The Illusion of Autonomy and the Fact of Recursivity: Virtual Ecologies, Entertainment, and "Infinite Jest"

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The Illusion of Autonomy and the Fact of Recursivity: Virtual Ecologies, Entertainment, and *Infinite Jest*

N. Katherine Hayles

TO BEGIN, two paradoxes. One comes from C. B. Macpherson's analysis of the conceptual foundations of the liberal subject, especially the writings of Hobbes and Locke.[1] Macpherson traces those passages in which Locke argues that the independence and autonomy of the subject stem from his ability to sell his labor, which in turn implies that first and foremost, the individual owns himself. In a state of nature a man owns himself even if he owns nothing else, and it is this ownership of self that precedes market relations and makes them possible. Yet as Macpherson observes, possessive individualism, as he calls this model of the self, obviously derives from a market economy that locates authenticity in ownership. Hence the paradox: the ownership of self must precede the market for the market to arise, yet ownership of self also derives from the very market it is supposed to underlie as a foundational premise.

The second paradox is pointed out by William Cronon in his provocative essay, "The Trouble with Wilderness: or, Getting Back to the Wrong Nature."[2] In U.S. discourse about wilderness, wilderness stands for what nature is in itself, before it was despoiled by human beings. "Wilderness is the natural, unfallen antithesis of an unnatural civilization that has lost its soul," Cronon summarizes. "It is a place of freedom in which we can recover the true selves we have lost to the corrupting influences of our artificial lives. Most of all, it is the ultimate landscape of authenticity" (80). But this view of nature requires that humans be absent from it, which leads to the following paradox. "If we allow ourselves to believe that nature, to be true, must also be wild, then our very presence in nature represents its fall. The place where we are is the place where nature is not." As a result, wilderness loses its power to authenticate our lives as soon as we try to take advantage of its redemptive potential (80–81).

On the one hand, then, we have a paradoxical relation between the liberal subject and market economy; on the other, a paradoxical relation between American individualism and wilderness. Just as the liberal

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subject has its historical roots in the ideologies of the Enlightenment, so the individual who will be redeemed by wilderness has its historical basis in the peculiarly American experience of a frontier that was no sooner proclaimed than it began disappearing. The historical specificity of the American idea of wilderness can be measured by juxtaposing it with the Malaysian proverb that comes from a country where people have traditionally been considered the valuable resource without which neither economic prosperity nor national existence would be possible. "Soil, yes," the proverb runs, "but no people. Soil without people is but a wilderness."[3] In this formulation, the freight that wilderness carries is precisely the opposite of redemption, signaling not only loss of use but of political integrity and economic subsistence.

It is no accident, I will argue, that the paradoxes of possessive individualism and redemptive wilderness come together in American culture and on American soil. At the center of both paradoxes is a privileging of autonomy, a very American virtue. Possessive individualism seeks foundations for market exchange in the autonomy of the individual; redemptive wilderness seeks foundations in the autonomy of the wilderness, which can then serve as a basis to restore the authenticity of the individual.[4] For those who start from possessive individualism, the environment can easily appear as a "natural resource" whose main importance is what it can yield in capitalist commodities. For those who start from redemptive wilderness, humans can appear as a biohazard to the earth, to be restrained or eliminated wherever possible.[5] In the one case, the environment is to be sacrificed for the people; in the other, people for the environment. The two paradoxes thus have similar structures and mutually reinforce each other.[6] They are created when coproduction is mistaken for a hierarchical dichotomy in which the privileged term acts as ground or origin for the belated term. Individual self-possession comes first, then the market; wilderness comes first, then the people. In both cases, the fetishizing of autonomy prohibits the recognition that market and individual, civilization and wilderness, coproduce each other.

But I am getting ahead of my story. Let us return to the idea of coproduction. The coproduction of market relations and possessive individualism is perhaps sufficiently obvious not to require further comment here. The coproduction of civilization and wilderness is more controversial. Nevertheless, there is much evidence to support Cronon's argument that wilderness came to be seen as a restorative force precisely at the moment that it ceased to be a natural given of the environment. People who must hack their way through forests, portage canoes over punishing terrain, and risk their lives to find mountain passes are not apt to romanticize rugged terrain as the site of redemptive experience,

as Richard White points out.[7] He argues there is a significant divide for just this reason between backpackers who tackle the terrain as a form of play and those who must win their living from the land. The same kind of dynamic can be found in Western American landscape painting, as Cronon has observed.[8] It is when wilderness is disappearing that wilderness is depicted through perspectives showing sweeping vistas and majestic mountain ranges—perspectives, that is, from which the beauty of the scene can be visually consumed without the inconvenience of being immersed in it. This perspective is then physically inscribed upon the landscape in viewpoint turn-offs and photo-ops, activities which construct wilderness as a category of visual experience and leisure consumption rather than an everyday part of life and the occasion for hard physical labor. Another way to make the same point is White's wry observation that we know land is wilderness when there is a three hundred-page document regulating its use.[9] In this sense as well, wilderness is produced by the civilization whose exclusion it symbolizes.[10]

Nowhere is the redemptive potential of wilderness more on display than when it is juxtaposed with such high-tech developments as virtual reality, as Albert Borgmann demonstrates in his argument that we must not lose sight of "real" nature as we continue to develop artificial environments.[11] Although I am sympathetic with Borgmann's project, in my view constructing the problem as a natural/virtual dichotomy has significant disadvantages (a formulation Borgmann is too sophisticated a thinker to posit, but which less careful analyses have often suggested). When the virtual is opposed to the natural, the emphasis falls on the redemptive potential of the natural world, which puts us back inside the paradoxes instead of giving us leverage to work through them. By contrast, when the virtual and the natural are aligned, new opportunities for analysis present themselves. Thinking the virtual and the natural together shifts the focus to the mutually reinforcing structures of redemptive wilderness and possessive individualism. Like wilderness and American individualism, artificial environments manifest and depend upon complex recursive structures. In whatever context coproduction appears, recursivity is central to its dynamics. Recognizing the recursive loops that make ecological balances so complex is one of the great contributions of scientific ecology; yet these recognitions exist side by side with ideological formations that continue to obfuscate the coproductions involved in redemptive wilderness and possessive individualism. With the increasing development of artificial environments, this irony is now being enacted in virtual as well as natural environments. At issue is the premise of autonomy and its destructive interactions with environments that operate recursively, which leads to deep irresponsibility to the environment and/or to the peoples of the earth. *The illusion of*

autonomy and the fact of recursivity—these are linked phenomena that make coproduction turn vicious, and it is this linkage that will be the focus of my essay.

To trace the pathways connecting recursivity and autonomy, I will turn first to the construction of intelligent agent systems. Close examination of one of these systems will demonstrate the importance of recursive loops to its operation and evolution. When intelligent agent systems are used to create a virtual shopping mall, these recursive structures come together with the premise of autonomy to reinscribe the paradoxical structures of possessive individualism. This "virtual terraform" operates according to a familiar logic that mistakes coproduction for autonomy and suggests how the dynamic can turn destructive. From there I will turn to David Foster Wallace's massive and fascinating novel *Infinite Jest* to explore how possessive individualism and redemptive wilderness interact destructively with one another when the illusion of autonomy is allowed to blot out the fact of recursive interrelation.[12] My intent in making these arguments is not to downplay the importance of the natural world or the complexities of our interactions with it. On the contrary, I hope to show that valuing autonomy without attending to recursivity leads to destructive behaviors that are unlikely to change unless we are willing to rethink what it means to be a subject in the contemporary world. Virtual environments enter the picture because they provide new and expanding arenas in which these behaviors are being played out. As *Infinite Jest* suggests, adding virtual environments to the mix, far from offering an escape from contemporary ecological problems, is likely to intensify the already existing paradoxes to the point of implosion.

Virtual Ecologies and the Illusions of the Liberal Subject

A useful guide to the high-tech world of virtual ecologies is the writing of Charles Ostman, formerly a computer designer and presently science editor of *Mondo 2000* and Senior Fellow at Global Futures, a consulting company specializing in predicting near-future technological development. Ostman makes it his business to know what is happening at the cutting edge of computational technologies, traveling each year to dozens of high-tech military and industrial conferences where the latest advances in proprietary software and hardware are discussed. Unlike many practicing technologists who spend twenty hours a day frantically trying to develop particular applications, Ostman strives to get a view of the whole terrain, to understand the larger picture that emerges from the individual developments. I venture to say he knows as much as

anyone on the planet about where virtual ecology technologies are headed in the near future. Of special interest to Ostman are the frontiers created when two formerly distinct areas of scientific research begin to merge. The synthesis of evolution and genetics created modern biology; the synthesis of modern biology with chemistry and information theory created molecular biology; the synthesis of information theory with automata theory created cybernetics. Now another far-reaching synthesis is underway, combining evolution with computation. The idea is to structure computational devices along evolutionary lines, so that both hardware and software become capable of self-evolution. Such devices can discover, through trial and error, solutions their human designers have not foreseen. Increasingly, researchers are interested not only in capturing evolutionary processes through the interplay between competing computational species but also in designing devices that operate according to principles of self-interestedness, preferring survival over extinction, pleasure over pain.[13]

One of the important tasks self-interested agents can perform is evaluating the global flood of information that threatens to swamp their human partners. Amalthaea, designed by Alexandros Moukas and Pattie Maes at the MIT Media Lab, is a self-evolving ecology that employs colonies of intelligent agents.[14] Summarizing Amalthaea's structure, Ostman explains there are two types of species in this ecology: discovery agents, which forage for information by looking for new territories from which they can harvest "crops" of information, and filtering agents, which modify these data to fit the "interest topology" of the human user.[15] Both agents and ecosystem are capable of self-evolution, continuously adapting to the environment in which they operate and the changing interests of the human user. Since evolution depends on diversity, foragers and filterers can differentiate; the foraging agents, for example, evolve to become especially responsive to particular types of information. Individually the agents have limited capabilities, but collectively they form a "hive" which operates at a much higher level of intelligence. As the individual agents (or organelles, as Ostman calls them) evolve, so too does the collective entity, operating as a macro-organism capable of making increasingly sophisticated decisions about which information to pass on to the human user.

The details of the agent programs and their articulation into a macro-organism reveal how this increasing sophistication is achieved. The agents are assigned a "survival quotient" based on how much informational "food" they harvest; only those agents with sufficiently high quotients are allowed to reproduce to create the next generation of agents. To increase efficiency, the system assigns a "satisfaction quotient" to an agent that reflects its ability to harvest the kind of knowledge the

human user desires. Over many generations, this process creates an evolutionary dynamics in which fitness is associated with the quantity and quality of information harvested. The more the satisfaction quotients of the individual agents increase, the more robust the ecosystem as a whole becomes. The agents begin the process by harvesting information that passes through a boundary surface to the "cognition engine." This boundary surface is constructed as a semipermeable membrane whose porosity evolves as a function of how much information is coming into the system. To prevent the cognition engine from being overwhelmed, the surface becomes less porous as the information stream gets heavier. Once the information has been interpreted and screened by the cognition engine, it is associated with an "activation vector." The combined shape of these vectors comprises an "influence topology" which coevolves with a second semipermeable boundary controlling the stream of information allowed to reach the response engine. Like the first boundary, this boundary operates as far more than a passive filter, changing dynamically to reflect the changing shape of the influence topology. The response engine evaluates the content of the information and assigns summation values, which are linked in turn with another active membrane, the commitment/decision boundary that processes the information into threads the user can select. This selection then defines the motivational values that feed back into the system to reward the appropriate foraging agents with an increase in satisfaction quotient.

Understanding these dynamics allows a fuller appreciation of how the system as a whole functions as an ecology. Central to the system's ability to evolve are the recursive structures connecting parts of the system to one another and the system as a whole to its environment and to the user. Because the system's output is linked with the agents' input, agents and system coevolve together, with World Wide Web functioning as the system's environment and the user's preferences providing the driving force of natural selection.[16] Ostman calls the end result of the harvesting, filtering, and evaluation processes "conditionalized knowledge," after John Kenneth Galbraith's "conditionalized power," that is, power intimately connected with the ideological structures that produce people as social and cultural subjects.[17] According to Galbraith, conditionalized power has greater social force than power based on coercion or reward, because conditionalized power works below the level of consciousness as part of the subject's world view. (Foucault of course extends this idea into the materio-theoretical arrangements that enact power relationships in a society, an approach that makes clear how embodied human subjects can be disciplined in ways that do not apply to intelligent agent programs, with their radically different embodiments.) The recursive loops of Amalthaea create something we might call the system's ideol-

ogy, the net result of all its previous experiences that lead it to label some kinds of knowledge as good (or tasty, or nourishing, or pleasurable), and other kinds less so. In effect, these judgments constitute an indwelling sense within the system of its own existence, manifested not as the self-consciousness that humans experience, but rather as a historical accretion of past experience that has sunk into the structure of the underlying programming. Incorporated into the software, these experientially-derived values comprise a level of influence so implicit and assumed that they function similarly to the presuppositions which constitute ideology for a human subject. Just as Galbraith's "conditionalized power" is produced through ideology at the same time it produces ideology, so the "conditionalized knowledge" of Amalthaea is produced by its ideology at the same time it produces the system's ideology as such. We can now understand why it is not merely fanciful when Ostman talks about the Amalthaea system approaching a threshold of sentience. If sentience implies a rich sense of self-awareness emerging from many interacting levels of sensation and awareness (consciousness, proprioception, emotional state, and so on), Amalthaea has a rich enough structure so that it may well achieve states equivalent to sentience.

Other multilayered, self-interested agent programs are designed to make decisions in contexts where data are uncertain, ambiguous, or conflicting. Like Amalthaea, these programs accrete experiences that cycle through multiple feedback loops. These accreted experiences form a topology oriented now not to values that make some bits of information tastier than others but rather to a belief structure (or ideology) that plays a central role in the system's decision to commit to a certain course of action. The system's morphology and functioning literally instantiate its ideology, and its ideology in turn provides values that cycle back into the system to influence assessment of the risks and rewards of anticipated actions. As data pass through the system's multiple layers, active filtering processes use feedback to arrive at values that, in effect, constitute varying intensities of belief in the rightness or wrongness of a given course of action. The resulting decision comes from the collective actions of all the agents and programs acting together. As with ants, these collective actions are much more intelligent than anything the individual agents could do.

Whereas Amalthaea's structure ties its self-interested behavior to informational "nutrients," these systems are constructed to connect self-interested behavior with minimizing risk and maximizing reward. Suggesting that sentience "can in some cases be measured by the defensive posturing and maneuvering that a synthetic sentient entity will employ on its own behalf," Ostman emphasizes that risk/reward assessment is tied in these systems to feedback loops that in effect constitute a desire

for survival (SS 10). Add the ability of these systems to self-evolve their connectivity into still larger networks, and it is easy to see why Ostman considers these systems as "ingredients for spawning an environment in which the global Internet system itself begins to take on ecological properties" (SS 10). The result, he suggests, will be to drive "human interaction with these systems toward a new form of operational symbiosis . . . [in which] a human population . . . [will be] induced into adapting, and evolving, to an *irreversible* symbiotic relationship" with synthetic sentience (SS 10). "The Rapture," Ostman calls this irreversible symbiosis, envisioning it as a transformation so profound it will amount to a change in the human condition.

How will this "virtual terraform" affect the consumer?[18] One area of application, Ostman suggests, lies in virtual interactive environments populated by synthetic sentiences and evolvable avatars that can change to become increasingly independent from the humans they represent.[19] Ostman predicts the emergence of virtual shopping malls that have dynamic environments adapted to the needs, preferences, and desires of an individual consumer. Instead of the static spaces of present-day malls, these virtual malls would "read" a consumer's avatar for initial information about the consumer. Then, using "spatial tracking, speech recognition, olfactory sensing where we can smell you on demand" as well as intelligent agent systems which learn how the consumer expresses "emotive content," intelligent systems adjust the environment and behavior of synthetically sentient characters so they coadapt with the consumer's desires (IB 27). If your responses indicate that you like purple, the environment will increasingly display this color. The effect, Ostman predicts, will be so compelling it will make the experience more like entertainment than shopping.

While the consumer is learning about the product, the system is learning about the consumer. "The intelligence rendered in these environments is bi-directional," Ostman explains. "This is an important concept, which potentially represents as much commercial value as the entertainment process itself. As a human audience participant interacts with a virtual character entity, or other components in a dynamic synthetic environment, this behavior can be readily measured, and monitored. This provides a method for realtime, interactive demographics measurement of a specific human audience" (SE 72). In addition to contributing information about the consumer to a database, the system also feeds the information back into recursively structured, self-evolving programs which continuously modify the environment so it becomes ever more seductive.

What does the human participant receive that makes this co-optation

into a capitalistic marketing process worthwhile for her? Not just any entertainment, but Entertainment so intense and personally tailored to her individual responses and psychology that it is irresistible. "We're selling enrapturement as a process," Ostman remarks, perhaps ironically; "we want you to buy time in the Enrapturement of the Month Club" (IB 26). Thus this technology will use the recursive feedback loops of intelligent agent programs to suture the consumer tightly into a circuit of pleasure, selling product and experience together as a commodity "so compelling, enriching and rewarding that you'll want to come back for more" (IB 26). Admitting "there's a whole bunch of dark and scary possibilities," Ostman sees as "most horrible" the prospect that "you'll become so enraptured that you won't want out; you'll become addicted" (IB 27). He concludes that "all aspects of media as [they exist] now will be amplified, including the ideological shill routines by which corporations sell the public on their image and the news media sell their version of news. We're looking at *sensory amplification* here" (IB 32). The irony, of course, is that the consumer is offered the pleasurable illusion of exercising her autonomous agency at precisely the point where that agency is being effectively subverted by the intelligent agent system.

As Ostman's hawker tone indicates, he is aware of this irony; yet he remains ambivalent about its consequences. The techno-enthusiasm that surfaces in his talk about the "Rapture" sits in uneasy relation with the political consequences of virtual terraforming. On the one hand, he acknowledges that extending computation into a global "functionality fabric" will create "an extremely competitive, very predatory realm" among businesses striving for nanosecond advantages in manipulating knowledge (IB 32). On the other, he predicts that once humans reach the "fabled Singularity" (that is, the Rapture), the "coveting of stuff, territory, physical things will no longer be an issue because there won't be any reason for it—you can make what you need. Wars, conquests, enslavement of peoples, malevolent dictatorships—all the stuff driven by predation—will be obsolete" (IB 35). How to reconcile this utopian vision with a predatory business environment where human agency is subverted and exploited? Ostman sees a winnowing process in which "probably well below 1% survive," with the tiny remainder consisting of people who "have gone through enough trial by ordeal to have learned the value and necessity of cooperation" (IB 35). These "chosen few" who learn "to adopt a basic moral code are allowed to get to the next level. The others pay a price—they're left behind" (IB 36).[20] Sounding suspiciously like the radical individualism of Ayn Rand, this scenario places the emphasis on exceptional individuals who are defined as fit citizens of the new regime through their ability to survive with their

agency intact. That they have learned to use their agency to cooperate rather than complete is scant comfort to the vast majority who do not reach this privileged state.

In this techno-version of the Apocalypse in which the worthy few are gathered together to make a new world, it becomes clear why Ostman chooses the religiously resonant term "Rapture," for his vision in effect reinscribes the Book of Revelations onto a technological landscape. The virtual terraform performs the double function of signifying near-future developments that are quite likely to happen and overlaying onto these developments a scenario that could scarcely be more traditional in calling sinners to account and separating out the elect for salvation, thus replicating the Calvinist assumptions built into the foundations of American individualism. Once again we are back inside the paradoxes, trapped within their dynamics rather than empowered to see them in a larger context.

The coproduction of possessive individualism and market relations that remain obscured in Ostman's writing are brought sharply into focus in Wallace's *Infinite Jest.* Uncannily echoing Ostman's predictions about the seductive power of virtual environments, Wallace foresees a future in which the subject will become sutured into a recursive cycle technologically enhanced to become so pleasurable nothing else in life will matter. In Wallace's text, predatory practices and "enraptured" consumers are bound together with recursive cycles to create a complex system that is spinning out of control toward a socio-ecological catastrophe of unprecedented scope. The suturing that Wallace envisions, like the virtual terraform Ostman predicts, encompasses us all within its relentlessly recursive loops. At the center of this complex recursion is "Infinite Jest," a data disk which its maker calls, perhaps ironically, an "Entertainment."[21] At once metaphor and causal agent, this "Entertainment" exemplifies a conditionalized knowledge so perfectly tailored to the subject's psychology that no one can escape its fatal ecstasy.

Media and Politics in the Loop

In contrast to the linear progress Ostman sees for intelligent agent technology, *Infinite Jest* creates cycles within cycles within cycles. Imagine a huge novel that has been run through the recursive feedback loops of an intelligent agent program and then strung out along the page. Although the words follow in linear sequence, the recursive enfolding would dramatically affect the novel's structure, sequence, and meaning. For such a novel any starting point would be to some extent arbitrary, for no matter where one starts, everything eventually cycles together with

everything else. Let us start, then, with O.N.A.N., an acronym that stands for Organization of North American Nations but also slyly points toward onanism, the sin of Onan in ejaculating his seed upon the ground. O.N.A.N. is the brainchild of Johnny Gentle, a crooner who gets elected President by running as the candidate for C.U.S.P., the Clean U.S. Party. Vowing to clean up America, Gentle would seem to be the ecological candidate of choice. His idea of cleanliness, however, is to covertly transport all of the nation's waste into sparsely populated regions of Vermont, New Hampshire, and upstate New York, turning this whole area into a huge toxic waste dump. Men with short hair and shiny trucks—the same men who carried out the transport—then "discover" the toxic wastes and declare the area uninhabitable. The next move is to sign treaties with Mexico and Canada that coerce them into becoming partners in the Organization of North American Nations, a union celebrated every November 11th with Interdependence Day.

It soon becomes apparent that Gentle's version of "Interdependence" is merely rampant nationalism under another guise, for the U.S. uses its O.N.A.N. clout to force Canada to annex the toxic waste area so it will not soil U.S. cleanliness. Surrounded on the south by Lucite walls and fed by great fans intended to keep toxic fumes from escaping, "The Great Concavity" as it is called in the U.S. (from the Canadian perspective it is "The Great Convexity") signals the transition from imperialism to experialism. While imperialism is about expropriating valuable natural resources from less powerful nations, experialism is about forcing them to accept the industrial wastes that result when the expropriated natural resources are turned into capitalist commodities. Like Onan wasting his seed upon the ground, the cycle of imperialism and experialism uses the Other merely as an occasion for a masturbatory engagement with one's own interests. There is no real "inter" in this version of Interdependence, only a pretense of hygiene created by the refusal to recognize those parts of oneself which are considered unclean, a process that, when it takes place in the psychological realm, is known as abjection.

Identifying the abject with the improper and unclean, Julia Kristeva calls it "neither subject nor object" because the abject is at once cast out from the self—the abject is "opposed to the I"—and yet somehow also unmistakably belongs to the self.[22] It is the "in-between, the ambiguous, the composite" that "does not respect borders, positions, rules" (4). Another way to think about abjection is as an attempt to preserve the autonomy of the self in the face of an unavoidable confrontation with interconnection. Instead of acknowledging the coproduction that binds together the subject and the environment, the self clings to its precious autonomy and creates a liminal space in which the distinction between

inside and outside, self and other, momentarily blurs. The interconnectedness created by recursive loops is at once recognized and obscured, brought into view and mystified.

Within the fictional world of *Infinite Jest*, this double move of obscuring and clarifying is associated with media, which operate in the original sense of media as mediation, circulating information along pathways so circuitous it is at once revealed and covered up. Crucial information is conveyed through such devices as a puppet show, a seventh-grade essay, a "soft profile" for a popular magazine, and correspondence buried in the footnotes. Just as waste is continuously recycled through the Great Concavity/Convexity, so information is recycled through a variety of media before it arrives on the page for the reader to consume, thus suggesting an analogy between the underground passages through which toxic contamination moves into the surrounding environment and the toxic dynamics percolating through the media. I will refer to this widening circle of toxicity, this failure to contain damage within a prophylactically enclosed area, as "the dump." The point of the dump is precisely that it cannot be contained because the loops continuously circulate through its permeable boundaries.

Add an ideology that celebrates individual agency at the very point where the recursive loops are most intense, and the result is a complex system about to veer catastrophically out of control.

The process can be illustrated through the sequence of events that killed broadcast TV. In Hal Incandenza's junior high essay, we learn that the demise of broadcast TV was intimately tied up with advertising, particularly with the Viney and Veals Agency (V&V). It began when V&V initiated a campaign for Nunhagen Aspirin showing excruciating paintings done by patients suffering from migraines. Viewers found the paintings too painful to watch, but sales soared for the aspirin company. The next series of V&V ads featured liposuction clinics, again nauseating for viewers but stimulating for sales. As the ads cycled relentlessly through prime TV viewing time, the numbers of people watching TV steadily declined, but for the fortunate few companies sponsoring the ads, sales continued to climb. With falling viewer numbers, the networks were more desperate than ever for advertising income. The feedback loop spun out of control when V&V took on NoCoat tongue scrapers. Although the ads made NoCoat rich, the networks bit the dust. Fatty tissue and tongue coating are not innocently chosen examples, for these are parts of the body that the typical consumer wants to reject, to label as undesirable and unclean and to cast out from the self. Thus these ads trade on the same tendency toward abjection that characterizes Gentle's "Clean U.S. Party." The idea, as Hal Incandenza remarks of tennis, is "to

send from yourself what you hope will not return" (*IJ* 176). The large project of *Infinite Jest* is to demonstrate the fallacy of the dump by exploring the underground seepages and labyrinthine pathways through which the abjected always returns in recursive cycles of interconnection that inexorably tie together the sanctified and the polluted. The media so prominently on display serve as the social mechanisms through which the abjected is both expelled from and returned to the self in a haunting that becomes more devastating as the text proceeds.

This return operates in the political realm partly through the machinations of the A.F.R., Les Assassins des Fauteuils Rollents, Québecois wheelchair assassins who in revenge for O.N.A.N and the Great Convexity dedicate themselves to wreaking havoc on the U.S. One symbolically significant tactic is to make U.S. motorists plunge off lonely mountain passes by dragging a large standing mirror across the lane, which the motorist interprets as another car racing toward him with which he is about to have a head-on collision. The self-other confusion this illusory doubling creates serves as an icon for the return of the abject to the self. More ambitious, and more catastrophic, is the A.F.R. plan to make the U.S. a nation of vegetables by unleashing on unsuspecting citizens the lethal Entertainment "Infinite Jest." Created by James O. Incandenza, a polymath genius who is wildly dysfunctional in his family relations, "Infinite Jest" is so powerful and seductive that once someone has seen it, everything in life ceases to matter.

Without necessarily knowing about Ostman's work, Wallace anticipates in "Infinite Jest" a virtual environment so compelling no one will want to leave it, as if enacting Ostman's prediction that "We're looking at *sensory amplification* here." "Infinite Jest" represents the ironic end point of the demand curve in which pleasure and profit at last come together in a perverted culmination of the two sacred American goals of the pursuit of happiness and the pursuit of money (*IJ* 417). A sure sign a viewer is unable to break the spell of Enrapturement is his refusal to go to the toilet so that he soils himself as he sits watching, a failure of cleanliness that recapitulates at a personal level the international failure of the U.S. to take care of its messes. As Alain, a Québecois who identifies himself as a "prosthetic film scholar," is overheard to say in a snatch of party conversation (another mediating route through which crucial information is disclosed), "Fans do not begin to keep it all in the Great Convexity. It creeps back in. What goes around, it comes back around. This your nation refuses to learn. It will keep creeping back in. You cannot give away your filth and prevent all creepage, no? Filth by its very nature it is a thing that is always creeping back in" (*IJ* 233).

Percolating Through the Dump

The recursivity that ensures the abjected will always be "creeping back in" reappears in the annular fusion that James Incandenza pioneered, a high-tech process intended to provide a technological fix for the toxic wastes accumulated in the Great Concavity/Convexity. Typical of Wallace's strategy of giving the reader information through mediating pathways is the account of annular fusion delivered by E.T.A. student Thorp to another E.T.A. student Idris, who needs the information to pass a "laughable Energy survey course" but at the moment desperately has to urinate and is looking for a toilet (*IJ* 569). Idris, full of what he wants to send away from himself and hopes will not return, strains to pay attention as Thorp explains that annular fusion can be thought of as a huge right triangle. One apex is up at the O.N.A.N.-guarded waste facility in "what used to be Montpelier in what used to be Vermont," where a fusion facility blasts away that has been especially designed to *create* (rather than eliminate) nuclear waste. A second apex is the point where these toxic wastes are mixed with other radioactive materials to form the fuel for a fission process, which forms the third apex by creating "like hellacious amounts of highly poisonous radioactive wastes," which are shunted back to the first apex to serve as fuel for the fusion process (*IJ* 571). As the waste cycles around in a "moving right-triangular cycle of interdependence and waste-creation and -utilization" (*IJ* 571), the ecosystem responds by growing like crazy when the fusion process is sucking toxic wastes out of the surrounding territory, giving rise to "insects of Volkswagen size and infantile giganticism and the unmacheteable regions of forests of the mythic eastern Concavity," like a "rain forest on sterabolic anoids," a Spoonerism that nicely illustrates the recursive process (*IJ* 573). As the cycle continues and the waste builds up that will fuel the next stage of the process, this environment "so fertilely lush it's practically unlivable" dies off, going from "overgrown to wasteland to overgrown several times a month" (*IJ* 573).

When the Great Concavity/Convexity becomes so ecologically unstable it can scarcely be entered at all, C.U.S.P.'s platform of cleaning up America takes the bizarre form of literally *catapulting* toxic waste several times a month into the Concavity to keep fueling a process that constantly demands more toxic waste and grows progressively harder to control. It is like "treating cancer by giving the cancer cells themselves cancer," Thorp explains (*IJ* 572), a strategy that does not give one hope there will be less cancer in the world. The "kertwang" in this cyclic process is obvious. Instead of returning the nation to cleanliness and the ecosystem to health, C.U.S.P.'s policies have led to such events as the A.F.R.'s fatal highway mirrors, with their speculatory dynamics of abjection.

The process reaches mythic proportions in "The Infant," a baby lost in the great relocation (or, some more ominously murmur, an abortion tossed into a dumpster that nevertheless survived) grown to gigantic proportions, leaving scat piles as big as houses and keening for its lost parents. Like the toxic wastes in annular fusion, the mythic Infant does not disappear but rather cycles around to return in magnified form. The myth of the Infant hints that the recursivity of annular fusion, fed on nuclear waste, is connected through underground seepage with the nuclear family.

Indeed there are multiple connections between the ecological disaster area and the Incandenza family, starting with the fact that the "Infinite Jest" master cartridge, which the A.F.R. is only too willing to kill to obtain, was buried in the microwave-exploded skull of James Inc, interred by his wife Avril in her family's farm in L'Islet Province of Nouveau Québec, which is to say, in the very Concavity/Convexity that the U.S. wanted to deny was part of itself. At once a communication, an art form, and a deadly addiction, "Infinite Jest" exemplifies the interconnections tying together the Incandenza family, O.N.A.N., and the terrorist tactics of the A.F.R. Fully understanding these complexities requires exploring the toxicity that percolates through the Incandenza family, for the dump is not only about technology and ecology but also about how the illusion of autonomy poisons family relations, creating failures of communication so extreme they become tragic. These failures are evident in James's relations with his sons, who call their father "Himself," as if to acknowledge the man is so inward-bent that any nominative referring to him must include an intensifier of selfhood. Wounded by his father, Himself fails miserably in nurturing his sons, managing to connect only with his deformed middle son Mario but remaining distant from Orin and Hal. Son of an alcoholic father, Himself carries on the family tradition with an alcoholism so acute that when he finally goes off the sauce, he kills himself to escape the pain of sobriety by putting his head in a microwave, leaving Hal, a twelve-year-old youngster, fatherless.

Youngest and most precocious of the three boys, Hal manifests his injury in two related symptoms, addiction and a communication disorder. Both contribute to a solipsistic state in which social connection becomes attenuated, either because the addictive Substance demands all one's attention, or because the lack of communication makes one more into a piece of furniture rather than a genuine participant in social reality. The only thing worse than this state of affairs from the addict's perspective is giving up the Substance, which not only plunges him into the ghastly experience of withdrawal but also enables him to remember the traumas that caused him to become addicted in the first

place. Hal's Substance of choice is marijuana. When he is forced to go cold turkey or risk getting expelled from E.T.A. and competitive tennis, he encounters the void. A Buddhist could have told him that the emptiness he feels is typical of a self who has had his autonomy breached and has not yet learned that lack of ground need not mean lack of meaning. Seized with panic, Hal feels opening up in himself a huge hole that he fears will swallow him and leave nothing behind: "I feel a hole. It's going to be a huge hole, in a month. A way more than Hal-sized hole . . . And the hole's going to get a little bigger every day until I fly apart in different directions" (*IJ* 785).

Although we do not see the full progress of Hal's disease because of the text's nonlinear chronology, there are many indications that even before Hal feels the hole opening up, he is becoming what his father calls a "figurant," an actor who seems to be engaging in animated conversation but is merely mouthing words so his conversation does not interfere with the main characters' dialogues. Hal's retreat into the role of a figurant is displayed in the narrative's opening scene, which chronologically is the latest date in the text (*IJ* 3–10). During an interview that will determine his future career, Hal feels he is being perfectly coherent and his speech and thoughts are rendered coherently in the text. Those listening, however, perceive only grimaces and noises so disturbing they rush to restrain Hal, assuming he is having some kind of terrible fit. The scene demonstrates Hal's profound isolation, made all the more painful because language can get through to him, but he cannot get through to language that anyone else can understand.

In many ways Avril Incandenza seems to be as exemplary a mother as Himself is a failure as a father. Orin confides that he felt "his mother was the family's pulse and center, a ray of light incarnate, with enough depth of love and open maternal concern to almost make up for a father who barely existed, paternally" (*IJ* 737). Avril makes it a point to trust her children completely, assuming even when the evidence points compellingly in other directions that they will tell her honestly and openly everything she should know about them and their lives. She alone seems to fulfill the promise of the family name, radiating luminous incandescence that makes her "the family's light and pulse and center" (*IJ* 737). Her sons' attitudes toward their parents is reflected in their names for them. While James is called Himself, signifying the inward bent of his nature, Avril is called the Moms, as if the job she does is so heroic that it would normally require several mothers.

Yet there are hints that Avril participates in the same dynamics of abjection that drives C.U.S.P., O.N.A.N., and the Great Concavity/Convexity. She has a pathological fear of anything that lives in the dark

and is considered loathsome and unclean. While she directs the academic side of E.T.A. from her suite at the top of the huge complex, young students prowl the tunnels beneath to find what she abhors. "[E]ven a confirmed rat would be a coup," they think. "Dean of Academic Affairs Mrs. Inc has a violent phobic thing about vermin and waste and insects and overall facility hygiene" (*IJ* 671). In typical mediated fashion, we learn about the underground pathways connecting Avril to the dynamics of abjection from a letter buried in the endnotes (*IJ* 1047–52). The letter, written by Orin's boyhood friend Marlon Bain, traces the origins of Orin's pathological lying, commenting that Orin "has come to regard the truth as *constructed* rather than *reported.* He came by this idea educationally, is all I will add. He studied for almost eighteen years at the feet of the most consummate mind-fucker I have ever seen" (*IJ* 1048). At first reading it appears "consummate mind-fucker" refers to Himself, for the letter goes on to list James's failures as a father. As the letter continues, however, it becomes clear that the reference may more appropriately be to Avril. Bain asks of Avril's generosity, "Is it mind-bogglingly considerate and loving and supportive, or is there something . . . *creepy* about it? . . . was this generosity for Orin's sake, or for Avril's own" (*IJ* 1051). He thus hints that the dark underside of Avril's policy of trust is a dynamic in which her sons are not so much the objects of her affection as occasions to practice and confirm her own virtue. In light of Bain's comments, Avril's virtue appears as the mirror image of Himself's inward bent. Apparent opposites, both parents are ultimately more preoccupied with themselves than with their children. Moreover, their failures are mutually reinforcing. In a subtle way, Avril's positioning of herself as a mediator between father and son helps to ensure that no communication can take place without her, a dynamic that reinforces Himself's inability to communicate with his sons.

The underground pathways that connect addiction, abjection, and dysfuntional parenting are further performed when Hal tries to visit a Narcotics Anonymous meeting and finds himself in a room full of men clutching teddy bears. As the scene becomes progressively surrealistic, it dawns on Hal that this cannot possibly be an NA meeting; instead, he has stumbled by mistake into a group of men trying to get in touch with their Inner Infants. The man on the hot seat is Kevin Bain, older brother of Marlon. As the leader calls out to Kevin to express his Infant's needs and to the other men to acknowledge and meet them, Bain crawls toward Hal clutching his teddy bear and bawling, so that Hal's vivid memory of trying to find help for his drug problem ends with "Bain's knees leaving twin pale tracks in the carpet and his head up on a wobbly neck and looking up and past Hal, his face unspeakable" (*IJ* 808). Like

the mythic Infant of the Great Concavity, this regression to infancy suggests that the abjected does not disappear but rather returns in magnified form, demanding to be reckoned with before any real solution can be found to the Gordian knot entangling the Great Concavity/Convexity with O.N.A.N., the A.F.R., and the Incandenza family. The filth that is "always creeping back in" operates on multiple levels, personal as well as political.

Technologies of the Self, or How to Escape Entertainment

We can now understand the import of the fatally addictive cartridge, "Infinite Jest." Piecing together disparate accounts from Joelle Van Dyne, who acted in the film but has never herself seen it, her friend Molly Notkin, and viewers who retained enough sanity to give fragmentary accounts, we know that the film opens with Joelle going through a revolving door. As she circles around she sees someone she knows, and to meet up with that person, she pushes further around while that person also continues to go around, an establishing shot that makes clear the importance of recursive loops to the film's design. Part of the film consists of her sitting naked at a table, patiently explaining to an unseen listener that she is Death, and the way Death works is to have the woman who kills you in one life come back as your mother in the next life. This sets up the next part of the film, which consists of her saying "I'm sorry" in different ways for twenty minutes, while bending naked and apparently pregnant over a crib in which is positioned a very special lens designed to record the scene as it would be seen through the blurry, wobbly vision of a very young infant. Like the virtual malls that Ostman envisions, this Entertainment taps into the deep psychic structures of the viewer. At the same time that the film performs the recursive loops entangling mother and child, it offers the seduction of an *apology* for this recursivity, as if it were recursivity that is the problem rather than the deadly illusion of autonomy.

Although James confesses that he made "Infinite Jest" in a last desperate attempt to communicate with Hal and save him, the cartridge has exactly the opposite effect, bringing the entire family, and indeed the nation, into imminent danger. No wonder it fails, for it reinscribes with toxic force the illusion of autonomy and the fact of recursivity. The radiating consequences make clear that the scale of the problem exceeds family dynamics, encompassing international politics and ecological crises as well as the socio-economic enactment of abjection that killed television. In a large sense the culprit is no single person, family, or even nation, but rather an ideology that celebrates an autonomous,

independent subject who is free to engage in the pursuit of happiness, a subject who has the right to grab what pleasure he can without regard for the cost of that pursuit to others. Presumably that is why the A.F.R. plasters the fatal cartridges with smiley faces, why the A.F.R. leader wears a smiley face mask when he carries out a particularly vicious raid, and why Gately dreams that the ravening maw of addiction wears a smiley mask over its hideous features.

If the "Entertainment" offers no solution, what does? Significantly, the most effective counter-measures displayed in the text—tennis and Alcoholics Anonymous—are presented not primarily as sports or organizations, but as technologies of the self. If the problem originates in the presumption of autonomy that is the founding principle for the liberal humanist self, then nothing less than a reconceptualization of subjectivity can offer a solution. The immensely hard work of rebuilding subjectivity from the ground up is performed in the story of Don Gately, a second-story man and recovering addict who discovers to his amazement that Alcoholics Anonymous actually works. Although Gately has no idea why the Twelve Steps have the power to release him from the terrible cage in which he found himself trapped, it gradually dawns on him that he does not have to understand why, only what. Addiction is deadly, he learns, because it infects the will; once reason has been coopted, it uses the power of ratiocination in the service of the Disease, inventing rationalizations that continue to operate until the Substance kills the Subject. "Analysis-paralysis," AA calls this kind of thinking, a state typical of addicts who indulge in making finer and finer distinctions about a situation while failing catastrophically to intervene or act constructively, a state that Hal often finds himself in after taking marijuana hits. "Personal will is the web your Disease sits and spins in," Gately realizes (*IJ* 357). AA teaches him through its practices that "You have to Starve the Spider; you have to surrender your will . . . You have to want to surrender your will to people who know how to Starve the Spider" (*IJ* 357). "Fake it until you can Make it," the AA motto goes, and so he gets down on his knees every morning and thanks a Higher Power for giving him that day, although he does not believe in a Higher Power and feels he is talking to himself. Nevertheless, the AA routines seem magically to have the power to release him from his addiction; he is more surprised than anyone when days and then weeks pass without him even thinking about his Substance of choice. In contrast to the bogus "interdependence" of O.N.A.N., Gately's struggle reveals what it means to attempt on a daily basis to shed the illusion of autonomous selfhood and accept citizenship in a world in which actions have consequences that rebound to the self because everything is connected with everything else. There are no simple or easy solutions, Gately discovers, only the

daily struggle to be "so disgustingly humble, kind, helpful, tactful, cheerful, nonjudgmental, tidy, energetic, sanguine, modest, generous, fair, orderly, patient, tolerant, attentive, truthful" (*IJ* 357).

Another site where discipline is used to restructure the autonomous liberal subject is the competitive tennis that young athletes go to E.T.A. to learn. Schtitt, the head coach, sees tennis less as a game than an occasion for transcending the self. "[A]thletics was about learning to sacrifice the hot narrow imperatives of the Self—the needs, the desires, the fears, the multiform cravings of the individual appetitive will—to the larger imperatives of a team (OK, the State) and a set of delimiting rules (OK, the Law)" (*IJ* 82–83). Lurking in Schtitt's view of the game is a paradox: the will is needed to win, but the will is precisely what the player must transcend. "You compete with your own limits to transcend the self in imagination and execution. . . . Which is why tennis is an essentially tragic enterprise. . . . You seek to vanquish and transcend the limited self whose limits make the game possible in the first place" (*IJ* 84). DeLint, Schtitt's assistant, makes the connection between this triumph over the will and the fatal ecstasy of Entertainment: "If [the young players] can forget everything but the game when all of you out there outside the fence see only them and want only them and the game's incidental to you, for you it's about entertainment and personality, it's about the statue, but if they can get inculcated right they'll never be slaves to the statue, they'll never blow their brains out after winning an event" (*IJ* 661). The young star may believe he represents the pinnacle of autonomous selfhood, but in fact he is enmeshed in a system in which his stardom produces the conditions that make it increasingly difficult for him to remain a star, at the same time encouraging his addiction to stardom. The solution, Schtitt believes, is to use the recursive loops connecting players to each other to smash the illusion of autonomous selfhood. "The competing boy on the net's other side: he is not the foe: he is more the partner in the dance. He is what is the word the *excuse* or *occasion* for meeting the self. As you are his occasion" (*IJ* 84).

While Gately's struggle for sobriety and Schtitt's tennis philosophy are meant to cure the dysfunctionalities of autonomous selfhood, the text also explores the possibility that in some instances the cure can be as bad as the disease. This possibility is performed through the A.F.R. Like Schtitt, the terrorist operative Marathe also sees the necessity to transcend the narrow imperatives of the autonomous self; "'Love of your nation, your country and your people, it enlarges the heart,'" he declares. "'Something bigger than the self'" (*IJ* 107). For him, the U.S. pursuit of happiness is a social disease. "Then in such a case your temple is self and sentiment. Then in such an instance you are a fanatic of

desire, a slave to your individual subjective narrow self's sentiments; a citizen of nothing. You become a citizen of nothing. You are by yourself and alone, kneeling to yourself" (*IJ* 108). Yet the terrorist sect that Marathe sees as freeing him from isolation merely displays another form of O.N.A.N.-ism, pursuing their objectives without regard for the pain and suffering they inflict on others. The A.F.R. is not so much an alternative to Gentle's administration as a mirror to it.

If part of the text's project is to explore the U.S. fascination with Entertainment and offer alternatives to it, what of the text's own status as an Entertainment? Like the cartridge that is its namesake, does *Infinite Jest* create an imaginative world so compelling that the reader wants only to consume this text, a desire made all the more insatiable by the text's excessive bulk, which stretches the process of reading into weeks, months, years, always offering just enough thrill in return so that reading *Infinite Jest* itself becomes addictive? Perhaps the author's awareness of this possibility explains the narrative's unusual structure. As the text draws to a close it becomes clear that the author intends to withhold from his readers the usual satisfactions of finishing a very long book. There is no climax, resolution, and denouement in any conventional sense. Rather, the main narrative (leaving aside the endnotes) is book-ended by the account of two Bottoms (recall that a Bottom in AA parlance is the low point an addict typically must hit before he accepts that the only alternatives are to change or die), opening with Hal's disastrous failure to communicate and ending with Gately's failing to intervene in Fackelman's torture and death. These episodes illustrate the percolation of the dump at its most toxic, displaying the end results of believing in autonomy while being sutured into a complex system through multiple recursive loops. If the constructive potential of hitting Bottom is to spring the addict into change, to what change are we readers impelled? The answer, I believe, is to discover the text's recursive patterns so we can see it, as well as the world it describes, as a complex system that binds us into its interconnections, thus puncturing the illusion of autonomous selfhood.[23] *Infinite Jest* achieves unity through recursive loops performing a world in which actions against others have consequences for those who perform them; a world where dysfunctional families cannot be healed without becoming aware of the underlying ideologies driving their dynamics; and a world where interdependence is not just a corrupt political slogan but a description of the complex interconnections tying together virtual Entertainments, political realities, and real ecologies.

If it is true, as Ostman suggests, that we are headed for an irreversible symbiosis with intelligent machines, then it behooves us to think about what that synthesis may require us to give up, for symbiosis always

involves loss as well as gain.[24] I believe it is not an adequate response to say, as Ostman does, that only one percent will survive, a scenario that eerily echoes the call of some radical ecoactivists to reduce drastically the world's human population.[25] *Infinite Jest* suggests a more constructive approach when it shows that the idea of an autonomous liberal subject can be a recipe for disaster in a world densely interconnected with interlocking complex systems. Authenticity in this vision is not about escaping from the realm of the social, but rather about recognizing the profound interconnections that bind us all together, human actors and nonhuman life forms, intelligent machines and intelligent people. We escape from Entertainment not by going to the woods but by recognizing our responsibilities to one another.

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NOTES

1 C. B. Macpherson, *The Political Theory of Possessive Individualism: Hobbes to Locke* (Oxford, 1962).

2 William Cronon, "The Trouble with Wilderness: or, Getting Back to the Wrong Nature," in *Uncommon Ground: Toward Reinventing Nature*, ed. William Cronon (New York, 1995), pp. 69–90; hereafter cited in text.

3 Proverb cited by James Scott, "Why the State is the Enemy of People Who Move Around: An Interpretation of the Frontier in Southeast Asia," presentation at the "Cultural Turn II" conference, University of California at Santa Barbara, February 1999.

4 For an astute analysis of how this quest for authenticity works in the context of capitalism, see Jennifer Price, "Looking for Nature at the Mall: A Field Guide to the Nature Company," in *Uncommon Ground*, ed. Cronon, pp. 186–203.

5 One of the tenets of deep ecology is the reduction of the human population, which some posit should be as much as ninety percent of the present population. See Dave Forman, *Confessions of an Eco-Warrior* (New York, 1991) and *Deep Ecology*, ed. Michael Tobias (San Diego, 1994). Michael E. Zimmerman has a thoughtful analysis of the deep ecology platform in *Contesting Earth's Future: Radical Ecology and Postmodernity* (Berkeley, 1994), pp. 19–56.

6 As Catriona Sandilands notes in another context, wilderness tourism as a practice brings together the concept of wilderness as an uninhabited space and market commodification which depends for its effectiveness precisely on erasing all traces of market activity, in "Between the Local and the Global: Clayoquot Sound and Simulacral Politics," in *Rainforest Crunch: The Politics of Clayoquot Sound*, ed. Warren Magnusson and Karena Shaw (University of Minnesota Press, forthcoming 2000).

7 Richard White, "'Are You an Environmentalist or Do You Work for a Living?'" in *Uncommon Ground*, ed. Cronon, pp. 171–85.

8 For a discussion of the changing faces of wilderness, see William Cronon, "Landscapes of Abundance and Scarcity," in *Oxford History of the American West*, ed. Clyde A. Milner II, Carol A. O'Conor, and Martha A. Sandweiss (New York, 1994), pp. 603–37.

9 A remark Richard White made in the "Reinventing Nature" seminar from which the Cronon book emerged.

10 Richard Grusin makes a similar point in "Representing Yellowstone: Photography, Loss, and Fidelity to Nature" (*Configurations,* 3 [1995]), when he cites a report by Aldo S. Leopold on park management: "[T]he report insists that 'observable artificiality in any form must be minimized and obscured in every possible way.' Although recognizing that the reproduction of nature would require active management rather than passive protection, the committee advises that the methods used by the Park Service should have as their 'objective . . . to manage "invisibly"—that is, to conceal the signs of management'" (417).

11 Albert Borgmann, *Holding On To Reality: The Nature of Information at the Turn of the Millennium* (Chicago, 1999).

12 David Foster Wallace, *Infinite Jest* (Boston, 1996); hereafter cited in text as *IJ.*

13 For a discussion of artificial life from a cultural perspective, see Richard Doyle, *On Beyond Living: Rhetorical Transformations in the Life Sciences* (Stanford, 1997); see also Stefan Helmreich, *Silicon Second Nature: Culturing Artificial Life in a Digital World* (Berkeley, 1998).

14 Alexandros Moukas, "Amalthaea: Information Discovery and Filtering Using a Multiagent Evolving Ecosystem," *Applied Artificial Intelligence: An International Journal,* 11.5 (1997), 437–57.

15 Charles Ostman, "Synthetic Sentience as a Strategic Commodity Resource," preprint at <http://www.biota.org/ostman/synthsn2.htm> (forthcoming on CD-ROM entitled "The Extended Encyclopedia of Systemics and Cybernetics"); hereafter cited in text as SS.

16 For a fuller explanation of artificial life as an evolutionary paradigm, see *Artificial Life,* ed. Christopher Langton, Vol. VI of the Santa Fe Institute Studies in the Sciences of Complexity (Menlo Park, 1989).

17 John Kenneth Galbraith, *The Anatomy of Power* (New York, 1983).

18 "Virtual terraform" is Ostman's phrase, explained in an interview with Galen Brandt, "Synthetic Sentience," *Mondo 2000,* 16 (1998), 27; hereafter cited in text as IB.

19 Charles Ostman, "Synthetic Sentience as Entertainment," *Midnight Engineering,* 8.2 (March/April 1997), 68–77; hereafter cited in text as SE.

20 It is not altogether clear here what Ostman means by "left behind"—by evolution, presumably. But what does it mean to be "left behind"? To die? Or (remember this interview was published in *Mondo 2000*) to slip back from the cutting edge into the retrograde territory of the unwired?

21 Following conventional usage, I italicize the book *Infinite Jest* and put the cartridge "Infinite Jest" in quotation marks.

22 Julia Kristeva, *Powers of Horror: An Essay on Abjection,* tr. Leon S. Roudiez (New York, 1982), p. 1; hereafter cited in text.

23 This description makes clear the affinity of *Infinite Jest* with what Tom LeClair has called the systems novel in *In the Loop: Don DeLillo and the Systems Novel* (Urbana, Ill., 1967).

24 For a fascinating account of the complex internal ecologies of the microorganisms that inhabit human beings, and of the transformations they underwent when they became symbiots eons ago, see Lynn Margulis and Dorion Sagan, *Microcosmos: Four Billion Years of Microbial Evolution* (Berkeley, 1986). The book makes an eerie complement to Ostman's prediction of "The Rapture." The conjunction suggests that today we are in the position that microbial organisms were billions of years ago. Like them, we are about to become symbiots and be absorbed into an irreversible union, only now the symbiosis will be with intelligent machines and will be global in scale.

25 For a trenchant critique of eco-activism, see Timothy W. Luke, *Ecocritique: Contesting the Politics of Nature, Economy, and Culture* (Minneapolis, 1997).