

A dark room with a large projection of a clock on the wall. The clock is white with black numbers and hands, and is mounted on a wall. In the foreground, several people are seated in a dark room, looking towards the projection. The title "VIRTUAL MEMORY" is overlaid on the image in large, stylized letters. "VIRTUAL" is in red and "MEMORY" is in white.

# VIRTUAL MEMORY

TIME-BASED ART AND THE DREAM OF DIGITALITY

HOMAY KING

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## THE BLUE MARBLE

Hannah Arendt begins *The Human Condition* with a parable about the launch of the Soviet *Sputnik 1* satellite, the first man-made object ever to break free from Earth's surface and enter its gravitational orbit. The launch occurred on October 4, 1957. Arendt writes, "For some time, the satellite dwelt and moved in the proximity of the heavenly bodies, as though it had been admitted tentatively to their sublime company." It was a moment of encounter with the seemingly miraculous, a technological achievement on the grandest of scales, and a symbolic reversal of the Copernican Revolution. It was also a military event modeled on imperial conquest that heralded the beginning of the cold war space race. Before this race was under way, though, Arendt noted a collective sigh of relief from Earth's inhabitants at the satellite's dispatch: a general sense of optimism in the face of this "first step toward escape from men's imprisonment to the earth."<sup>1</sup>

As a staunch advocate for her home planet who argued in favor of accepting the limitations that had thus far defined the human condition, Arendt found this reaction troubling. The longing to escape the planet and the idea that earth's inhabitants were imprisoned or shackled to its surface went hand in hand with the degradation of tangible, incarnate, sensory experience, along with the kinds of thought, speech, and action that are made possible by embodied perception. For Arendt, the launch of *Sputnik* was troubling insofar as it served as a metaphor for



I.1. Photograph of Earth taken by the U.S. *Explorer IV*, August 14, 1959, from approximately seventeen thousand miles, showing the sunlit area of the central Pacific Ocean and its cloud cover. Image courtesy of NASA.

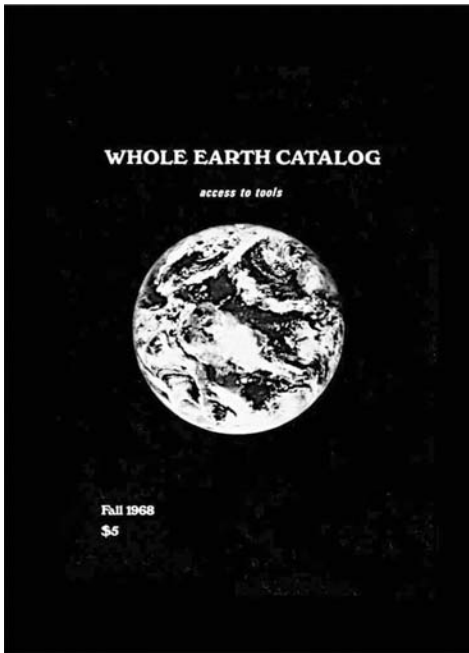
the upward gaze of the scientist or idealist philosopher. It allegorized the victory of the notion that knowledge and power require extraterrestriality, or a similar route to freedom from the web of relations by which the living are bound on Earth.

Two years later, on August 14, 1959, a much-anticipated image began to circulate: the first photograph of earth taken by satellite from outer space (figure I.1).<sup>2</sup> The photograph was made by the U.S. *Explorer IV*, whose flight was made possible in part by the integrated circuits developed at Fairchild Semiconductor, a start-up company located in what would later be known as Silicon Valley. *Explorer IV*'s photograph was heavily abstract. It revealed that from the satellite's point of view, Earth resembled a curved crescent without precise outlines, blurred as if by rapid motion.

Its face was cast mostly in shadow, having been upstaged by the moon. A blizzard of similar photos followed in quick succession. Many of them were likewise dim, inchoate, and creatively framed, as if the mechanical photographer had not yet learned the concept of figuration. Such pictures, in spite of the fact that they were taken from outer space, lacked what Arendt called the “Archimedean standpoint”: a position aspiring to a “truly universal viewpoint . . . taken, willfully and explicitly, outside the earth.”<sup>3</sup> Earth, in a manner of speaking, had not yet had its mirror-stage.

In 1966 Stewart Brand—a writer, environmental activist, and technology entrepreneur from California—suggested that it was high time to cross that developmental bridge. He made buttons bearing the slogan “Why haven’t we seen a photograph of the whole Earth yet?” Brand wrote letters posing this question to luminaries and dignitaries he had selected, including Marshall McLuhan, Buckminster Fuller, a few U.S. senators, and members of the U.S. and Soviet space programs. The only one to reply was Fuller, who wrote, “Dear boy, it’s a charming notion but you must realize you can never see more than half the earth from any particular point in space.”<sup>4</sup>

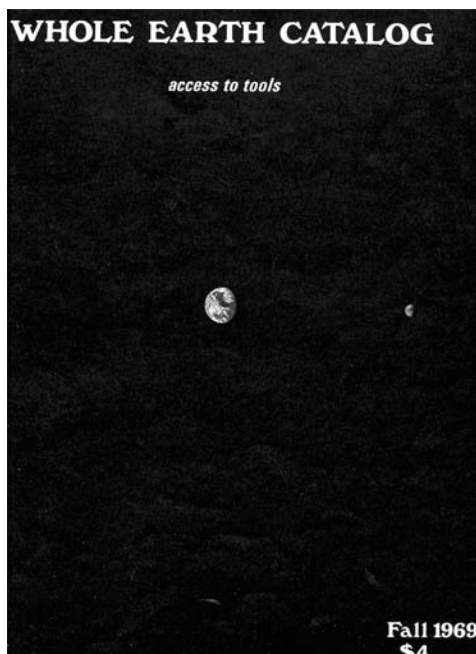
On November 10, 1967, though, a photograph appeared that made Brand’s wish come true—or rather, half-true, according to Fuller’s flawless logic. Made by the U.S. ATS-III satellite, the image showed the earth as a nearly perfectly round disc, in color, surrounded by a black void. The planet was now visible from its good side, its face an evenly illuminated, vivacious circle, beautifully centered in frame. Earth had finally assumed what Jacques Lacan, in reference to the baby in front of the mirror, called the “orthopedic form of its totality.”<sup>5</sup> Brand eagerly adopted this image for the cover of the fall 1968 issue of the *Whole Earth Catalog*, for which he served as editor (figure I.2). This catalogue offered “access to tools,” a collection of product reviews and short texts, and its audience was the community of tech-savvy, ecologically minded, vaguely Libertarian, countercultural enthusiasts that was beginning to form in the mid-1960s in northern California. Located in and around the San Francisco Bay Area, this community of proto-hackers brought together the curious paradoxes of the “Californian ideology”: a fusion of “hippie culture and cybernetics, nature romantics and technology worshippers, psychedelia and computer culture,” as it has been described.<sup>6</sup> Rather than sell merchandise directly, the *Whole Earth Catalog* offered a



I.2. Cover of the *Whole Earth Catalog*, Fall 1968, featuring a photograph of Earth taken by the U.S. ATS-III satellite.

curated directory of product endorsements, pointing users to vendors who could supply tools and materials for DIY projects by mail order alongside essays by Brand, Fuller, and others. As such, it was in some ways a precursor to the crowd-sourced reviews and linking practices found some forty years later on the Internet.

For Brand, the color photograph captured the planet's fragility. Earth had finally appeared in the form that would earn it the nickname "the Blue Marble," as it was affectionately called in captions of similar pictures taken from space. This photo, in Brand's view, had the potential to solicit an attitude of care and concern for Earth: to promote worldly stewardship, environmentalist practices, investment in local planetary resources and infrastructure, and harmony across differences that, from an intraplanetary perspective, now seemed extraordinarily minor. It expressed not mankind's jubilant conquest of outer space, nor a triumphant escape from Earth's shackles, but rather the world's smallness and delicateness relative to the cosmos as a whole. In an interview Brand described how the earth appeared to him in these images as a "little blue, white, green, and brown jewel-like icon amongst a quite featureless



I.3. Cover of the *Whole Earth Catalog*, Fall 1969.

black vacuum.” In Brand’s view, this image conveyed the precariousness of the planet and its occupants. It looked like an island, with all the accompanying associations of desert island prudence. “Islands know about limitations,” he remarked; nevertheless “people still think the earth is flat. . . . They act as if its resources are infinite. But that photograph showed otherwise. Unless and until we find other flourishing planets, this is all we’ve got and we’ve got to make it work. There’s no backup.”<sup>7</sup>

The fall 1969 issue of the *Whole Earth Catalog* bears a similar “whole earth” photograph on its cover (figure I.3). In this image the planet appears smaller and more marble-like. The moon sits to its right, providing a reference point of size and distance. Whereas the 1968 cover’s composition and framing suggest a portrait—the world as a familiar face in close-up—the 1969 cover adopted a decidedly Archimedean point of view. Here Earth and its companion satellite appear as lone figures in a vast, inhospitable landscape. The picture offers an intriguingly contradictory set of options for the viewer. On the one hand, if we identify with the small world represented by the blue dot, the image might invite the kind of caretaking attitude that Brand and his cohorts espoused. On

the other hand, if we identify with the eye of the camera and the perspectival point from which the image was taken, we find ourselves at a great distance from the planet: exiled and painfully alone perhaps, or, alternatively, larger than life, a deity who could crush the little planet with just a thumb and forefinger.

The remote perspective is traditionally associated with a quasi-theological capacity to appraise, possess, and control. As Arendt writes in *The Human Condition*, “The greater the distance between [man] and his surroundings, world or earth, the more he will be able to survey and to measure and the less will worldly, earth-bound space be left to him.” This perspective is also associated with disembodiment. The spatial distance becomes a metaphor for disconnection and indifference. The point of view in which the world appears as a distinct, independent entity is like that of the mirror stage, insofar as this viewing position, while joyful and satisfying to occupy, also entails an alienation or separation. As Arendt puts it, the flight from the planet inserted “a decisive distance between man and earth, alienating man from his immediate earthly surroundings.”<sup>8</sup>

The space race has now come to an end, more or less, to the disappointment of many youth of that era. But the longing to escape Earth did not vanish when the race was over. It went elsewhere. It was channeled into digital futures, dot-com bubbles, and the information superhighway, whose netscapes would be navigated, explored, safaried, and homepaged not by astronauts but by new armchair Magellans who took their legacy from Brand and his peers. Digital media universes seemed to promise an alternate place of refuge from the weight and restrictions of Earth-bound existence. It was a virtual refuge, which would likewise require great feats of technical engineering, the assistance of the military-industrial complex, and the consumption of vast natural resources, but it would put the dream of disincarnation vicariously within reach of more than just the astronauts.

## SILICON DREAMS

The term *virtual reality* first appeared in print in a 1987 issue of the *Whole Earth Review*, a companion journal spun off from the *Whole Earth Catalog*.<sup>9</sup> It was the title of a short essay about utopian depictions of

technology in advertising imagery. The author was Yaakov Garb, a doctoral student in mathematics and science education at the University of California at Berkeley. Garb was not writing about virtual reality in the sense of an electronically simulated, computer-based environment. Rather he used the term to describe computer interfaces and end-user operating systems in general; he called them “masks” that layer on top of hardware. “The source of much of the myth which [computers] weave,” Garb wrote, “is achieved through multiple maskings, the creation of ‘virtual realities.’ One on top of another, levels of symbols are built . . . each level further simplifying the material intricacies which underlie and support it.” For Garb, “virtual reality” was the result of an abstraction away from and occlusion of the machine’s complex material hardware in favor of its friendly textual and skeuomorphic graphical interfaces. The magazine advertisements added another layer to this virtual reality, and they tapped into a set of fantasies that had begun to crystallize around the image of the personal computer. Garb called these fantasies “the dreams our culture has inscribed in silicon.” Above all, and to Garb’s dismay, the dream involved “an uninhibited celebration of the separation and transcendence of mind over body.”<sup>10</sup>

Some of the images Garb analyzes in this essay feature gridded landscapes reminiscent of early Atari video games or the original Disney version of the movie *Tron* (1982). The images are strikingly dystopic by twenty-first-century standards: today technology industry advertising tends to adopt a more pastoral, agrarian aesthetic, in which the computer user has left the Kubrickian clean room and has gone to the beach with her tablet computer, or perhaps she smiles amid a harvest of fair-trade, organic coffee beans. In the 1980s advertisements, though, anonymous hands manipulate controls at personal computing base stations, giant heads generate reams of text and geometrical forms, and investors use dial-up modems to manage invisible soybean farms by remote control (figure I.4). Garb’s commentary on them is prescient. He quotes Descartes describing himself as a thinking entity “whose being requires no place and depends on no material thing.” In answer to this fantasy, Garb asks, “Who plants the soybeans, Gentleman Farmer? . . . And where does the irrigation water come from?” He issued an early reminder that someone, somewhere, is always “scurrying to support our virtual reality. . . . Our machines are fed a tremendous amount of





I.4. "The Power Is within Your Reach." Advertisement, Timex Corporation, 1982.

Life so that they may whisk symbols around." Among the things that support this virtual reality, he listed "the labor of Taiwanese women in microchip factories, the toxins flushed into our rivers, the dams, mines, and factories," all of which churn invisibly to power "our pristine alpha-numerics."<sup>11</sup>

In the image of the computer user as a gigantic flying eye or head, we are invited to assume the iconography and perspective of a deity. The 1960s-era photographs of Earth seen from outer space split our consciousness in two: we are this god-like, extraterrestrial eye, but we are also unimaginably small specks on the blue marble in the distance. In the graphical images that Garb analyzes, though, there is no longer a blue marble to identify with—and no stories or accompanying information reminding us that there was once a photographic lens there or an uninterrupted continuum of space between that place and the world that we currently occupy. The Cartesian silicon dream would have it that digital media, the Internet, and virtual worlds free us from the constraints of physical, sensory, and space-bound reality. They allow us to become someone else or to overcome geographical divides, all at seem-

ingly little cost to, and perhaps even to the benefit of, the environment, worldly action and concerns, and the fabric of social relations.

This dream, as Garb and others have claimed, is a myth, similar to those that have accrued to the purportedly uncharted frontiers of earthly and outer space. Howard Rheingold, a former editor of the *Whole Earth Review* and *Millennium Whole Earth Catalog*, says as much with the title of his book *The Virtual Community: Homesteading on the Electronic Frontier*. The myth of digital media as immaterial, abstract, and unworldly allows us to paper over the reality of embodied, lived experience (including experiences of gender, race, sexuality, disability, and economic hardship), as well as the reality of Earth-bound, time-bound, limit-bound existence in general. The myth emerges in tandem with the increasing association of knowledge with data and information and of thinking with their processing. This association is in turn predicated on the idea that computational, quantitative ways of thinking—ways of thinking that can be expressed by a mathematical notation system and rendered in what Alan Turing called “computable numbers”—are the best or the only truly accurate ways of thinking.<sup>12</sup>

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These short parables about the Blue Marble and the silicon dreams that followed, alternately cherished and critiqued by pioneers of the information age, are here to set the stage for an inquiry into the relationship between digital media and alienation from Earth-bound and time-bound experience, perception, and thought. Like the early adopters of computing technology, many of whom expressed skepticism about the effects of widespread digitalization at the same time that they celebrated its potentials, in this book I approach digital culture in an extra-moral sense, offering neither a purely utopian nor strictly dystopian account of it. On the one hand, I elaborate a critique of digitality, specifically of the notion that everything can be rendered in numeric, encoded, and computable form; on the other, I claim that contemporary artists and practitioners who use digital media have often rejected this dream, in many cases actively subverting it, and that it is in no way endemic to the matter that supports these works’ continued existence. My primary interlocutors for establishing the first point are the British mathematician and computer pioneer Alan Turing and the French phi-

philosopher Henri Bergson, best known for his theories of matter, perception, and duration and for his cryptic yet sustained elaboration of the concept of the virtual. The digital media makers through whose work I develop the second point are diverse in kind: they include Agnès Varda, grande dame of the French New Wave, as well as lesser known figures like the artist Erin Shirreff, the electronic music duo Matmos, and the largely anonymous participants of the Occupy Wall Street movement. These figures do not form a coherent set in terms of their geographical origins or current whereabouts nor in terms of their modes of practice or the extent to which they are expressly identified with computing, new media art, or digital culture. What unites the practitioners in this group is that they are denizens of the twenty-first century who have all attempted to grapple with the relationship between analog and digital technology and who make works of digital media that cannot be understood without recourse to earthly, time-bound matter and concerns.

In addition to these figures who form the book's substantive archive, there are a number of contemporary scholars whose work has been inspirational for this study. N. Katherine Hayles established for the emerging field of new media studies an idea similar to that of Garb's "silicon dream": that "the great dream and promise of information is that it can be free from the material constraints that govern the mortal world" and "achieve effective immortality."<sup>13</sup> In *Reading the Figural, or, Philosophy after the New Media*, D. N. Rodowick observed that the digital arts are "the most radical instance yet of an old Cartesian dream: [that] the best representations are the most immaterial ones, because they seem to free the mind from the body and the world of substance."<sup>14</sup> These scholars provided my initial access point to the notion of a digital Cartesian dream, widespread as a symptom in popular media and culture, an idea that Rodowick also touches upon in *The Virtual Life of Film*. In her book *Carnal Thoughts*, Vivian Sobchack cautions against digital media's promise to liberate its users from "the pull of what might be termed moral and physical *gravity*"; she also describes how electronic technologies invite the viewer into a "spatially decentered, weakly temporalized and quasi-disembodied (or diffusely embodied) state." What is lost, Sobchack asks, when digital media promise to liberate users from the limitations of space and time, or indeed when spatiotemporal finitude is understood as a form of imprisonment rather than as the

very precondition for perception, thought, and action? For Sobchack, as for Arendt, the overcoming of gravity risks devaluing “grounded investment in the human body and enworlded action.”<sup>15</sup>

Some of the most relevant current scholarship on Bergson comes from film theory and gender studies. Bliss Lim’s *Translating Time: Cinema, the Fantastic, and Temporal Critique* juxtaposes Bergson’s “corrective theory of time” with postcolonial scholarship to argue that Newtonian time, largely a Western construct, occludes the more deracinated, plural, crisscrossing forms of temporality that are on display in non-Western science fiction and fantasy film. I join Lim in reading Bergson’s critique of the cinematograph not as a rejection of the medium as such but as an arrow directed at schools of thought that “regard time as a measurable quantity . . . the scientific and mathematical view of homogenous time . . . [from] the legacy of Newton’s clockwork universe.”<sup>16</sup> In *Time Travels: Feminism, Nature, Power*, Elizabeth Grosz offers an observation that I take as another embarkation point for this study: that the notion of the virtual, one of Bergson’s signature if slippery concepts, is far richer and more complex than today’s vocabulary suggests: it “has been with us a remarkably long time. It is a coherent and functional idea already in Plato’s writings, where both Ideas and simulacra exist in some state of virtuality.”<sup>17</sup> Jean Baudrillard suggests something similar when he complains that in its contemporary sense “the virtual stands opposed to the real. . . . We no longer have the good old philosophical sense of the term, where the virtual was what was destined to become actual, or where a dialectic was established between the two.”<sup>18</sup>

Today the virtual has become practically synonymous with digital and computer-based technology and media. But this sense of the word, as we see in Garb’s essay, emerged relatively late in the twentieth century. The 1960 edition of *Roget’s Thesaurus* perhaps unwittingly captures the good old philosophical dialectic that Baudrillard refers to, and his complaint about its cleaving. In that volume the word *virtual* is indexed under the entry for “Nonexistence,” along with the following synonyms: “unreal, potential, unsubstantial, chimerical, fabulous, ideal.” But *virtual* is also indexed under another heading, “Intrinsicality.” In this competing entry, synonyms include “immanent, inherent, incarnate, indwelling, indigenous, instinctive, natural.”<sup>19</sup> These clashing entries suggest that virtuality, at the dawn of the information era, was an an-

tilogy or a contranym: it simultaneously invoked existence and non-existence, reality and unreality, fact and fable. Fifty years later, though, the immanent, incarnate, and indwelling have been submerged in favor of the ideal and the unsubstantial, which, in a Neo-Platonic turn, have likewise become synonyms for one another.

Meanings for the word *virtual* that have nothing to do with the simulacral or immaterial first appear in the English language in 1398. The word is descended from the medieval Latin *virtuālis*; its oldest definition is that which is “possessed of certain physical virtues or capacities; effective in respect of inherent natural qualities or powers; capable of exerting influence by means of such qualities.”<sup>20</sup> This ancient virtuality was not opposed to the actual. It was deeply rooted in the present world, conducive to earthly actions and concerns, and infused with embodied, sensorial, time-bound experience. It has the whiff of what is conveyed by the still extant expression “I am virtually there.” This phrase does not mean “I’m not there” nor “I appear to be there by simulated proxy, but in actuality I am somewhere else,” but rather “I am nearly there, almost there, close enough to be practically indistinguishable from being there.”

Scholars such as Gilles Deleuze, Pierre Lévy, Brian Massumi, Quentin Meillassoux, and Rob Shields have worked closely with this more grizzled sense of virtuality; their commentaries appear from time to time throughout this book. In *The Virtual*, Shields critiques the notion that the virtual is not “real” and outlines some of the dangers of the fantasy of pure abstraction. Like Deleuze, Grosz, and others, he invokes Proust, who wrote that memories are virtual in the sense that they are “real without being actual, ideal without being abstract.”<sup>21</sup> In this Proustian formulation, the virtual is not a parallel, unreal world, separated by a chasm from the present world, but an interstice that connects the two and is the site of becoming or being-in-process. Lévy offers the following related formula: “The virtual . . . has little relationship to that which is false, illusory, or imaginary. [It] is by no means the opposite of the real. On the contrary, it is a fecund and powerful mode of being that expands the process of creation.”<sup>22</sup> Massumi defines the virtual as “that which is maximally abstract yet real, whose reality is that of potential—pure relationality, the interval of change, the in-itself of transformation.”<sup>23</sup> Hayles, in turn, calls for the recovery of “a sense of the virtual

that fully recognizes the importance of the embodied processes constituting the lifeworld of human beings.”<sup>24</sup>

These writers suggest that a virtual virtuality, more enabling and capacious than its successor, lies nascent within it, and that we might even seek to recover it in works of digital media. This is in part the undertaking of this book. The task does not require that we choose between the two terms in Baudrillard’s dialectic, nor that we adopt the stance of an analog, materialist purist to recover what is lost, nor even that we privilege and isolate the sublimated moment of digital-analog synthesis. Rather it understands the virtual from another angle: as a new reality on the cusp of existence that emerges in an interval of present time that is rich with past and future images. The virtual, in this view, is a potential treasure chest full of images that perform and elicit memory, intuition, and speculation, all while retaining an underlying continuity with what is here in the present moment. The figures in this book deny the digital its divorce from the tangible and time-bound, implicitly critiquing the Cartesian dream of immateriality and countering transcendence with immanence. At the same time they reveal other, more genuinely progressive potentials that lie dormant in digital forms, in large part by the way they work with time and change.

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The chapters that follow elaborate these ideas primarily through Bergson’s philosophical writings on time and the virtual, as they illuminate and are illuminated by contemporary, time-based works of art, film, and video. However, chapter 1, “Keys to Turing,” provides a backstory to this argument, dialing back the clock to the life and work of Alan Turing. Turing is perhaps best known for his World War II military intelligence achievements at Bletchley Park in England, where he cracked the infamous German Enigma cipher. As part of this work, he designed a series of machines that served as prototypes for the modern computer. Turing was also a brilliant mathematician who conducted pioneering research in artificial intelligence. In the 1950s, though, he was arrested on gross indecency charges and, as an alternative to prison, was subjected to chemical castration treatments that may have driven him to suicide. The cause of death was ingestion of a poisoned apple, a possible refer-