without being officially recognized as such. In this sense, the virtual is perceived as both the equal of the real and as its inferior. Even though it is "as good as" the real thing, it suffers from a lack of legitimacy that prevents it from completely displacing the real.



As we see from these lexical definitions, the term "virtual" encapsulates two distinct concepts: the largely negative idea of the fake, illusionary, non-existent, and the overwhelmingly positive idea of the potential, which connotes productivity, openness, and diversity. These features correlate to the two dimensions of the VR experience, as defined by Pimentel and Texeira: "In general, the term virtual reality refers to an immersive, interactive experience generated by a computer" (11). It is through immersion that the VR user experiences the "fake," immaterial world projected by the computer as a physically present reality to which she can relate through the movements of her own body; it is through interactivity that she actualizes one of the many possible worlds contained *in potentia* in the simulative system.

## The Virtual as Fake

If the virtual is the fake, cyberspace is a virtual space because it creates a sense of place, even though it does not exist physically; and the Internet provides the experience of virtuality because it transports the user into the non-existing territory of cyberspace.

In the textual domain, the virtual-as-fake is manifested as fictionality. The fictional text invokes the non-existing in the factual mode, thereby inviting the reader to pretend belief (or suspend disbelief) in its (lack of) reality. This idea of suspension of disbelief is the literary-theoretical equivalent of the VR concept of immersion. It describes the attitude by which the reader brackets out the knowledge that the fictional world is the product of language, in order to imagine it as an autonomous reality populated by solid objects and embodied individuals. The importance of the experience of immersion for the phenomenology of reading for pleasure has been acknowledged under various names: being lost in a story (Nell); transportation into a fictional world

(Gerrig); engaging in a game of make-believe (Walton, *Mimesis*); and mental simulation of the represented events (Walton, "Spelunking").

The assimilation of the virtual to the fake reflects the obsession of postmodernism with simulacra and technologies of reproduction, an obsession forcefully described by theorists of contemporary culture such as Eco and Baudrillard. In contrast to the Décadence movement of the late nineteenth century, which cultivated the artificial out of fear or disgust for the natural, the late twentieth century regards the fakeness of the fake as an inherent source of aesthetic gratification. In this frame of mind, the purpose of art is not to redo the creation to make it more livable, as it was for Décadence writers, but to flaunt its own power of simulation by making the copy more desirable than the original. As Eco has argued, the visitors of Disneyland are more thrilled by automata performing as pirates or animals in the jungle than they would be by real animals or by role-playing humans. The worlds created by VR technology promise to outdo Disneyland in their combination of lifelikeness and artificiality. In the recent work of Baudrillard, VR has indeed displaced Disneyland as allegory of the addiction of late-twentieth-century culture for the hyperreal (Poster, this volume).

The opposition of the virtual-as-fake to an implicitly authentic real has prompted two types of reactions. One of them is a rejection of the fake, leading to a backlash against electronic culture. A flurry of recent books enjoins us to "get real" by renouncing the so-called virtualizing technologies: *Silicon Snake Oil* (Stoll), *The Gutenberg Elegies* (Birkerts), *War of the Worlds* (Slouka), *Virtual Realities and Their Discontents* (Markley), *Virtual Worlds: A Journey in Hype and Hyperreality* (Woolley), *Resisting the Virtual Life* (Brook and Boal), *Data Trash: The Theory of the Virtual Class* (Kroker and Weinstein). Computers may take us into virtual worlds, but it is on this side of the symbolic screen, these books tell us, that we will find genuine human relations, the outdoors, a body able to move in space without cumbersome contraptions, books that can be read in our bath and authors who can be our partners in an intellectual exchange.

The other reaction is one of skepticism regarding the concept of real life and its alleged authenticity. As Sherry Turkle argues, "[the] context [of the culture of electronic simulation]" is the story of the eroding boundary between the real and the virtual (10). For Michael Heim, the development of virtual realities challenges us to reexamine our sense of reality. Will the development and propagation of VR technologies swallow the real and lend support to the militant anti-realism of postmodern thought, as these technologies create an addiction to their fake worlds? Is RL (the MOO users' abbreviation for real life) "just one more window, and it's usually not [the] best one," as an informant told Turkle (13)? If the answer is negative, as my instinct tells me, what are the criteria for distinguishing computer-generated virtual worlds from the real world?



It used to be that the presence of the body spelled the difference between virtual worlds and reality; but with the development of VR technology, this is no longer true. As Brenda Laurel argues, computer simulations offer the opportunity of "taking your body with you into worlds of the imagination" (14). Common sense suggests a number of other distinctions: Virtual worlds are controlled by rules, the real world behaves unpredictably. Virtual worlds are created by man, the real world is not. Virtual worlds depend on the real world for energy, the real world creates its own. Virtual worlds are immaterial, the real world contains matter. Thomas Laudal, an engineer, refutes all these arguments: virtual worlds are capable of evolving in a way not foreseen by their programmers. This is known as "emergent" behavior. A virtual world capable of emergent behavior is in a state of continuous self-creation, rather than being created once and for all by man. If virtual worlds depend on another world for their energy, so perhaps does the real world: its energy may come from the big bang or black holes speculated by modern physics. And finally, virtual worlds are not totally deprived of matter: as Laudal argues, they contain lots of electrons and photons. Their matter is simply more fluid and less dense than the matter of reality. The last three of these arguments bring to mind an idea developed by J. L. Borges in *The Circular Ruins*. The story depicts a man who dreams another man into reality, only to realize that he may himself be the dream of another mind, and so on *ad infinitum*. By the same reasoning, the real world could be seen as the virtual world of another world, thus losing its centrality in the system of all possible worlds.

To these theoretical arguments, Michael Heim opposes a gut feeling. The difference between real and virtual realities resides in three constraints that "anchor" us in the real world: our inevitable mortality, the irreversible direction of time, and a sense of precariousness arising from the possibility of physical injury (136). It is, in other words, the final character of evil that provides the ontological proof of the difference between real and virtual worlds: if I die or get injured in a computer-generated reality, I can always exit the system, rewind time and start all over again. This argument is valid for currently available simulation systems, but it would not stand against Laudal's objections: one can conceive of a VR system in which time would be irreversible and death final, because users would be locked in. This possibility is suggested by the drama *The Maids* by Jean Genet: when the maids stage the murder of

their hated mistress in a play within the play, the one who plays the mistress ingests poison and dies, both in the virtual world of the simulation and in the actual world. The virtual world has been designed in such a way as to prevent escape.

## The Virtual as Potential

If the virtual as fake cannot be rigorously distinguished from the real, we may avert the problem by returning to the scholastic definition of the virtual as potential. This alternative is developed by Pierre Lévy, an eminent French theorist of computer culture. Lévy writes:

> Rigorously defined, the virtual has few affinities with the false, the illusory, the imaginary. The virtual is not at all the opposite of the real. It is, on the contrary, a powerful and productive mode of being, a mode that gives free rein to creative processes. . . . (10; all translations are mine)

I will develop here Lévy's theory of the virtual in some detail because it covers texts, writing, electronic technology, and many aspects of contemporary culture without reducing them to virtual realities. (Of the two grammatical forms of "virtual," the noun is much more likely to suggest the potential, and the adjective form the fake and non-real.)

Lévy outlines his idea of the virtual (inspired in part by Deleuze) by opposing two conceptual pairs: one static, involving the possible and the real, and the other dynamic, linking the actual to the virtual.[5] The possible is fully formed, but it resides in limbo. Making it real is largely a matter of throwing the dice of fate. In the terminology of modal logic, this throw of dice may be conceived as changing the modal operator affecting a proposition, without affecting the proposition itself. The operation is fully reversible, so that the proposition *p* can pass from mere possibility to reality back to possibility. In contrast to the predictable realization of the possible, the mediation between the virtual and the actual is not a deterministic process but a form-giving force. The pair virtual/actual is characterized by the following features:

1. The relation of the virtual to the actual is one to many. There is no limit on the number of possible actualizations of a virtual entity.
2. The passage from the virtual to the actual involves transformation, and is therefore irreversible. As Lévy writes: "Actualization is an event, in the strong sense of the term" (135).
3. The virtual is not anchored in space and time. Actualization is the passage from a state of timelessness and deterritorialization to an existence rooted in a here and now. It is an event of contextualization.
4. The virtual is an inexhaustible resource. Using it does not lead to its depletion.



These properties underscore the essential role of the virtual in the creative process. For Lévy, the passage from the virtual to the actual is not a predetermined, automatic development, but the solution to a problem which is not already contained in its formulation. "Actualization is . . . the invention of a form out of a dynamic configurations of forces striving toward a goal [*configuration de forces and finalities*]. It involves more than the passage of the possible into the real and more than a choice from a predefined set of alternatives: it is the production of new qualities, a transformation of ideas, a true becoming which nourishes the virtual in a feedback process" (15). As this idea of feedback suggests, the importance of Lévy's treatment of virtuality does not merely reside in its insistence on the dynamic nature of actualization, but in its conception of creativity as a two-way process involving both a phase of actualization and a phase of virtualization. While actualization is the invention of a concrete solution to answer a need, virtualization is a return from the solution to the original problem. This movement can take two forms: given a certain solution, the mind can reexamine the problem it was meant to resolve, in order to produce a better solution; cars, for instance, are a more efficient way to solve the problem of transportation than horse-drawn carriages. Virtualization can also be the process of reopening the field of problems that led to a certain solution, and finding related problems to which the solution may be applied. A prime example of this process is the evolution of the computer from a number-crunching automaton to a worlds-projecting and word-processing machine.

The concept of virtualization is an extremely powerful one. It involves any mental operation leading from the here and now, the singular, the usable once and for all and the solidly embodied to the timeless, abstract, general, versatile, repeatable, ubiquitous, immaterial, and morphologically fluid. Skeptics may object that Lévy's concept of virtualization simply renames well-known mental operations such as abstraction and generalization; but partisans will counter that the notion is much richer, and that the significance of the theory resides precisely in making virtualization at the same time a timeless operation responsible for all of human culture, and a trademark of the contemporary *zeitgeist*. In our dealing with the virtual, we are doing what mankind has always done, only more powerfully, consciously, and systematically. The stamp

of postmodern culture is its tendency to virtualize the non-virtual and to virtualize the virtual itself. If we live a "virtual condition," as Katherine Hayles has suggested, it is not because we are condemned to the fake, but because we have learned to live, work and play with the fluid, the open, the potential.

Lévy's examples of virtualization thus includes both elementary cultural activities and contemporary developments. Among the former are tool making and the creation of language. Tool making involves the virtual in a variety of ways. The concrete, manufactured object extends our physical faculties, thus creating a virtual body. It is reusable, thus transcending the here and now of actual existence. Other virtual dimensions of tools are inherent to the design itself: it exists outside space and time; it produces many physically different yet functionally similar objects; it is born out of an understanding of the recurrence of a problem (if I need to drive *this* nail here and now, I will need to drive nails in other places and at other times), and it is not worn out by the process of its actualization. Language originates in a similar need to transcend the particular. The creation of a system of reusable linguistic types (or *langue*) out of an individual or communal experience of the world is a virtualizing process of generalization and conceptualization; conversely, the use of the system through individual acts of parole is an actualization that turns the types into concrete tokens of slightly variable phonic or graphic substance. Through this actualization, language is contextualized and bound to a spatially and temporally determined referent. Even in its manifestation as parole, language exercises a virtualizing power. Life is lived in real time, as a succession of presents, but through its ability to refer to physically absent objects, language puts consciousness in touch with the past and the future, metamorphoses time into a continuous spread that can be traveled in all directions, and transports the imagination to distant locations.

As examples of more specifically contemporary forms of virtualization, Lévy mentions the transformations currently undergone by the economy and by the human body. In the so-called information age, the most desirable good is no longer solid manufactured objects, but knowledge itself, an eminently virtual resource since it is not depleted by use, and since its value resides in its potential for creating wealth. On the negative side, the virtualization of the economy has encouraged the pyramid schemes currently plaguing the industries of sales and investments. As for the body, it is virtualized by any practice and technology aiming at expanding its sensorium, altering its appearance, or pushing back its biological limits. The inspiration for these practices is the fundamentally virtualizing question: To what new problems can I apply this available resource? As we have seen above, the virtualization of the body begins with the manufacturing and use of tools. In contemporary culture and counterculture, the process is intensified by an array of body-manipulating practices prominently featured in cyberpunk fiction: genetic engineering, cosmetic surgery, sex-change operations, body-building, body art, extreme sports (through which the body becomes fish, bird, or mountain goat), artificial organ implants, performance-enhancing equipment, remote-control devices, telecommunications, and last but not least, VR applications. The development of simulation technologies such as VR illustrates yet another tendency of contemporary culture: the virtualization to a second degree of the already virtual. The purpose of a simulative system is to explore the range of situations that can develop out of a given state of affairs. The knowledge gained by trying out the potential enables the user to manage the possible and to control the development of the real. If all tools are virtual entities, simulations are doubly virtual, since they incorporate the virtual into their mode of action.



The textual domain has not been spared from the virtualizing frenzy of the postmodern age. Consider first the text in its material support. If the virtual is a singularity that produces a plurality, the history of writing technologies is a tale of ever increasing virtuality. The oral text depended on the presence of the body, and the closest thing to duplication was a new performance made possible by memorization. Texts became easily preservable with the invention of writing, and easily copyable with the invention of printing. The electronic medium takes this property to a higher level. Texts can be copied on disk by the stroke of a key; by another stroke, the disk version is copied to the screen. Since the version preserved on disk is invisible to the user, it exists in the virtual mode, waiting for an actualization that will fulfill its potential: being perceived by the eye, being read by the mind. Rather than listening to an original oral performance, or holding one of the many copies of a book, the reader of the electronic text faces one of many screen actualizations of one of many disk copies. Paralleling this exponential ratio of duplication is a loss of volume and solidity of the material support: from the live human body, to thin clay tablets, sheets of paper, minuscule silicon chips, and easily erasable pixels of light flickering on the screen, the text is virtualized by the rarefaction of its substance.[6]

Virtuality is more than a feature of the newly developed material supports of the text; it is also the mode of existence of the text itself as mental object and linguistic artifact. "From its Mesopotamian origin,"

writes Lévy, "the text has been a virtual and abstract object, independent of any particular support" (33). Paradoxically, this virtual object originates in an actualization of thought. The act of writing taps into (and enriches in return) a reservoir of ideas, memories, metaphors, and linguistic material which contain potentially an infinite number of texts. These resources are textualized through selection, association, and linearization. But if the text is the product of an actualization, it reverts to a virtual mode of existence as soon as writing is over. From the point of view of the reader, a text is like a musical score waiting to be performed; every act of reading constructs the text and actualizes its world in a different way. This potentiality is not just a matter of being open to various interpretations, nor of forming the object of infinitely many acts of perception; otherwise texts would be no more and no less virtual than works of visual art or things in the world such as rocks and tables. The virtuality of texts and musical scores stems from the complexity of the mediation between what is there, physically, and what is made out of it. Color and form are inherent to pictures and objects, but sound is not inherent to musical scores, nor are thoughts, ideas, and mental representations inherent to the graphic or phonic marks of texts. They must be constructed through an activity far more transformative than interpreting sensory data. In the case of texts, the process of actualization involves such highly individualized operations as filling in the blanks in the text with information drawn from the reader's knowledge, memory, and experience; visualizing in imagination the depicted scenes, characters, and events; and spatializing the text by following the threads of various thematic webs, often against the directionality of the linear sequence.

As a generator of potential worlds, interpretations, uses, and experiences, the text is thus always already a virtual object. What the marriage of postmodernism and electronic technology has produced is not the virtual text itself, but the elevation of its built-in virtuality to a higher power. In no form is this exponentiation more obvious then in hypertext. A double one-to-many relation creates an additional level of mediation between the text as produced by the author ("engineered" might be a better term) and the text as experienced by the reader. This additional level is the text as displayed on the screen. In a traditional text, we have two levels:

1. The text as collection of signs written by the author
2. The text as constructed (mentally) by the reader

The object of level 1 contains potentially many objects of level 2. In a virtualized text, the levels are three:



1. The text as written or "engineered" by the author
2. The text as presented, displayed, to the reader
3. The text as constructed (mentally) by the reader[7]

One object of level 1 generates many objects of level 2, which in turn contain potentially many objects of level 3. The additional level is not exclusive to electronic texts. Classical print examples of second-order virtuality are *Hopscotch*, by Julio Cortázar, which can be read according to several reading protocols; or Raymond Queneau's *Cent mille milliards de poèmes*, which are generated by combining the lines of fourteen different sonnets. But the additional level of virtuality is greatly facilitated by the electronic medium. In hypertext, the textual machinery becomes, in Lévy's words, "a matrix of potential texts" (38). As a virtualization of the already virtual, hypertext is truly a hyper-text, a self-referential reflection of the virtual nature of textuality.

As I have suggested above in reference to VR, the development of the virtual as potential usually involves an interactive relation between the user and the system. In textual matters, the concept of interactivity can be interpreted in two ways: figuratively and literally. As might be expected, it is the literal forms that elevate textual virtuality to a higher power. Each of the two manifestations of interactivity may in turn be divided into a weak and a strong form:

| | Interactivity | |
|---|---|---|
| | Figural | Literal |
| Weak | Classical narrative | Hypertext |
| Strong | Postmodern texts | MOOs, Interactive Drama |

**Table 4.1**

In the weak figural sense, interactivity stands for the collaboration between the reader and the text in the production of meaning. As the phenomenologist Roman Ingarden and his disciple Wolgang Iser have shown, the construction of the fictional world is an active process through which the reader provides as much material as she derives from the text. This activity is intensified by the problematic coherence and self-referential stance of postmodern literature: the postmodern text invites the reader to construct a fictional world not so much to become immersed in it, as for the purpose of observing the process of its construction. Interactivity between text and reader can be literal only if

the text undergoes physical changes during the reading process. The interactivity of hypertext is weak because the reader's contribution to the configuration of the text is a choice between predefined alternatives, rather than the actual production of signs. It is only in the performance-oriented environment of MOOs and Interactive Drama, where the user's empowerment involves the power to use language, that interactivity reaches its full meaning of active participation in the creative process.

As important as interactivity is to the development of virtuality, however, it is not the only way to produce an ever changing text. In the visual arts, we have mechanized objects that move like machines, sculptures that chime in the wind, and structures that reflect the light of the sun at different times of the day. All of these artworks present the "many-in-one" quality of the virtualized work. In the textual domain, there are so-called textual machines that use aleatory procedures to produce an ever changing display without intervention by the user. (See "computer-modulated texts" in the introduction to this volume.)

Even when the renewal of the text is obtained through interactive mechanisms, as in hypertext, randomness plays an important role in the process. There is a significant difference between the interactivity of hypertext and of VR systems. In VR, the user can usually foresee the result of her actions. For instance, she can touch a can of yellow paint, then touch the carpet of a virtual living-room display, and the carpet turns yellow. But in most literary forms of hypertext the choices are largely blind. In Michael Joyce's *Afternoon,* we are told that there are "words that yield," words that have special links and branches attached to them, and others that simply lead to the default continuation. The words that yield are not physically marked, and there is really no way for the reader to detect them other than trial and error. The author gives rather cryptic suggestions in the accompanying pamphlet: try pronouns, words that appeal to you, words that have "texture." There is of course no guarantee that a word that has texture for me also will for the author: part of the appeal of the game is to find out where Joyce has hidden links, and whether he and I agree on which words are worthy of special treatment. In this case, reading the hypertext becomes like an Easter egg hunt; the reader clicks on words to find out if more words are hidden underneath. Another function of clicking is to keep the textual machine running. Hypertext theorists claim that interactivity reduces the gap between reader and writer, but the reader's contribution to the production of the text is mostly that of an agent of chance.

It is in non-fictional uses of hypertext that the reader has the greatest control of the textual display. In the World Wide Web, for instance, the



highlighted, link-activating key words capture the topic of the text to be retrieved and enable the reader to customize the output to her own needs. In Lévy's words, the screen becomes a new "reading machine, the site where a reserve of potential information is realized here and now for a singular reader through an act of selection" (Lévy 39). As the user of the electronic reading machine retrieves, cuts, pastes, links, and saves, she regards text less as a unified work to be experienced in its totality than as a resource that can be scooped up by the screenful. Electronic technology has not invented the concept of text-as-resource, but it has certainly contributed to the current expansion of this approach to reading. The attitude promoted by the electronic reading machine is no longer "what should I do with texts" but "what *can* I do with them." In a formula that loses a lot in translation, Lévy writes: "Il y a maintenant du texte, comme on dit de l'eau et du sable" (46). (There is now "text," as there is sand and water.) If text is a mass substance, rather than a discrete object, there is no need to read it in its totality. The reader produced by the electronic reading machine will therefore be more inclined to graze at the surface of texts than to immerse himself in a textual world or to probe the mind of an author. Speaking on behalf of this reader, Lévy writes: "I am not interested in what an elusive author put into the text. What I ask of the text is to make me think, here and now. The virtuality of the text nourishes my acting intelligence" (47). The non-holistic mode encouraged by the electronic reading machine tends to polarize the attitude of the reader in two directions: reading becomes much more utilitarian, or much more serendipitous, depending on whether the user treats the textual database as what Mark Nunes calls in this volume a striated space, to be traversed to get somewhere, or as a smooth space, to be explored for the pleasure of the journey, and for the discoveries to be made along the way.

The idea of doing things with text also prevails in the case of electronic writing. The writing process may be the actualization of thought, but word processors and hypertext software promotes a play with "textrons" that maintains the text longer in a virtual state. The ease of manipulation encourages the writer to permute, expand, and edit chunks of text, to reinstate previous versions, and to create databases of potentially usable elements. (As I write this paragraph, I save it in a file called "stuff," not sure whether I'll use it, and if I do, in which one of my current projects.) Writing used to be like weaving on a loom, one word, one sentence after another, as the pen or typewriter carriage moves back and forth like a shuttle.[8] Now, as the pioneers of hypertext software tell us (Bolter and Joyce foremost among them), writing is more like arranging ready-made objects in the metaphorical space of computer

memory. We used to think of texts as being made out of words and sentences; now under the conjoined influences of postmodern theory and electronic writing technologies, we think of texts as being made out of text. The loom is still needed to weave the individual elements (unless they are "found objects," lifted from other texts), but organization and linearization is now a two-stage process, the virtual text produced by the first stage serving as input to the second. While the writer remains responsible for the microlevel operations, she may bypass the macrolevel stage, thus offering *du texte* as a freely usable resource to the reader, rather than *un texte* structured as a logical argument aiming at persuasion.

## The Virtual Text and Postmodern Theory

The heightened virtuality of the electronic text has been hailed by some theorists as the triumph of the conception of textuality proposed by postmodern literary theory, more particularly by postructuralism and deconstruction.[9] The subtitle of George Landow's book *Hypertext* is unequivocal about the relationship: *The Convergence of Contemporary Critical Theory and Technology*. There seems indeed to be an "extraordinary convergence"—to borrow the title of a chapter of Lanham's book—between postmodern doctrine and what can be done with electronic textuality. Taking advantage of the inherent reversibility of McLuhan's famous formula, "the medium is the message," theorists of electronic textuality (Lanham, Landow, Bolter) are prone to reading the medium as a message, and this message is invariably the gospel of postmodernism. As Lanham writes: "it is hard not to think that, at the end of the day, electronic text will seem the natural fulfillment of much current literary theory" (130). The passage below (quoted from Landow 3) seems tailor-made for hypertext, but it is actually Roland Barthes's description of the writerly (*scriptible*) in *S/Z*:

> In this ideal text the networks [*réseaux*] are many and interact, without any one of them being able to surpass the rest; this text is a galaxy of signifiers, not a structure of signifieds; it has no beginning; it is reversible; we gain access to it by several entrances, none of which can be authoritatively declared to be the main one; the code it mobilizes extends as far as the eye can reach, they are indeterminable. . . . the systems of meaning can take over this absolutely plural text, but their number is never closed, based as it is on the infinity of language. (*S/Z* 5–6)



Or again, consider this passage from Barthes's essay "The Death of the Author":

> [the text is] a multidimensional space in which a variety of writings, none of them original, blend and clash. The text is a tissue of quotations drawn from innumerable centers of culture. Similar to Bouvard and Pecuchet, those eternal copyists, at once sublime and comic and whose profound ridiculousness indicates precisely the truth of writing, the writer can only imitate a gesture that is always anterior, not original. His only power is to mix writings, to counter the ones with the others, in such a way as never to rest on any one of them. (*Image, Music, Text* 146)

I am singling Barthes out, but theorists of electronic textuality have found parallels with the work of numerous prominent French theorists: Derrida, Foucault, Lyotard, Baudrillard, Deleuze, and Guattari.[10] The aspects of contemporary literary theory that find their fulfillment in hypertext hardly need explanation. The open text. Meaning as reconfigurable network. The slipperiness of the signifier and the deferral of meaning (symbolized by the system of links). Intertextuality. Reading as "exploding the text" and as endless activity. (You never know if you have seen all the lexemes, and traveled all the links of hypertext.) Nonlinearity. The death of the author. The empowerment of the reader. Other points and metaphors of postmodern doctrine are literalized in the role-playing activity of the MOOs: The decentered, multiple nature of the subject. The body and its attributes of gender and race as textual constructs. (Users design their identity through verbal descriptions.) The body inhabited by different selves (who will, on the MOO, grow their own bodies). The self as the performance of roles. In the series of oppositions listed below—through which postmodernism distinguishes itself from earlier periods (mostly from the scapegoat of the Enlightenment)—print texts have been overwhelmingly associated with the left and electronic textuality with the "right" term (in both senses of the word):[11]

| | |
|---|---|
| Durable | Ephemeral |
| Linear organization | Spatial organization |
| Authorial authority | Reader freedom |
| Predetermined meaning | Emergent meaning |
| Attention focused on textual world | Attention focused on language |
| Text experienced as depth (immersion) | Text experienced as surface (surfing) |

| | |
|---|---|
| Centered structure | Decentered structure |
| Tree structure (hierarchical) | Rhizome (free growth) |
| Top-down design | Bottom-up design |
| Global coherence | Local coherence |
| Reading as goal-oriented navigation | Reading as aimless wandering (*flâner*) |
| Systematic approach | Tinkering with the heterogeneous |
| Logical thinking | Analogical thinking |
| Work | Play |
| Unity | Diversity |
| Order | Chaos (self-organizing system) |
| Monologism | Heteroglossia, dialogism, carnivalesque |
| Continuous development | Jumps, discontinuity |
| Sequentiality | Parallelism |
| Solidity | Fluidity |
| Text as rhetoric for persuasion | Text as resource |
| Static representation (of world) | Dynamic simulation (of brain activity, of memory) |
| Immersive text | Interactive text |

Table 4.2

The predominance in electronic texts of many of the features on the right derives to some extent from the inherent properties of the medium. As is the case with all media, electronic writing facilitates certain operations, favors certain structures, and promotes a certain type of writer and reader. It is tempting to interpret this relative determinism as an autonomous "agency of the medium" (Grusin's term, 43). The "extraordinary convergence" of postmodern doctrine and electronic textuality would then be explained by the power of the new technology to create a new subject, as it dictates compelling changes in our mode of thinking. Alternatively, the development of the technology could be attributed to the force of postmodern thought, a force through which ideology would produce the proper tools to fulfill its ideals. Without entirely discounting the possibility of these two explanations (or the possibility of a feedback loop between the force of thought and the force of the technology), the convergence appears much less wondrous if one remembers that already available ideologies affect the *use* as well as the theorizing of already available technologies. The form, content, and mode of action of currently available specimens of hypertext fiction are as much a reflection of general trends in the avant-garde literary production of our time as they are the product of the properties of medium itself. Similarly, the MOO practices of creating new bodies and inventing new forms of sexuality follows the body politics of our age as much as they are promoted by the role-playing facilities inherent to the system. We don't read much in the critical literature about the MOO users who choose to be "just themselves" because they find role-playing too strenuous, "authenticity" more pleasurable, and the self unproblematic; but I have encountered some of these living anachronisms. (They may, of course, have been lying.) In a different age—one that believed in the knowability of reality, and whose literary elite placed value in plot, character, and global coherence—the medium of hypertext could be used for entirely different purposes than it has been so far. For instance, rather than inviting the reader to explode it, the text could present itself as a jigsaw puzzle challenging the reader to put back together a coherent narrative picture. In contrast to Joyce's *Afternoon*, there would then be a definitive answer to the question "what happened," but the reader would have to explore the entire network to find the solution. The system of links could also be used to provide detailed descriptions or background information about the characters and settings. The reader could thus choose to speed through the plot—as in *Reader's Digest* versions of books—or to linger on the scene. Still another possibility would be to use the hypertextual mechanism to tell a tale with parallel plot lines or to narrate events from different points of view. As Jack makes love to Jill, clicking on either character's name would access their private thoughts. None of these conceivable uses would lead to the demise of what Barthes calls the "readerly," nor to its replacement by the "writerly" text.



There is no point in denying the natural and elective affinities of electronic writing for postmodern aesthetics—natural, because of the transient substance of electricity itself, and elective, because of the influence of the cultural climate on what is done with the medium. But if every medium exercises its own power and constraints, and if every medium is inserted within a cultural context, it is nevertheless up to the users to decide how to exploit this potential. Art is as much a matter of resisting, transforming, or expanding the medium as one of taking advantage of its built-in features. In the visual arts, there are watercolor works that imitate oil painting, and oil paintings that imitate watercolor; photographs that imitate paintings and paintings that imitate photographs. In literature, there are print narratives that revive oral storytelling traditions (a significant contemporary trend, as the popular success of Gabriel García Márquez, Isabel Allende, and Toni Morrison suggests), and others that explode the covers of the book and realize in print the possibilities now associated with the electronic medium. It is not unthinkable that electronic writing will one day rediscover (and

transform) the forms of literary expression typical of the book medium, or that it will emancipate itself from postmodern doctrine.

Nothing could be more detrimental to the cause of electronic textuality than enrolling it in a war between the left side and the right side of the above table. Hypertext theory has too often resorted to an "End of the Book" rhetoric that doomed to extinction the pleasures and modes of thinking associated with the print medium. This rhetoric has done more to turn off amateurs of literature than to promote electronic textuality. The features on the left may have dominated literature when the book was the main support of texts, but it is also the texts of the late age of print that have familiarized us with the patterns of the other side: postmodern theory has been largely developed in book form. If the resources of the right are accessible to a thought elaborated in the print medium, why should the resources of the left side be banned from electronic textuality? Thought progresses by expansion, not by elimination. If we consider the three major modes of transmitting texts—oral, print, and electronic—from the point of view of efficiency, it is obvious that each mode represents a progress over the preceding one, and that computers should eventually replace books, just as books have replaced storytelling as the dominant way of disseminating knowledge. But if we look at the three modes from the point of view of their literary potential, privileging aesthetic considerations, then each one expands the resources of literary expression, without rendering obsolete the pleasures provided by the other two. It is only by recognizing the legitimacy and aesthetic potential of both the left and the right column of the table that literary theory can approach electronic textuality without turning into a "pleasure police."[12] And while the right side is inherently more hospitable to the virtual than the left one, it is only by remaining open to both sides (and perhaps by developing others) that the texts of cyberspace can fully invest in the resources of virtuality. If the virtual as potential is their essence, postmodernist uses and theorizing are a possibility, not a necessity.

## Notes

1. The Greek root *cyber* means "steersman," and cybernetics is the study of the mechanisms controlling the travel of information, but we are accustomed to associating the word with electronic information.
2. In the press, the term "cyberspace" is typically used in titles of articles about the Internet. For instance, an article from the Associated Press about an Internet user feeling suddenly sick, sending a message on the Net and



getting help from other users is titled "Ailing 'Net chess player gets aid from cyberspace" (*Denver Post*, 9/30/96), but the word "cyberspace" is absent from the article itself. Titles, it should be remembered, are selected by the staff of the newspaper, while the article usually comes from a news agency. Since the function of titles is to catch attention, they display a more creative, more metaphorical use of language. In this case, the personification of cyberspace as an agent providing aid lends a supernatural aura to an otherwise fully explainable event.
3. This metaphor is suggested by Lévy, 45.
4. Internet posting by Reuters (C-reuter@clarui.net), 10 April 1996.
5. The relation between these two pairs, as well as between the two components of each pair, leaves quite a few unresolved questions. Is the possible opposed to the real, or does Lévy regard the real as a subset of the possible (as does modal logic: the real world is a member of the set of all possible worlds)? Does the actual coincide with the real, or does the real comprise both the virtual and the actual? One solution would be to regard the real as a subset of the possible, and the actual and virtual as two modes of being within the real.
6. This passage develops ideas borrowed from Lanham and Hayles, as well as from chapter 3 of Lévy's book *The Virtualization of the Text*.
7. Philippe Bootz (237) comes up with comparable categories: *texte-écrit* (text as written), *texte-à-voir* (displayed text), *texte-lu* (text as read).
8. The image of the web is commonly used to suggest non-linearity, but weaving is a fundamentally sequential operation.
9. VR technology has not fared as well with postmodern theory. Its self-enclosed world, ideal of immersive participation, metaphysics of (tele)presence, and striving toward a post-symbolic mode of communication clash with most of the ideas put forward by contemporary literary criticism.
10. See Mark Poster, *The Mode of Information*, on these relations.
11. These oppositions are drawn from various sources, but I would like to single out Turkle's *Life on the Screen* and Lanham, *The Electronic Word*, especially pp. 14ff.
12. I borrow this phrase from the title of David Shaw's book *The Pleasure Police* (New York: Doubleday, 1996).

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