Virtual Reality

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The 1990s began – from the perspective of media – on the night of January 17, 1991, when laser-guided smart bombs and Tomahawk cruise missiles rained down on Baghdad at the start of the first Persian Gulf War. While the respective anchors of the network nightly news broadcasts were at their desks in New York, a trio of CNN correspondents, Bernard Shaw, John Holliman, and Peter Arnett, were hunkered down in the Rashid Hotel providing live, unedited reports by radio and satellite uplink, of the city under an intensive aerial bombardment. Awed as much by the real-time graphics as by the display of military firepower, the American television viewership found overnight that the streaming of cable news coverage had displaced the punctual, cocktail-hour broadcasts in media consciousness. Abetting the saturation of cable news was the confluence of digital technologies that "fed" real-time content to the transfixed viewing public. The CNN team's ability to provide instantaneous coverage relied on mobile satellite technology. Night-vision equipment was used to capture imagery of tracer fire and ground explosions bathed in an eerie green glow that resembled a video arcade game or computer terminal rather than anything in nature. More significantly, the Pentagon provided the network television pool with digital footage from the nose cones of smart bombs and cruise missiles as they navigated to the targets in their crosshairs. Through this technology the viewer became embedded in virtual warfare. The point of view is no longer that of an individual soldier – say, Paul Bäumer in Erich Maria Remarque's *All Quiet on the Western Front* (1929) – but that of cybernetic feedback in which the viewer assumes the position of a detached, inhuman weapon. Cable television and virtual warfare both relied on digital satellite technology and became indistinguishable simulations from the point of view of the West, as Jean Baudrillard has asserted in *The Gulf War Did Not Take Place*.[1]

The nineties are a transitionary moment from analogue to digital media when the legacy forms of broadcast TV, print fiction, journalism, and 2-D

cinematic projection are gradually replatformed by the new media of cable TV, hypertext fiction, e-book readers, the Internet, game boxes, streaming video, and virtual reality engines. Even as this replatforming occurs, legacy media retain a commanding share of the public audience. What is observable is how established forms such as the novel are disturbed by the advent of new media, altering their contours and reappropriating the claims made on the popular imaginary by their digital competitors.

That same year saw the publication of Howard Rheingold's nonfiction bestseller, *Virtual Reality*, then subtitled "the revolutionary technology of computer-generated artificial worlds – and how it promises and threatens to transform business and society."[2] Rheingold's history of technological invention is as engrossing as that of the Lumière cinematograph, the Marconi radio, or the Braun cathode ray tube. But it too is spiked with a premillennial enthusiasm that was "arousing people's expectations for imminent breakthroughs in a technology that would take years, perhaps decades to mature."[3] The technological lag involved the development of head-mounted displays, "goggles," and wired "gloves" that afforded the VR early-adopter the illusion of stereoscopic immersion in virtual space and the ability to interact with virtual objects. The simulation of Virtual Reality remains at the mercy of "tracking," the graphical processing engine required to refresh the imagery so that, when the user moves or when she shifts her point of view in 3-D space, there is little perceptible lag, measured in milliseconds. Without such seamless tracking, the illusion of immersion in an artificial world collapses. The reality of Virtual Reality evolved not so much from a "homebrew" collaboration of a Jobs-and-Wozniak or a Hewlett-and-Packard in the Silicon Valley personal computer industry, as in the academic and military research consortiums of PARC, ARPA, and SRI. Yet Virtual Reality – the term is coined by computer scientist Jaron Lanier in 1989 to describe a range of simulation machines – is a revolutionary technology, even if it has failed so far to become a household appliance. The history of representational media (or mimesis) describes an evolution in point of view: early photography was of a stationary object by a camera in a stationary position; early film presented a moving object from a stationary cinematograph; the "movement-image" of classical Hollywood cinema, theorized by Gilles Deleuze in *Cinema 1* (1983),[4] showed a moving object from a moving camera (montage; shot/counter-shot), although the cinematic spectator is himself immobile in the presence of the silver screen. But a "goggles and gloves" Virtual Reality holds out to the user the promise of interacting with moving objects from a moving point of view. As Jay

David Bolter and Richard Grusin remark in *Remediation: Understanding New Media* (1999), "Virtual reality can thus be seen to remediate all previous point of view technologies."[5] Full and transparent (especially wireless) immersion, or what Bolter and Grusin call "immediacy," still remains beyond the technological grasp of VR.

Half believing his own advance marketing, Rheingold speculates, "If the ten-year rule of thumb holds true, personal computer enthusiasts by the millions a decade from now [i.e., in 2001] will be interacting directly with virtual worlds through their desktop reality engines."[6] Ken Hillis offers a diagnosis of why the "ten-year rule" did not apply in this case: "VR achieved its greatest popularity during the last decade of the twentieth century. Its ability to seize the technical imaginary during this period was linked to a massive amount of hype that promised a distributed VR of networked computers that would allow people to share the same virtual world and interact in real time . . . Issues of cost, insufficient bandwidth, and the physical awkwardness of donning cumbersome HMDs replete with encumbering wiring all played a role in reducing public interest."[7] If "hype," or premillennial enthusiasm, led to disappointment in consumer electronics in the decade after Rheingold's book touted a reality-engine on every desktop, the films and literature of the 1990s that represent the use and abuse of VR uniformly express a postmillennial apocalypse. Their dystopias are a means by which the legacy media of print fiction and the cinema "remediate" both the false "promises" and the disturbing "threats" of the artificial reality that would supplant them.

What if, as Michael Heim asks, "the seductive obsession with digital phantoms leads to an apocalyptic 'end of reality'"?[8] Kathryn Bigelow's film, *Strange Days* (1995), is set in Los Angeles on the last two days of 1999 as the fear or celebration of Y2K engulfs the city in criminal violence and rioting.[9] Lenny Nero is a dealer in bootleg recordings made with a SQUID, or "Superconducting Quantum Interference Device," wired directly to the wearer's cerebral cortex, which, when played back on a head-mounted "deck," enables another user to apprehend the full sensory experience of an event, such as a robbery or erotic tryst, as if it were their own. Clips that end with the wearer's death, known as "blackjack," are shunned by Lenny, but lead him along a trail of antisocial violence, rape, and murder. An addiction to vicarious reality spells the end of civilization, if not to Hollywood. In David Cronenberg's film, *eXistenZ* (1999), organic virtual reality consoles called "game pods" represent a near-future upgrade of the cumbersome electronic head-mounted displays and all-over body transducer

suits proposed by nineties VR theorists.[10] Much like the organic "sockets" that induce stimuli directly in the consumer's brain in Pat Cadigan's novel, *Synners* (1991), the virtual reality game "eXistenZ" is connected via "bio-ports" into the players' spines through biotechnological umbilical cords, or "UmbryCords." Two media technology companies, Antenna Research and Cortical Systematics, vie for platform dominance (much like VHS and Betamax did in the eighties for video recording), as resistant "real-ists" strive to prevent the "deforming" of reality. Most influential was Lilly and Lana Wachowski's cyberpunk film, *The Matrix* (1999), in which intel-ligent machines (the apotheosis of Alan Turing's AI) have programmed an artificial reality, "the Matrix," that hides from humanity the scorched planet on which it now exists only to provide thermoelectric power for the machines.[11] The key to this dystopian inversion of the organic and machinic phyla lies inside the smuggler's bible on the desk of Thomas Anderson, aka the hacker "Neo," Jean Baudrillard's *Simulacra & Simula-tion*, which tells us, "Disneyland is presented as imaginary in order to make us believe that the rest is real, whereas all of Los Angeles and the America that surrounds it are no longer real, but belong to the hyperreal order and to the order of simulation . . . concealing the fact that the real is no longer real."[12] These films and cybernetic fictions critique their technological over-lords, the Death Stars of narrative.

As the millennial apocalypse descended upon us, VR technology itself had not yet arrived. In a 2015 update on the "next generation" of VR head-sets, including Facebook's Oculus Rift, Samsung's Gear VR, and Google Cardboard, Lorne Manly exclaims, "Virtual reality – once the stuff of sci-ence fiction – is still in its infancy. But there's already a gold rush around the technology, which plunges viewers into a simulated 3-D environment and lets them explore their surroundings as if they were really there . . . . By 2025 [yet another ten years!], the market for virtual reality content will be $5.4 billion." A shill for 20th Century Fox remarks, "We're at the brick-size cellphone days of VR. The technology works . . . but it is nowhere near good enough, on any front, to take on mass, mass adoption."[13] In the two dozen years since Rheingold popularized a VR technology in its developmental stages, VR for the masses still remains a decade away. Or, as Lawrence "the Yogi" Berra once observed, "The future ain't what it used to be."

The Virtual Reality extolled by Rheingold in 1991 relied on the research and development of "goggles and gloves" technology and mainframe com-puting that could be demonstrated in something like the Seattle-based "Realization Lab" of Richard Powers's novel, *Plowing the Dark* (2000),

or the CAVE Simulator at Brown University for which Robert Coover and his students conducted a CAVE Writing seminar,[14] but which was far too expensive and demanded processing power beyond the capabilities of home-use devices. Public disappointment with VR technology in the 1990s, the invention of the World Wide Web and HTTP protocol by Tim Berners-Lee in 1989, and the arrival online of the first website from CERN in 1991 signaled a shift in attention to virtuality. Although the virtuality of flat-screen personal computer displays precludes the sort of immersion that VR technology promised, the variety of applications made available inexpensively for home computing and mobile communications introduced the non-geek user through the window of a browser to interactive multi-player virtual environments for role-playing (such as *Second Life*) and gaming and a conversant online social media (such as chat rooms and user-generated commentary). The public incursion into cyberspace came with the adoption of an "avatar," a typically anonymous graphical representation of a user in gaming, virtual worlds, and Internet forums. Thus, virtuality as a surrogate experience conducted through digital media encompasses the technology of VR rigs, the locative media of smartphones and tablets, and the graphical interface of personal computing through which the mundane chores of an information economy are conducted as well as the stealthier interactions of our "second selves."[15] Neal Stephenson's cyberpunk novel, *Snow Crash* (1992), features a katana-wielding hacker whose real name – not his online moniker or "handle" – is "Hiro Protagonist."[16] Every avatar that haunts cyberspace is a virtual protagonist in a first- or third-person narrative adventure.

The broader appeal of virtuality should have spelled doom at the millennium for traditional print fiction. That it did not is partially explained by that *éminence grise* of postmodern fiction, John Barth, in "The State of the Art" (1996), in which he files his report on the advent of hypertext literature. Whereas once, in "The Literature of Exhaustion" (1967), he observed that the greatest threat to print fiction was "movies and television," which surely spelled the "Death of the Novel,"[17] now the desktop personal computer has brought forth Electronic Virtual Reality. He descries, however, a "difference between virtual reality, which deals in *real virtualities*, and the purely virtual virtuality of literary texts, especially printed texts. The sights and sounds and feels of EVR are literal physical sensations generated by artificial stimuli. The printed page, on the other hand – except for illustrated texts and scratch-and-sniff kiddie books – is strictly anesthetic, however incidentally appealing to the eye and hand may be its typeface, paper stock, and binding."[18] Barth's distinction here jives with Rheingold's

assertion that VR history begins with Morton Heilig's "Sensorama Simulator" (1962) and 3-D multisensory cinema.[19] If the sensation of VR is by implication an immature art form or caters to immature sensibilities, Barth claims something more for the legacy medium of print fiction: "The virtual worlds of literature are unencumbered by literality. It is both their great limitation and their indispensable virtue that their virtuality is virtual, that they exist not in our nerve endings but in the pure hyperspace of our imagination."[20] Barth is conducting a *derrière-garde* action in "State of the Art" by remediating the immersive virtual world as a *virtue* – the words are etymologically related in the Latin *virtūs* – of the legacy medium.[21] Whatever is compelling about virtuality has always already been present in imaginative literature without any unnecessary distraction from the medium itself. As if to underscore his point with a bit of postmodern irony, Barth pens the short story, "Click" (1997), in which he spoofs "*The Hypertextuality of Everyday Life*," whose text is replete with faux hyperlinks printed in cyan blue.[22] The onetime self-professed "print-oriented bastard"[23] extends his millennial musings on the worthiness of print fiction versus hypertext in his novel, *Coming Soon!!!: A Narrative* (2001), which stages his reservations regarding virtuality in a confrontation between the Novelist Emeritus and the Novelist Aspirant.[24]

As hypertext fiction caught the attention of Barth, Coover, and younger practitioners of electronic textuality such as Michael Joyce, Shelley Jackson, and Stephanie Strickland, the nineties represents the final decade in which television stands, largely uncontested, as literature's technological other. Not unlike the sweaty brow and five-o'clock shadow that sank Richard M. Nixon's candidacy in the first televised presidential debates with the telegenic John F. Kennedy in 1960, the angst of an elite culture of filmmakers, critics, and writers who despise the appeal of populist mass media, but can't otherwise turn away from it, is palpable. In his lengthy manifesto, "E Unibus Pluram: Television and U.S. Fiction," David Foster Wallace describes a "certain subgenre of pop-conscious postmodern fiction, written mostly by young Americans," which "made a real attempt to transfigure a world of and for appearance, mass appeal, and television." This "image-fiction," he argues, has been hoisted on its own ironic petard by a "televisual culture [that] has somehow evolved to a point where it seems invulnerable to any such transfiguring assault."[25] The chief exhibit in Wallace's take-down of image-fiction is Mark Leyner's collection of short fiction, *My Cousin, My Gastroenterologist* (1990), an avant-pop mash-up of advertising jingle, TV kiddie-show, and NFL instant replay, chased down with a Quaalude. Wallace argues that such image-fiction does not simply

reference televisual culture but constitutes a *response* to a society that has been "deformed by electric signal."[26] Leyner's fiction is its own form of *remediation*, as it not only appropriates TV programs but also seizes upon the technique of hyper-montage popularized by the incessant jump cuts of MTV music videos in the 1980s. Wallace admits to binge-watching TV, but unlike Leyner he fails to appreciate the transformation in the 1990s from classic broadcast TV, whose serial episodes, sports, and newscasts were largely unrepeated "events," and the proliferating channels of cable TV whose twenty-four-hour programming situates itself for reflexive rebroadcast, or rewatching. With an eclectic mix of high and low cultural references that typifies postmodernism, Leyner's fiction represents *how* we watched TV in the nineties, not just *what* we watched: "I'm an exploding skeleton of kinetic vectors. I stand upon a peak in Darien like stout Cortez shouting I write the songs! I rupture into afterimages like the nude descending the staircase. Holographic clones of myself appear all over the apartment smoking cigarettes and drinking martinis. Where are the women, they chuckle. Mona arrives to borrow a cup of sugar. Quaaludes. Clothes shed. Gang bang. Death. Ambulance. Police . . . "[27] Switching from a rephrased bit of Keats's sonnet, "On First Looking into Chapman's Homer" (1816), to the title phrase of Barry Manilow's treacly hit song (1975), the reader of *My Cousin, My Gastroenterologist* must be practiced in the art of channel surfing as the decontextualized clips skid by with the click of a remote control. Unlike modernist poetry whose allusions were freighted with cultural treasure, these incidental quotations contribute to pastiche of the sort that Fredric Jameson attributes to the pop art of Andy Warhol and Roy Lichtenstein, "speech through all the masks and voices stored up in the imaginary museum of a now global culture."[28] The hypnotic-hallucinatory elisions in Leyner's writing may either be symptoms of amphetamine addiction or of "a recovering postmodernist," as Leyner quips in "Geraldo, Eat Your Avant-Pop Heart Out" (1997).[29] As a guest on *The Jenny Jones Show* (1991–2003), "Alex" (not his real name) admits to having first read Jameson at age nine. He found Jameson's assessment that the style of postmodernism is that of schizophrenia, "in the form of a rubble of distinct and unrelated signifiers."[30] "Alex" is finally confronted by a man in the studio audience "in his mid-30s with a scruffy beard and a bandana around his head," the avatar of Wallace, who accuses him of being "the single worst example of pointless irony in American literature, and this whole heartfelt renunciation of postmodernism is a ploy – it's just more irony."[31] It is that, but for the delectation of a reader who can appreciate the send-up of both obscurantist postmodern theory and popular daytime talk shows.

The skittish humor of Leyner's avant-pop novel succeeds by being both collusive with and yet critical of popular media, employing familiar icons, types and styles (the pop), but registering critique through an array of formal defamiliarizations inherited from the avant-garde (the avant). Pat Cadigan's novel, *Synners* (1991), presents the popular forms of music videos, daytime TV romances, and movie thrillers as addictive substances for which the technology of VR implants acts as a more efficient and deadly delivery system. *Synners* is fluent in the grunge techno of cyberpunk fiction pioneered in William Gibson's *Neuromancer* (1984) and Bruce Sterling's *Schismatrix* (1985). Its contribution to this branch of science fiction lies in its tracking of the technology of virtual reality and digital media such as it appeared in 1991 and its amplification in the postmillennial future setting of the novel. Gabe Ludovic, a frustrated artist who toils in the "simulation pit" of the media conglomerate Diversifications, works on VR shorts using a "head-mounted monitor" and wired feeds from a transdermal "hotsuit."[32] He labors in the "reality-industrial complex" whose transfer Rheingold foresaw from academic and military research-and-development to popular entertainment.[33] Ludovic soon recognizes, in what becomes the refrain of the novel, that as technology evolves so too will humans have to "change for the machines."[34] This transformation is literalized by the introduction of therapeutic cortical implants in "feel-good mills" that treat epilepsy, manic depression, autism, and neurological disorders, but which are soon abused by the clinics that dispense them like the addictive psycho-pharmaceuticals of the present day. The therapeutic implants "all have some percentage of hardware,"[35] however, and their introduction as foreign objects into the body makes the patient a cybernetic organism, or cyborg, a mainstay of cyberpunk fiction. Cadigan envisions the next generation of what Gibson coined "simulated stimulation," or simstim decks,[36] as Dr. Joslin's research for a medical technology firm in entirely organic tissue "sockets," combining nanotechnology and microsurgery, is adopted by the virtual reality industry. Such direct input to the brain that dispenses with wearable devices provides the total immersion and interactivity that was the fantasy of VR in the nineties. A mere eight sockets that can organically alter brain tissue are required to access the "limbic system, the seat of our basic emotions – rage, fear, pleasure. When the sockets are engaged, stimuli will induce these things directly, for the duration of the experience. The consumer plugs into the feature presentation – music video, movie release, commercial, standard TV fare – and undergoes a three-dimensional experience."[37] The corporate acquisition of Dr. Joslin's research in neural sockets is less visionary than commercialized as this advanced technology monopolizes the streaming of

entertainment media, including the extant genres of music video, film, and TV. In the near future of *Synners*, VR achieves the comprehensive remediation of all legacy media, becoming the sole portal for transmission.

Simulation through sockets offers unparalleled interactivity, as now "the consumer can cooperate in the forming of the images."[38] The most talented synthesizer of image and music goes by the tag of Visual Mark. As his occipital lobe is hypertrophied, or overdeveloped, he enjoys a direct "pipeline to some primal dream spot, where music and image created each other, the pictures suggesting the music, the music generating the pictures, in a synesthetic frenzy."[39] Visual Mark is the original "synner" – with the operative pun on sensory synesthesia and humanity's hubristic transgression. Mark's protégé, Gina Aiesi, appreciates that the flat, rudimentary joining of image and sound in Old Hollywood, the passive reception of televisual entertainment and unidirectional live performance, are being overtaken by simulation: now "it was better. It wasn't just hearing the music, it was being in the music, and the images coming up on the screen of her mind, forming as she looked at them. As soon as she thought it, there it was, and if she thought to change it, it changed, growing from her like a live thing."[40] Bliss was it in that dawn to be alive, but to be a real "synner" was very heaven.

Cadigan's *Synners*, like most cyberpunk fiction and film, is dystopian, and the technological revolution that it charts is inevitably followed by a reign of terror. The novel correlates ecological and technological apocalypse closely enough to suggest a causal relation. Set in "Mimosa," the Manhattan/Hermosa Beach section of Los Angeles, after a catastrophic earthquake has riven the city and ushered in "the postmillennial madness that had followed,"[41] the novel simultaneously takes to task the fractured, overpopulated, and poisoned society of Los Angeles in the nineties and any misplaced investment in technological solutions to its problems. Paired with the Big One is the "cerebral vascular accident," or stroke, experienced by Dr. Joslin and her research partner who are found dead while "still connected to direct neural interface equipment,"[42] as the premature adoption and commercial application of the unsafe socket technology is found to cause neurological damage. The print novel has always been an imperfect interface between two brains, the writer and the reader who collude in creating a virtual virtuality, as Barth has it, residing in the anesthetic realm of the imagination. Cadigan is no Cassandra of the hyperreal, but *Synners* issues a clear warning against the promises of an immaterial intercranial transfer of sensory experience. Not only does the inventor of the cerebral socket fall victim, but so does Visual Mark, whose tampering with the new technology unleashes a

"live" or self-recognizing virus that spikes the global communications system and anyone connected to it: "There was an ecology here, gradually becoming more and more unbalanced, polluted, and infected. Ecological disaster had been inevitable, even before the stroke had been released into the system; there was no way around it. It would be universal. Computer apocalypse, a total system crash,"[43] anticipating the dreaded Y2K crash. It's left to Gina as a survivor to make the final pronouncement: "Think on this one. All appropriate technology hurt somebody. A whole lot of somebodies. Nuclear fission, fusion, the fucking Ford assembly line, the fucking airplane. Fire, for Christ's sake. Every technology has its original sin.' She laughed. 'Makes us original synners. And we still got to live with what we made."[44]

Much of the nomenclature of virtual reality has its origins in works of science fiction, and therefore its conceptual genesis in literature precedes its technological application. Robert A. Heinlein imagined the experience of telepresence in his novel, *Waldo* (1940),[45] before the construction of the first electronic computer, ENIAC, in 1946. William Gibson's hero Case "jacked into a custom cyberspace deck that projected his disembodied consciousness into the consensual hallucination that was the matrix" in *Neuromancer*, written before he could afford a personal computer of his own.[46] Neal Stephenson lays claim to the coinage of "avatar" in the acknowledgments to *Snow Crash* (1992).[47] In its Sanskrit derivation, an avatar refers to the descent of a Hindu deity in earthly forms, as the visible manifestation of the metaphysical. Stephenson's hero, the reflexively named Hiro(aki) Protagonist, is a freelance programmer who, along with his friend Da5id and other hackers, has written the software for an exclusive club in the Metaverse, The Black Sun. In this three-dimensional virtual world, avatars "are the audiovisual bodies that people use to communicate with each other."[48] Neophytes and tourists on the Street without coding skills may adopt any sort of cartoonish icon or buy off-the-shelf models such as Brandy and Clint available in kits from Walmart. As an accomplished hacker and self-proclaimed greatest sword fighter in the virtual world, Hiro's avatar is customized. Rather than a garish or idealized *imago*, "Hiro's avatar just looks like Hiro, with the difference that no matter what Hiro is wearing in Reality, his avatar always wears a black leather kimono."[49] The programmer recognizes how much more difficult it is to render a realistic human figure in three dimensions – moving through virtual space – than it is to mock up a flat cartoon. Stephenson wishes us to consider the metaphysics of the Metaverse, in which the most sophisticated avatars are those which more closely resemble their embodied selves rather than an idealized figure.

The Metaverse – or any representation of virtual reality – is entirely arti-factual, a conceptual tool not substantially different, as the novel informs us, from the Sumerian cuneiform tablets whose *me* encode the laws of the gods that govern human civilization. In a debased form of the Metaverse – not unlike the vulgar commercialism that is the Internet – the Brandys and Clints are always aware of their own artifactuality, always adherent to the "Association for Computing Machinery's Global Multimedia Pro-tocol Group," and always compliant consumers of the wares offered on the Street.[50] Once, Hiro observes, hackers could independently write their own software, but in the twenty-first century of market state franchis-ing, "[s]oftware comes out of factories" and programmers have become "assembly-line workers," or worse yet, "managers who never get to write any code themselves."[51] A "hack" is a circumvention of a programming convention "that different computers agree to follow. In theory, it cannot be ignored."[52] But as a world-class hacker, Hiro has the capacity to make his avatar invisible, to miniaturize it, and to penetrate the walls of buildings following his katana. If cyberspace is a form of Cartesian theater, then the avatar is its homunculus, the epiphenomenal projection of the mind onto its stage. Stephenson questions whether that homunculus should perform as the rational *kybernetes*, or steersman, obedient to the First Programmer's rules. Hiro's avatar not only closely resembles his person but also his behav-ior and values in Reality. The novel's antagonist, the fiber-optic network monopolist, L. Bob Rife, has constructed a massive Cube in the Metaverse that is the nerve center of a "utopian" rational control society. Hiro strug-gles with Rife for control of the *nam-shub* of Enki, the Sumerian incan-tation of linguistic disintegration, a version of the Babel myth, which he wages simultaneously in the Metaverse and on Rife's Raft, an offshore float-ing island of migrants. The battle is for nothing less than the liberation of the pre-/post-rational human subject. Were Rife able to infect the entire populace with the metavirus of Enki, he could bypass the acquired lan-guage (the brain's linguistic software) of its victims and penetrate directly into the brainstem (its BIOS), gaining a control of his subjects that fascists could only dream of. Only the neurolinguistic hacker, only the Hiro of a thousand faces (Joseph Campbell), can preserve individual freedom and the power to break the rules.

While cyberpunk writers such as Stephenson engage in speculative and often dystopian futures, the novels of Richard Powers braid together the pursuits of humanists and scientists in knowledgeably researched narratives that involve computer programming in *The Gold Bug Variations* (1991), artificial intelligence in *Galatea 2.2* (1995), and virtual reality in *Plowing the*

Dark (2002). In the latter novel, Powers turns his erudition to a study of two dark rooms in the 1980s: one is the Cavern, or Realization Lab, on the Washington coast, for which the artist manqué, Adie Klarpol, has been recruited to develop virtual reality environments; and the other is a cell in Beirut, Lebanon, where Taimur Martin, an Iranian-American teacher of English, is held hostage in the multi-factional civil war in 1986 – and for five years thereafter. The Paleolithic paintings found in the Lascaux caves mark an inception of the symbolic imaginary and ritual in human history and, as one of the programmers of the RL observes, "The mind is the first virtual reality."[53] The Cavern is the technological extension of Lascaux, and Adie chooses to paint its walls with digital representations of Vincent van Gogh's *Bedroom in Arles* (1888) and Henri Rousseau's *The Dream* (1910). The artist's bedroom, on whose walls hang miniature copies of the unsold masterworks by van Gogh and the lush jungle foliage into which Rousseau has transported the Polish mistress of his youth, are alike in demonstrating the power of *homo significans* to project the mind onto the blank wall of reality. But to do so requires at the very least a détente between the two cerebral hemispheres, between the imagination and *technē*, between Adie's visions of beauty and the autodidact poet-turned-programmer Stevie Spiegel's logical systems. He espouses "the ability to make worlds – whole, dense, multisensory places that are both out there and in here at the same time. Invented worlds that respond to what we're doing, worlds where the interface disappears . . . VR reinvents the terms of existence. It redefines what it means to be human."[54] Yet Adie regards the graphics rendering of the Cavern with the same withering critique of Plato's Cave, that it is no more than "a copy of a copy, a debasement of the debasement of Forms."[55] That is also Baudrillard's definition of simulation and points to a contradiction in the purpose of the Cavern, whether it is intended to be an instrumental digital reproduction of the world as we know it or an exploratory platform for a world that we can only imagine. The former is faced with the problem of "simulator sickness," jerky animation: "Material reality's supreme Cray never dropped frames. That's how you knew you were *in* the real world: all the flicker-free, smooth scrolling. The Cavern's goal – believability through total immersion – could not survive an image that spluttered."[56] That's a hardware problem. The latter challenge is a version of the first programmer Ada Lovelace Byron's objection, in her notes to Charles Babbage's Analytical Engine (1842), that it "has no pretensions whatever to originate anything. It can do whatever we know how to order it to perform."[57] That's a software problem, expressed in the novel by programmer Jack Acquerelli, who critiques Adie's bedroom and jungle

environments: "I mean, sure, it's beautiful and all. But it doesn't do anything. It's basically a flat gallery. The user can't really . . . make anything happen." The Cavern isn't sufficiently interactive and the "little artworks" don't register the presence of the user.[58] While the developers take bets on "the year that simulation finally surpassed reality,"[59] that's a wager that has yet to be collected.

Meanwhile, Taimur Martin languishes, chained to the radiator in his cell in Beirut, trying to recall on the inside of his eyelids a hardbound copy of Dickens's *Great Expectations* and its opening lines, the virtual virtuality of a Victorian saga of class struggle. "Every turn, every further constriction in the plot – yours or the author's – makes it easier to keep to the general contour. Where you cannot recall a scene, you invent one."[60] Deprived of reading materials, hindered by the limitations of memory, Martin rewrites the classics in his mind. Adie and the RL project fall victim to the publicity hype that explodes like nearby Mount St. Helens: "Media latched wholesale upon this thing that it refused to call anything else but virtual reality. The public took so quickly to the fantasy that it must have recognized the contour from something it already knew."[61] The narrator here alludes to the remediated form of print narrative, the plot, character, and setting of the novel. "VR overnight became 1990's cover girl. A couple of research outfits let the ghost out of the machine before it was time. Here and there, universities began to demo projects that suddenly had the whole world talking as if full-body dives into wraparound LSD, robotic prostitution, and long-distance teledildonics would hit the toy store shelves by Christmas . . . Ready or not, reality engineering was about to become a full-fledged industry."[62] Unfortunately for the venture capitalists and the start-up's sponsor TeraSys, the new medium is not yet ready for its close-up. The pyroclastic flow that washes over the RL, however, is geopolitical reality. As 1991 dawns, the "electronic storm, so long in simulation, at last broke . . . Two delirious American reporters trapped in a high-rise office babbled on, over satellite uplink, about the phantoms screaming across Baghdad's dome."[63] The Cavern's representation of Hagia Sophia in Istanbul is co-opted for the twenty-four hour cable feed. "Smart bombs beamed back video to even smarter bombers. Nosecone shots documented their descents all the way up to the moment of deliverance . . . Pinpoint delivery turned evidence so intoxicating that no one who once looked at it could look away. The race had achieved the precision of its earliest dreams."[64] While the coders toiled at a simulated reality environment, the empire had struck "to create our own reality" in the Persian Gulf.[65] Adie is shocked by the realization that the Air Force had invented

virtual reality for its flight simulators and that the RL counted among its clients not only the entertainment giants Disney and Sony but also the military-industrial complex. With that, Adie sets about to delete the Cavern's code from the root directory. Taking one last look into the simulated dome of Hagia Sophia, she sees a solitary, bedraggled man – in a metaphysical transformation, outside the body and beyond the machine. If humans have a soul, which is the seat of wisdom, Powers suggests, it will not be found wandering through the virtual blandishments of the Cavern but in the hard-shell cranium, in literature and philosophy. The failure of VR was its preoccupation with creating the proprioceptive illusion of the Body in virtual space while depriving the Mind of any profound reason to be there.

The grand coup of virtual reality, as Bolter and Grusin assert, is its ability to remediate all other visual media, including painting, photography, film, and television. The fictions of the 1990s that re-remediate VR in print underscore with a fine graphite point how the new medium has failed – not in the technical parameters of immersion, interactivity, simulation, and navigation (for these will surely be upgraded in the next generation device, such as Oculus Rift), nor even in its obsession with puerile fantasies and military cooptation – but in its offering of sensory illusions that fail to project a mindscape onto reality as humanity once did at Lascaux.

NOTES

1   Jean Baudrillard, *The Gulf War Did Not Take Place*, trans. Paul Patton (Bloomington: Indiana University Press, 1995).
2   Howard Rheingold, *Virtual Reality* (New York: Simon, 1991).
3   Rheingold, *Virtual Reality*, 34.
4   Gilles Deleuze, *Cinema 1: The Movement-Image*, trans. Hugh Tomlinson and Barbara Habberjam (1983; Minneapolis: University of Minnesota Press, 1986).
5   Jay David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge, MA: MIT Press, 1999), 162.
6   Rheingold, *Virtual Reality*, 87.
7   Ken Hillis, "Virtual Reality," in *The Johns Hopkins Guide to Digital Media*, ed. Marie-Laure Ryan, Lori Emerson and Benjamin J. Robertson (Baltimore: Johns Hopkins University Press, 2014), 513.
8   Michael Heim, "Virtuality," in *The Johns Hopkins Guide to Digital Media*, 516.
9   *Strange Days*, directed by Kathryn Bigelow (United States, 20th Century Fox, 1995).
10 *eXistenZ*, directed by David Cronenberg (Canada, Miramax, 1999).
11 *The Matrix*, directed by Lana and Lilly Wachowski (Australia and United States, Warner Bros., 1999).

12 Jean Baudrillard, *Simulacra and Simulation*, trans. Sheila Faria Glaser (1981; Ann Arbor: University of Michigan Press, 1994), 12–13.

13 Lorne Manly, "A Virtual Reality Revolution, Coming to a Headset Near You," *New York Times* November 19, 2015, https://www.nytimes.com/2015/11/22/arts/a-virtual-reality-revolution-coming-to-a-headset-near-you.html.

14 As with the next generation of VR goggles, a new CAVE (for Cave Automatic Virtual Environment) was unveiled in 2015. See Amanda Katz, "Brown University unveils 3D virtual-reality room," *Boston Globe* June 20, 2015, https://www.bostonglobe.com/lifestyle/style/2015/06/19/brown-university-unveils-virtual-reality-room/Q0TOOp66NpPZeGMFobapjO/story.html.

15 See Heim, "Virtuality," 515.

16 Neal Stephenson, *Snow Crash* (New York: Bantam, 1992).

17 John Barth, "The State of the Art," *Wilson Quarterly* 20.2 (1996): 42–43.

18 Barth, "State of the Art," 42; his emphasis. His critique of the materiality of the book does not anticipate the appearance of multimodal, graphic novels, such as Mark Z. Danielewski's *House of Leaves* (2000), whose complex spatial and multicolor typography is hardly for "kiddies."

19 Rheingold, *Virtual Reality*, 50.

20 Barth, "State of the Art," 42.

21 See Heim, "Virtuality," 514–515, on how the strength of *virtualiter* became a weaker, invisible or virtual quality.

22 Barth, "Click," *Atlantic Monthly*, December 1997, 81–96.

23 Barth, *Lost in the Funhouse: Fiction for Print, Tape, Live Voice* (New York: Bantam, 1969), 123.

24 Barth, *Coming Soon!!!: A Narrative* (Boston: Houghton, 2001).

25 David Foster Wallace, "E Unibus Pluram: Television and U.S. Fiction," *Review of Contemporary Fiction* 13 (1993): 171.

26 Ibid., 172.

27 Mark Leyner, *My Cousin, My Gastroenterologist* (New York: Vintage, 1993), 49–50.

28 Fredric Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism* (Durham, NC: Duke University Press, 1991), 18.

29 Leyner, "Geraldo, Eat Your Avant-Pop Heart Out," *New York Times*, December 21, 1997, Op-Ed, 11. The cognitive dissonance of this piece is abetted by the fact that it ran opposite a William Safire column on public integrity.

30 Jameson, *Postmodernism*, 26.

31 Leyner, "Geraldo," 11.

32 Pat Cadigan, *Synners* (1991; New York: Four Walls Eight Windows, 2001), 40.

33 Rheingold, *Virtual Reality*, 132.

34 Cadigan, *Synners*, 97. See also John Johnston, "'Change for the Machines': The Complexity of Bodies in *Synners*," in *Information Multiplicity: American Fiction in the Age of Media Saturation* (Baltimore: Johns Hopkins University Press, 1998), 257–265.

35 Cadigan, *Synners*, 64.

36 William Gibson, *Neuromancer* (New York: Ace, 1984), 11.

37 Cadigan, *Synners*, 66.
38 Ibid.
39 Ibid., 109.
40 Ibid., 226.
41 Ibid., 8.
42 Ibid., 319.
43 Ibid., 324.
44 Ibid., 435.
45 Rheingold, *Virtual Reality*, 257.
46 Gibson, *Neuromancer*, 5. See "An Interview with William Gibson," in *Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Science Fiction*, ed. Larry McCaffery (Durham, NC: Duke University Press, 1991), 270.
47 Stephenson remarks in the Acknowledgments to *Snow Crash*, "The words 'avatar' (in the sense used here) and 'Metaverse' are my inventions, which I came up with when I decided that existing words (such as 'virtual reality') were simply too awkward to use," 440.
48 Stephenson, *Snow Crash*, 33.
49 Ibid., 34.
50 Ibid., 23.
51 Ibid., 36.
52 Ibid., 407.
53 Richard Powers, *Plowing the Dark* (New York: Farrar, 2000), 130.
54 Ibid., 159–160.
55 Ibid., 40.
56 Ibid., 60–61.
57 Quoted in Joan Baum, *The Calculating Passion of Ada Byron* (Hamden, CT: Archon, 1986), 82.
58 Powers, *Plowing the Dark*, 164–165.
59 Ibid., 337.
60 Ibid., 242.
61 Ibid., 268.
62 Ibid., 269.
63 Ibid., 393.
64 Ibid., 394.
65 Ron Suskind, quoting an anonymous senior advisor to George W. Bush, in "Faith, Certainty and the Presidency of George W. Bush," *New York Times Magazine*, October 17, 2004, http://www.nytimes.com/2004/10/17/magazine/faith-certainty-and-the-presidency-of-george-w-bush.html.