
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)

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 censored 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 worlds 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

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 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).

- 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-

ble 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 "cyberbarnaut" 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" tech-

nologies 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 nine-

teenth 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, illusory, 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 life-likeness 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 Glass* (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 win-

dow, 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

