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The Rest of All Possible Worlds: Making Space in the Age of Virtual Reality

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THE REST OF ALL POSSIBLE WORLDS:
MAKING SPACE IN THE AGE OF VIRTUAL REALITY

by

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Committee in charge:

Professor Michael Mascuch, Chair
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ABSTRACT

The Rest of All Possible Worlds: Making Space in the Age of Virtual Reality
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First formalized in Italy in the fifteenth century,[1] linear perspective gave rise to the very idea of the "fidelity" of an image: that a two-dimensional representation could be said to correspond perfectly with an anteceding world scene—or, what's more, that new, never-before-seen images could be endowed with such detail as to convince a viewer of their actuality. The inventions of the photograph in the 1820s, cinema in the 1880s, and the desktop graphical user interface (GUI) in the 1960s all represent a migration of the image to the forefront of our lives. Indeed, with the commercialization of "virtual reality" headsets in the 2010s, this movement has continued to the forefront of our faces themselves. According to a recent Nielsen report, the amount of time the modern subject now spends consuming visual media has expanded to over eleven hours per day.[2] While spending well in excess of half our waking hours in front of screens, we might consider the serious ontological question: "*Where are we* when we are looking at images?"

The obvious answer is, of course, "at our desk," or "in a gallery," or "at work." But the nearly six centuries that have unfolded following the codification of perspective in 1435 have seen the gradual emergence of the notion of "virtual space." When our attention becomes fixated on a screen, for example, we are sometimes perceived as being "absorbed by," "lost into," or "taken with" the images depicted; we become "drawn in" by an image or "caught up in" a digital game. Our metaphor for attentiveness to media—especially media that generate an illusion of "depth" or "immersion"—is often explicitly spatial. When we spend more and more time "in" virtual spaces, as the trope so often goes, do we conversely spend less and less time in what we have hitherto called "the real world"? How have spatial dialectics changed to accommodate the increasing number and intricacy of virtual spaces with which, or *in* which, we engage each day?

This document explores some of the logics of our being "immersed" in virtual spaces. It begins by tracing the idea of a technologically-mediated "virtual space" back to one possible point of origin in Federico de Montefeltro's *studioli*, two rooms constructed using systematized perspectival techniques to give the appearance of panoramic depth. Taking these ambitious art objects as a starting point, I demonstrate that the renaissance witnessed the beginning of a "stereoscopic regime" that gave the viewing subject the tools by which to interpret future perspectival images, prefiguring the flourishing of virtual spaces in the nineteenth, twentieth, and early twenty-first centuries.

[1] Or, according to some, "rediscovered": substantial evidence suggests aspects of what we now call linear perspective were used extensively in the Early Classical period in Ancient Greece, before being lost in advance of the middle ages. See Samuel Y. Edgerton's *The Renaissance Rediscovery of Linear Perspective* for an especially nuanced account of this history.
[2] "The Nielsen Total Audience Report."

Following this exploration of the *studioli* as primordial virtual spaces, chapter 2 seeks to first quantify, and then qualify, virtual spaces according to possible metrics of size and value: how does one "measure" or "map" virtual space? Encounters with Baudrillard and Benjamin in this chapter help illustrate how virtual spaces exaggerate the actual, overlaying it with the virtual, before establishing those virtual spaces as the new consensual real. Contrary to Baudrillard's claim in *Simulacra and Simulation*, however, obviation of the actual does *not* mean obviation of the real: indeed, the real, which has by the twentieth century been resolutely subordinated to the human sensorium, simply expands to include virtual spaces as they proliferate.

Chapter 3 then looks at two case studies of the photographic image being used to generate novel virtual spaces. Part one discusses artist Taryn Simone's 2008 photographic documentation of the 1995 Srebrenica massacre, concluding that her images of families and lineages affected by the genocide reanimate the individuals and stories they depict, producing a whole spectrum of virtual realities in which the family members themselves are both restored and lost with each viewing. In this context, we understand the image, like the losses it endeavors to describe, to perforate the actual with an ever-expanding number of virtual realities, each poignant and substantive in its own right.

Part two of this chapter takes an alternate tack on the genre of the photographic portrait by examining a widely distributed ad campaign shot by Annie Leibovitz in the early 2010s, asking whether the commercial image has similar world-generating properties to the artistic or memorial image. To what extent are both photographic series "immersive" and "generative" independent of their original motives? Both studies similarly illustrate how photographs codify, masquerade as, and re-present history, producing exaggerated virtual spaces which their viewers are then compelled to inhabit. Chapter 3 ends by claiming that the very idea of postmodernity (Jamesonian), which entails "depthlessness," mistrust of metanarrative, and recourse to irony, only goes so far in describing the commercial photographic portrait, which indeed contains elements of depth and sincerity endemic to emergent virtual spaces. Virtual space can therefore be described, rather, as a product of modernity—or, indeed, of "the early modern," as chapter 1 has previously endeavored to show.

Finally, chapter 4 arrives at digital environments of the computing era, suggesting that there is no longer any "outside of the image." In an effort to understand what this means for the embodied human subject, part one begins by describing how the history of computing has long conflated the human with the technological, especially across lines of race and gender. The chapter then advances to suggest how this conflation situates our implicit point of view to "within" the digital interfaces with which we engage, represented most conspicuously by the figure of the cyborg. It is therefore no surprise that one of the defining commercial imperatives of the 2010s for digital media has been the movement of the screen onto the human face. In 2019, dozens of companies are competing to market virtual-, augmented-, and mixed-reality apparatuses as both enterprise and consumer-oriented "solutions" for the failures of the human body. These failures include the body's lack of data awareness, network connectivity, and, most importantly for this document, lack of natural visual apparatus capable of integrating the diverse and expanding array of virtual spaces that parade just beyond our field of view.

The document concludes that the slow progression of the stereoscopic regime, which begins with the perspectival image and extends to the head-mounted display, has not yet, contrary to the opinions of twentieth-century media theorists, obviated the actual, but rather granted us privileged access to the many "other" possible worlds first described by Leibniz.

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Writing a dissertation has felt at times like looking through a long telescope at a single star: one distant object, several supporting lenses, and the understanding that to focus in such a way for so long will inevitably cause the rest of the world to blur. As I back away from this particular telescope, however, it becomes clear the extent to which this project has been made possible by an extraordinary network of people to whom I owe unspeakable gratitude. My most enduring thanks go out to my mom, Stephanie Levy, whose generous heart, indominable spirit, and uncanny sensitivity to the thoughts and feelings of others have lifted me high in life, and across countless obstacles, for over three decades. Thank you, mom! The completion of this project, and indeed my enactment of life itself, owes more to you than I have hope of expressing in language of any kind—two advanced degrees in rhetoric notwithstanding.

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To Stephanie Levy,
for her unwavering support
every moment of every day.

INTRODUCTION: SHADES OF THE VIRTUAL

Close Encounters of the 3D Kind

I saw my uncle for the first time in nearly twenty years—and also for the last time—in the fall of 2015.

I remember being struck by his outfit: a bright yellow hazmat suit, with olive green boots. He looked as young as he did in my earliest memories, but his voice, quiet and gravelly, betrayed a decades-old affinity for smoking—and ultimately, his waning health. His hair, sparse in all the old photographs, was now gone; his beard, once distinctly chest-length, had likewise vanished. I remember that seeing him clean shaven felt like a shock: an unsettling departure from all prior registrations I'd had of my uncle, as if he had appeared to me for this first and last time in so many years without any face at all.

Figure 1: PJ Hutz's avatar in Rust, an open-world "sandbox" MMORPG, first released in 2013.

The meeting, as may be evident from the above description, was mediated through a virtual space, taking place across six hundred miles between his home in Hillsboro, Oregon, and mine in the San Francisco Bay Area. The medium for our reconnection was a massive multiplayer online role-playing game (MMORPG) called *Rust*. Though indeed "virtual," whatever this may come to signify in the forthcoming pages, PJ's in-game avatar nevertheless shared a few essential and aesthetic features with his "true-to-life" embodied self: his voice, familiar to me despite the intervening years, cracked through my speakers with a rhythm establishing him unequivocally as my father's brother. His smart, cutting sense of humor, matter-of-fact in delivery, paired conveniently with his avatar's own minimally-expressive features. Both in-game and in-life he remained, indeed, bald; in person, however, he maintained a long and distinguished beard. His avatar in *Rust*, in contrast, was fresh-faced, being but a default character mode. The model, dubbed "Newman" by *Rust*'s player base, is both a moniker derived from the surname of the game's original creator—Garry Newman—and also apropos shorthand for the ethos and meta-narrative of all avatar-based games: an implicit promise of a kind of

"rebirth" ("new-man") into another body, in another space, with another history, and another set of rules.

For a Newman, PJ was unusually well-outfitted. According to the premise of *Rust* (c. 2015), one awakens on a beach with nothing but a rock and torch and must find other players by scouring the landscape on foot. Rather than finding me in this usual manner, however, PJ flew in from the sky and settled down before me on the barren earth. It was his server alone. His island in *Rust*, a game played by tens of thousands of players across thousands of servers per month, remained otherwise uninhabited. That is: PJ had generated himself a space apart, and then restricted its access from the public—at least until I arrived.

This meeting struck me as both profoundly novel in time, and also eerily familiar: media closes distances, as McLuhan reminds us, "extend[ing] our central nervous system itself in a global embrace, abolishing both space and time as far as our planet is concerned"[3], and have done so since the advent of the sign. *Rust*, a social space unto itself, much like any other MMORPG, acts as a kind of wormhole bridging geospatial distance: for the first time in nearly two decades my uncle and I were "face to face," digital representations notwithstanding. But being presented with the bipedal embodiment of an estranged family member felt somehow more pronounced than any text message, email, or phone call I'd received: one finds an unavoidable immediacy to a virtual body, an unshakable presence that exaggerates McLuhan's claim of the intimacy of mediation, and renders the virtual visceral.

Despite all appearances, and the meeting's significance for me, PJ didn't originally instantiate the server to elide the space between us. His meeting with me was important, but incidental—the byproduct of the existence of the space, but by no means the space's *raison d'etre*. Rather, PJ created the server months prior to produce a *new* space: his long history of asceticism, bordering on polite misanthropy, had developed in parallel with technologies of isolation, and he had found games to be useful tools for achieving space unto itself. It strikes me as a coincidence, but a sadly poetic coincidence nevertheless, that his last Facebook post in 2015 was an endorsement for a game called "The Room."

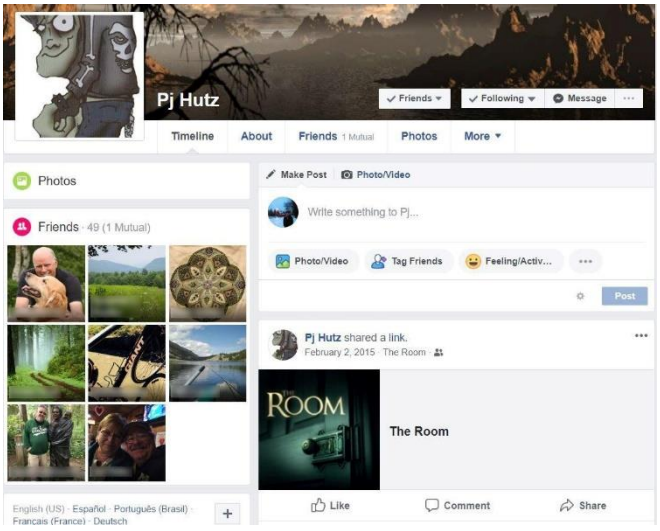

Figure 2: PJ's final Facebook post, shared in 2015, just shy of a year before his death.

[3] McLuhan and Lapham, *Understanding Media*, 3.

The Room's website describes the game as "a physical puzzler, wrapped in a mystery game, inside a beautifully tactile 3D world," and invites its players to "*[b]e transported* into a unique space that blends spellbinding visuals with intriguing problems to solve."[4] To call the metaphors of physicality embedded within this description "explicit" would be an understatement: the game, which situates its user in a single virtual room, interacting with a single puzzling object, makes every effort to constrain the player in space—yes, by locking their avatar's attention *programmatically* in the hard-coded camera-delimiting structure of the game, but also by capturing the attention of the viewer, arresting all but the subtlest movements of their eyes, neck, hands, and body for the duration of the experience. The player "loses themselves" in the gamespace as a condition of playing the game; the body, to track the metaphor, seems to go dormant while it awaits the subject's return.

Little to my knowledge at the time, "the actual" had, over the preceding year or so, begun enacting and enforcing new limitations on PJ's physical experience of the world: acute renal failure had despatialized his life nearly to the single room in which he conducted dialysis. Not a person especially inclined towards social situations anyhow, he inhabited worlds apart from "the actual," provoking for me serious ontological questions about what it means to "be" in the world. We summon diagnoses of schizophrenia when embodied minds emphatically seek out imaginary spatialities—but the language of pathology seems inappropriate for discussing our disappearance into "digital" virtual spaces. How do various planes of spatiality—the actual, the imaginary, the virtual, the social, the programmatic—wax and wane along the timeline of a life according to an individual's physical lived conditions, emotional desires, and temporal attentions? Do spatialities "compete," and potentially "win out" in a single mind? Or can they only be understood dialectically in light of each other?

What kinds of "virtual spaces" exist? As Barthes remarks in an early parenthetical in *Camera Lucida*, "we must surely classify, verify by samples, if we want to constitute a corpus."[5] The phrase "virtual space" has come to incorporate a rich mélange of significations—significations that oftentimes share little, except in the kinds of spatial metaphors used in their description. The late twentieth century advent of "chat rooms" provides a perfect example: the word "chat," from the 1500s until circa 1984, according to the OED, referred to a kind of "frivolous talk"[6]—a definition notably privileging *phonos*. After the spatial signifier of "room" became appended to the end of the word in the mid-1980s, the phrase came to mean instead a digital forum, conducted in real-time, in which people would write each other *text-based* messages—a definition privileging *logos*. Chat rooms are not, strictly speaking, "places," and yet etymologically they prevaricate as "locations in which individuals speak frivolously with each other." "Chatting in a room" is, if we're being pedantic about it, a misleading-at-best way to describe sending a "text-message" to a constellation of IP addresses through a server farm. Digital interactive media—games like *Rust*, as described above—complicate this relationship between the "physically-spatial" and the "socially-spatialized" by actually registering the "chat room" into a three-dimensional simulation, and permitting voice-to-voice communication as a parallel feature of face-to-face presence. From the perspective of data transfer, this interactivity looks structurally identical to chat rooms of the 1980s: a bountiful string of ones and zeros coursing through electronic infrastructures. The simile of the telegram becomes the metaphor of

[4] "The Room." my emphasis.
[5] Barthes, *Camera Lucida*, 4.
[6] "Chat, n.1."

virtual presence, however, which then occludes whatever differences remain between face-to-face and avatar-to-avatar interactivity.

The question remains: what *is* virtual space? A two-word signifier; the phrase combines a noun, "space," and a focusing descriptor, "virtual." "Space," denoting area or extension, is a term which describes in various contexts and moments a relativistic logic among objects or ideas (a "long-distance relationship," for example), an absolute property of the universe ("Cartesian space"), "time" ("in the *space* of three minutes"), "decorum" ("*room* for discussion"), and the privacy of one's own body and state of mind ("personal space; headspace"). Space, so often rendered meaningful by its descriptive adjective, lists between the physical and the abstract, the absolute and the contextual.

For now, suffice it to say that the rich tradition of discourse on spatiality in political, social, ontological, and geographical studies in the 1960s, 70s, and 80s effectively identifies the rise of an academic consciousness of spatiality as a constitutive property of everyday life. Space, Lefebvre argues in his *The Production of Space*, is referred to so widely and in so many contexts that its meaning is made opaque, and its relevance obscured. He writes,

> ...consider how fond the cognoscenti are of talk of pictural space, Picasso's space, the space of Les demoiselles d'Avignorr or the space of Guernica. Elsewhere we are forever hearing of architectural, plastic or literary 'spaces'; the term is used much as one might speak of a particular writer's or artist's 'world' …. leisure, work, play, transportation, public facilities—all are spoken of in spatial terms.[7]

Lefebvre's last phrase here bears repeating: "...all are spoken of in spatial terms." The OED's page on "space, n." alone includes seventeen distinct entries, hundreds of phrases, and comes in at almost thirty thousand words, indicating that we don't only "live" in space, but also "speak" in terms of space. Space is therefore by definition discursive: relationships among objects are codified lexically, distinguishing those objects "in space," and evaluating the space between. Space cannot be touched but can be described: from here to the door; across the street; inside of the jar.

Explicit theorizations of "the virtual" as such arrive in print not long before Lefebvre's 1974 writings on space: Henri Bergson's *Matter and Memory*, itself originally published in 1896, is revived by Deleuze in his 1966 book *Bergsonism*. *Matter and Memory* investigates the relationship between consciousness and the world, along the way offering virtuality, while almost never using the term, as a conceptual framework for understanding "image reception." "Here I am in the presence of images," he writes,

> …in the vaguest sense of the word, images perceived when my senses are opened to them, unperceived when they are closed. All these images act and react upon one another in all their elementary parts according to constant laws which I call laws of nature, and, as a perfect knowledge of these laws would probably allow us to calculate and to foresee what will happen in each of these images, the future of the images must be contained in their present and will add to them nothing new.[8]

[7] Lefebvre, *The Production of Space*, 8.
[8] Bergson, *Matter and Memory*, 17.

Bergson's framework positions the body at the center of a collage of images that strike the eye in procession. Deleuze reexamines this framework, proposing an extension of Bergson's interpretation of the object: that virtuality is not a quality of the concrete, but rather made up of the coexistence of not-yet-actualized memories: the past, in its multiplicity, is virtual. The object, on the other hand, may or may not be concrete, but is always actual:

> Bergson means that the objective is that which has no virtuality - whether real-ized or not, whether possible or real, everything is actual in the objective. The first chapter of *Matter and Memory* develops this theme more clearly: Matter has neither virtuality nor hidden power, and that is why we can assimilate it to "the image."[9]

"Virtual space" then anticipates a relational aspect (space) that's "real" (in that it has effects) but not "actual" (meaning it inhabits no matter); lived-in and yet exterior-to. Virtual space can be technologically produced—through image-producing devices like cameras and screens, for example—or discursively produced—through storytelling and mythology. One "occupies" virtual space through proxies of identity: avatars, pseudonyms, and aliases—but to what extent are these proxies meaningfully distinct from the body itself? In the years that follow from Deleuze's analysis of Bergson, a variety of terms have come to be used to describe virtual spaces and other non-physical systems of contingency in public and academic discourse: thirdspace, heterotopia, and cyberspace all illuminate facets of spatiality, be they political, social, or technological in origin.

A Taxonomy of Virtual Spaces

These "categories" of virtual space must take their positions in our taxonomy—even if such boundaries must eventually be troubled:

The actual, definitions of which vary wildly across intellectual contexts,[10] is "concrete" but not "virtual": it exists materially, occupying space; it has no duration, for duration is only acted upon the concrete by memory.[11] The concrete depends on human perception to be actualized, for without perception there is no duration, and without duration there is no subject or action. *The actual,* or the real, as Henri Bergson specifies in *Matter and Memory*, whether or not it "exists," cannot be divorced from the sensations of sight and touch: "Reduce matter to atoms in motion," he writes: "these atoms, though denuded of physical qualities, are determined only in relation to an eventual vision and an eventual contact, the one without light and the other without materiality… they are still images."[12] For Bergson, the distinction between "presence" and "representation" is merely a short interval between the constellation of an objective reality's images and a subject's perception of those images. He continues:

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[9] Deleuze, *Bergsonism*, 41.
[10] To put it mildly! This taxonomy attempts to associate its terms with one or more theorists who pioneered their use, but by no means masquerades as comprehensive.
[11] Deleuze, *Bergsonism*, 26.
[12] Bergson, *Matter and Memory*, 35.

> That which distinguishes it as a present image, as an objective reality, from a represented image is the necessity which obliges it to act through every one of its points upon all the points of all other images, to transmit the whole of what it receives, to oppose to every action an equal and contrary reaction, to be, in short, merely a road by which pass, in every direction, the modifications propagated throughout the immensity of the universe.[13]

Bergson's "reality" can be thought of in terms of its "insistence" along an axis of time upon all other points in the universe; reality is an "obligation" towards consistency and obedience: an absolute confluence or agreement of the sum-total of "images" of an object.

The virtual, in contrast, is untroubled by such agreement; "virtual," we note, again, is an adjective describing representations, which are themselves only the reductive shades of perceptions of objective reality. Keith Ansell Pearson puts it well in his analysis, "The Reality of the Virtual: Bergson and Deleuze": "[Bergson] strips matter of virtuality in order to show that, strictly speaking, a virtual life belongs only to subjectivity (we have virtual perception, virtual action, and virtual memory)."[14] "The virtual," the extensive subject of this thesis, is widely used to describe all states left outside of "actuality" into one nearly meaningless amalgam. At best, however, the word describes a long history of the creative deployment of alternative spatialities as varying means of expanding "the real world" to locate novel reserves of power and resistance. "The virtual" is what we do when our attentions stray from "the actual," whether such straying takes the form of dreaming, imagining, pretending, or enacting or entertaining an external fiction: a photograph, a film, or a game, to name only a few of the most obvious examples.

The simulated, a recent category indebted to philosophers like Jean Baudrillard, Sherry Turkle, Alexander Galloway, among others, describes an imitative, fictive space enabled or described by computation. The concept of "simulation" as a "technique of imitating the behavior of some situation or process … by means of a suitably analogous situation or apparatus"[15] only extends back in time to 1947, according to the OED. In *Simulation and its Discontents*, Sherry Turkle asks: "What does simulation want?" "On one level, the answer…" she writes, "is simple: simulations want, even demand, immersion …. and immersion makes it hard to doubt simulation."[16] "The simulated" is "real" and "virtual," but not "actual," although it is *subject* to the actual. Once we are "immersed," it becomes difficult to resurface.

The lived-virtual, skirting the boundary conditions of "actual" or "virtual," describes only the feeling of being present or existing completely in another space. One's "lived-world" depends only on one's subjective feelings of "at home-ness" or "comfort," such that one's body ceases, for a time, to have material significance in relation to the actual. This feeling of comfort is perhaps nowhere better described than in Sara Ahmed's *The Cultural Politics of Emotion*. In her chapter "Queer Feelings," she describes feelings of comfort as follows:

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[13] Ibid., 36.
[14] Pearson, "The Reality of the Virtual," 1.
[15] "Simulation, n."
[16] Turkle et al., *Simulation and Its Discontents*, 6–8.

> To be comfortable is to be so at ease with one's environment that it is hard to distinguish where one's body ends and the world begins. One fits, and by fitting, the surfaces of bodies disappear from view. The disappearance of the surface is instructive: in feelings of comfort, bodies extend into spaces, and spaces extend into bodies. The sinking feeling involves a seamless space, or a space where you can't see the 'stitches' between bodies.[17]

Ahmed uses the idea of "comfort" to contrast heteronormativity, or the condition of being always already rendered acceptable in a society that has been conditioned towards one's heterosexuality, with discomfort, or a status of maintaining an existence labeled by default at odds with one's environment. Indeed, virtual space does not always entail belonging: virtual spaces can be, and often are, inimical and exclusive, harboring and even amplifying the same deleterious voices heard in actual spaces; but "lived virtual spaces" imply this same "disappearance of the surface": a forgetting of the body and its limitations; a "seamless space."

Is it possible to be self-aware of one's being in a lived-virtual space, or does one's awareness of the space's virtuality imply a return to embodiment in the actual? Regardless, it does seem possible to witness lived-virtual space from the outside: say, when we catch ourselves smiling at a television, or are shaken from typing an email by the sound of thunder through a window. "The lived-virtual" provides us with a tool to answer the question of "where one is" when one is, for example, writing a forum post or email, watching a film, or texting while crossing the street, accounting for moments in which one forgets about one's body and psychically inhabits a simulated, or otherwise virtual, space.

The possible, in contrast with the actual, the virtual, and the real, is a Leibnizian quality that imagines all possible alternatives as "existent" insofar as they can be invoked in the mind. "The possible" describes all constitutive alternatives to "the real"—that which "isn't but could be" or "could have been"—or the options among which, for example, an omniscient deity would be impelled to select while executing the future. The "possibility" of other non-actual worlds allows Leibniz to arrive at his famous conclusion that this, our present actuality, must be "the best of all possible worlds": and so "the potential" does not pertain to the actual, but does inform the actual by virtue of its relational non-being.

This document argues, in the end, that technology hasn't "removed" us from reality, but only illuminated the uncharacterizably vast array of possible worlds that grace the margins of actuality.

Social space, "[t]he generative source for a materialist interpretation of spatiality is the recognition," Edward Soja writes in his *Postmodern Geographies*, "that spatiality is socially produced and, like society itself, exists in both substantial forms (concrete spatialities) and as a set of relations between individuals and groups, an 'embodiment' and medium of social life itself."[18] A social space constitutes both a psychic state of relationality and also a virtual form of presence. Much in the way that, in "The Possible and the Real," Bergson questions the relevance of the actual when one subtracts perception, social space makes little sense without interlocution.

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[17] Ahmed, *The Cultural Politics of Emotion*, 148.
[18] Soja, *Postmodern Geographies*, 120.

Social space has also been formulated as "Institutional Facts" by John Searle in his *The Construction of Social Reality*, in contrast with "Brute Facts."[19] Institutional facts, like social space, can be described as explicit or implicit understandings of the significance, relationship, or value of various material, moral, or legal conditions, and how those understandings come to propagate among members of a community.

Expansive virtual spaces, a novel category proposed by this text, privilege the "adding of space" to public infrastructures: film, for example, resulting from the display through which it witnessed, expands upon a subject's local environment to include novel localities, personalities, and histories described by the film. All virtual spaces are expansive to some degree, but not all virtual spaces privilege expansion to the same extent: many virtual spaces leveraging display technologies gesture towards extended spatialities, suggesting that one could "reach" or "step through" the display to occupy novel spaces. Indeed, "expansive virtual spaces" might seem to describe *all* virtual spaces, until one considers the corollary:

Contractive virtual spaces, in contrast, simplify, reduce, or consolidate lived-spaces: maps, for example, represent real environments to render complex spaces manageable, and inaccessible spaces obviated; text-based chat programs circumvent the need for visual data or the spatiality of face-to-face interaction; street signs, virtual spaces insofar as they always "defer" meaning, "mask" the complex nature of reality, both literally and figuratively, and present a streamlined amalgamation of social constructs and directional imperatives in a carefully constrained window.

Hybrid spaces, or concrete spaces mixed with virtual spaces, overlay the virtual onto the actual; hybrid spaces predominate in cities in the twenty-first century. Obvious examples include the movie theater, stadium, highway, mall, and storefront. Hybrid spaces can also have living elements: "human billboards," or individuals adorned in signage, gesture towards their spaces of employment; busses with windows half-obscured by images of countrysides, contain commuters peering into their phones; or, an app compels one's phone announce deals from one's pocket when one enters a participating store. It seems rare, in fact, to encounter spaces that are not hybrid in some respect, and yet we must examine this as a discrete and constitutive category of spatial experience.

Game spaces, a vast subset of simulated space, are contractual social spaces conjoined with the virtual, entreated by the potential, and "lived" by their participants: they compel bodies to respond to the virtual with expectation, attentiveness, and even sometimes a stillness accompanied by both a heightening and an evacuation of the senses.[20]

The body, frequently discussed below, is a space unto itself. It represents the seat of subjectivity, the locus of perception, and the focus of all external spatialities. It is an *actual space* insofar as it contains volume: organs, bones, and blood. But it is also and primarily a virtual space. In most moments it is forgotten, or at least recedes, as the primordial lived-space, while its

[19] Searle, *The Construction of Social Reality*, 27.

[20] For thorough overviews of the complexities of game space in particular, see Michel Nitche's Nitsche, *Video Game Spaces*. and Boluk and LeMieux, *Metagaming*.

effects remain: one "feels good" or "bad" about the body one occupies, whether one feels as if one is occupying a body at all at any particular moment. Its effects cascade into feelings of profound belonging or catastrophic discordance with the world, sometimes leading to the body no longer feeling lived-in, but merely endured, or even rendered unendurable. Space is experienced in layers, and the body so often comes to represent the layer of greatest propinquity to human experience: the body "defines" us, and to spill beyond its borders is to be labeled inhuman. Yet, as this document hopes to show, time spent in virtual space is often interpretable as time spent exceeding the body.

Finally, and though this thesis largely avoids the psychoanalytical lens, a Taxonomy of the Virtual would not be thorough without mention of Lacan's triad of the symbolic, the real, and the imaginary. Virtuality, in many of the above definitions, is formulated in relation to subjective experience, or at least constituted by subjectivity. Indeed, Lacan's Mirror Stage, which describes a moment of initiation for human subjective experience, can also be examined in terms of the virtual: the world at the point of self-discovery in infancy loses its expression of "wholeness" with the body and instead fragments into patterns of virtual experience. By entering into the Symbolic Order, an individual learns to experience the real virtually: i.e. as mediated through language and the acceptance of language's rule.

Slavoj Žižek leans heavily upon Lacan's triad in his own analysis of virtual reality in his 2004 documentary, "The Reality of the Virtual." He begins with the qualification that "[v]irtual reality is a rather miserable idea," adding that in the common parlance "[i]t simply means, let us reproduce in an artificial, digital medium, our experience of reality."[21] Instead, he asks us to consider the following formulations:

The reality of the virtual: an umbrella term for all that follow, these are the "real effects, produced, generated, by something which does not really exist, which is not yet fully actual." Žižek divides this "efficacity" of that which does not exist formally speaking into three subcategories, themselves couched in Lacan's triad: the Imaginary Virtual, the Symbolic Virtual, and the Real Virtual.

The Imaginary Virtual he defines as "the virtual image that determines how we interact with other people." When we engage with others, we are in fact always interacting with an image of the other, discarding "whole strata" of their material reality to simplify or sterilize the interaction. Extrapolating from his argument, we see how the Imaginary Virtual accounts for the resemblance of virtual interactions, like that described between myself and my uncle at the top of this introduction, to face-to-face interaction: two individuals can meet in an online environment and have a "normal" engagement (whatever normal entails), because the formulation of the avatar mirrors this same discarding of the visceral reality of the human that we accept during in-person human-to-human interactions of all kinds. One's interlocutor arrives freed of any distracting nuance of physicality, leaving a subject to focus on the *image* of the person alone and in relief.

The Symbolic Virtual is a form of potentiality or power that is operative, according to Žižek, only so long as it remains virtual. He gives the example of paternal authority: once such

[21] Žižek et al., *Slavoj Zizek, the Reality of the Virtual*.

authority is exercised, the power endemic to the threat becomes legible as impotence. Beliefs also fall within this schema: people "believe," say, in ideology, not from some inner drive, but only in accordance with some virtual body's wishes for them to believe: a parent, a priest, a network, or a tribe. It's important for the symbolic virtual to remain virtual to remain effective. Belief begins to structure reality because of the public's very support of that belief.

The Real Virtual, the third term in this series, Žižek divides into three *additional* subcategories:

The Imaginary Real includes images that are so strong that they have real effects: photographs of the horrors of war, visuals of monsters, and the fictions that haunt us: the imaginary that becomes real because of its effects;

The Symbolic Real: Symbols which, while "true," cannot be translated back into meaningfulness: formulas that can be tested and verified, quantum mechanics, pure signifiers, and that which is "meaningless" with regards to our ordinary notion of real";

The Real Real, according to Žižek, is also paradoxically the most virtual real: the underlying form that structures the abstractions above it. Like ferromagnetism, he argues, the "real real" is invisible to the human, and yet evident insofar as the material world, through the human sensorium, approximates its forms. Žižek's "real real" can be understood as a contemporary approximation of Platonic idealism: there is an absolute firmament that *exists,* but which is fundamentally inaccessible to the human sensorium owing to the sensorium's profoundly limited scope of receptivity.

At last we arrive at the fundamental subject of this document, **Virtual Reality**, hereafter abbreviated as "VR." The term, as Brain Massumi notes in 1998, has become somewhat amorphic: "The phrase has shown a pronounced tendency to decompose into an oxymoron," he writes. "It was in that decomposed state that it became a creature of the press, a death warrant on its usefulness as a conceptual tool".[22] A decade later in the 2010s, the phrase was again revived in the press to narrowly signify a specific technologically-mediated experience being brought to the commercial fore. During this experience, a user is outfitted with a miniaturized head-mounted display (HMD) and optically loosed into a digitally simulated virtual space.

But the narrowing of the definition of VR risks the elision of at least three useful meanings. Indeed, we can't ignore that VR now implies a specific genre of commercial media technologies, but we must consider "virtual reality" also as (1) a descriptor of the simulated environment itself *apart* from the technologies through which such an environment is received, opening the field to a more comprehensive host of media, and (2) a more generalized system of understandings and relations that exceed the influence of the actual, much more akin to ideology than any more specific technologically-induced apparition. This is to say, one's "virtual reality," more than describing any singular environment or point of access to simulation, entails the full system of beliefs, understandings, recognitions, and identities attributable only to the enormous confluence of intertwined spatialities to which a subject is exposed over their lifetime of experience, which are then flagrantly distilled into the mutable present.

[22] Massumi, "Sensing the Virtual, Building the Insensible," 1.

The remainder of this document will explore this triad of signification, but for the moment suffice it to say that "virtual realities," generally speaking, respatialize the viewing subject in exaggerated, persuasive, synthetic environments, which are then incorporated into the subject's remapping of the real. Understanding that this process is likely complex beyond measure, the below analyses focus especially on the relationship between the virtual and the body. Language like "living in," "occupation of," "inhabiting," and "visiting" virtual spaces is deployed throughout, indicating an appreciation of Hume's claim that we confirm our existence through our sensorium.[23]

Beyond the "what" and "why" of virtual spaces, this thesis seeks to consider the "when" of virtual space: at what points in history, and under what circumstances, do virtual spaces begin to "encroach" upon the actual? Lefebvre writes, for example, about "the production of space"; is to talk about "the production of virtual space" merely an extension of the same conversation? Is the production of virtual space unique to modernity? Or is all space, in fact, virtual, and to discuss the production of space at all to already be discussing the production of virtual space?

Contemporary commercial imperatives make it easy to view the exigencies of virtual worlds as manifestly *economic*, and by extension colonial: that is, economies in the information age produce "new space" in order to exploit it, its resources, and its citizens. Lisa Nakamura suggests in her writing about "gold farming" in "Don't Hate the Player, Hate the Game" that the transactional unit of one particular virtual space (*World of Warcraft)* in late capitalism becomes, in fact, the racialized bodies of Chinese gold farmers.[24] But virtual space also allows for novel strategies of *informational* dominion: one remembers Snowden's revelation that the NSA had gone so far as to plant agents in online virtual environments like *Second Life* in order to spy on dissidents. Virtual spaces even generate new kinds of monetary transactions, in the case of P2P or "freemium" worlds that have—like many geopolitical locations—up-front costs of living, and "property" in many current software platforms sells for "actual" money (if one can overlook the oxymoron).

At its most optimistic, this dissertation hopes to historicize the continuation of a paradigm shift in visual representation, while still paying tribute to the ways in which the creation of virtual spaces has always masqueraded as a force of democratization, while still consolidating power into the hands of the elite. What this document calls the "virtual break" actually begins in a "visual break" pioneered by Crary and Batchen, who write about stereoscopy and its relationship with pre-modern expressions of subjectivity, and by Friedrich Kittler's work on optical media. Beyond "what is virtual space?" the following chapters ask: how does our current moment's preoccupation with alternate realities as localized in virtual spaces challenge contemporary political allocations of actual space? And how do these emerging visual media simultaneously represent themselves as liberatory only to once again reinforce capitalist hegemony? Do such technologies imply a "twenty-first century virtual turn" in relation to the "visual turn" of the twentieth century? Or are they merely one more point on our inexorable march towards an acceptance of a Huxlian world in which we act as catatonic and depoliticized cyborg reticles of the multi-sensory fairground of shock and display we call contemporary life?

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[23] "All belief of matter of fact or real existence," Hume writes, "is derived merely from some object, present to the memory or senses, and a customary conjunction between that and some other object." Hume, *An Enquiry Concerning Human Understanding*, 33.

[24] Nakamura, "Don't Hate the Player, Hate the Game."

I think often about the moment of PJ's touchdown on that virtual soil, when he landed in front of me in a world entirely familiar to him (having logged, according to his profile, over a thousand hours in the game), yet conversely foreign to me. He invited me to look around the island, said that I could explore wherever I liked, unbothered by other players. If I wanted anything, he could "spawn it in": I wouldn't have to laboriously climb the game's skill tree, forage for resources, fight for survival, or concern myself with the elements, but could comfortably get right down to the aspect of the game he appreciated most: building. It was its own utopia, needs abated, open space as a signifier of freedom abundant. PJ constructed magnificent structures on his island, unwitnessed by prying eyes—megalithic monuments to virtuality on his private server.

Figure 3: A palace built in Rust, an MMORPG that allows for "world-building."

Unlike building in the "actual world," however, *Rust* programmatically emphasizes impermanence: the digital media company responsible for the game initiates "forced wipes" on all game-hosting servers on a monthly schedule, eliminating all progress made by all players every 30 days. Anything PJ built—indeed, anything anyone built—is obliterated monthly, no matter how precious or carefully crafted.

Figure 4: Aerial view of a structure built in Rust. *All structures are demolished monthly.*

How do we understand this impulse towards "developing the virtual"? Can we call such constructions works of artistic expression—a 3-dimensional mandala of sorts? Does the development of virtual space map exactly onto the development of actual space? Are we to read these activities as an all-too-human attempt at negotiating temporality and mortality? How are such "other spaces" behaving as both fertile grounds for both sociality and also serving as bastions of solitude?

CHAPTER 1: A PREHISTORY OF VIRTUAL SPACE

Metaphors of Light and Dark

In the years that elapsed between the fourteenth and the sixteenth centuries, as Erwin Panofsky famously argues in his 1944 essay "Renaissance and Renascences," there occurred a dramatic break in how the history of Western culture was able to be received and understood by its interlocutors.[25] This "break," in the narrative of Panofsky's historiography, begins with Petrarch's denigration of the millennium that would come to be known as "the Dark Ages," and in turn divides Western history into three parts: Antiquity, the Medieval, and the Modern. By inverting the commonplace theological metaphor of "darkness versus light" to eulogize the pre-Christian Age of Antiquity, Petrarch had recast the ancient philosophers (including Cicero, for whose revival he is most well-known) as living during a "glorious day" that lamentably and unceremoniously slipped into a ten-century-long night of cultural paucity.[26] This era of darkness, he implies, will necessarily then be followed by an emerging dawn of a profound revival of the ideals of antiquity.

To put it another way: Petrarch exchanges the religio-teleological history of the long evolution from Pagan barbarity to Christian piety for a telos split asunder by a thousand years of "darkness"—a word of Petrarch's which, for Theodore E. Mommsen writing in 1942, suggests a general "worthlessness" of the centuries between the fifth and the fifteenth.[27] In this darkness, creative agency was subordinated to doctrinal servitude, and the age experienced, according to Petrarch, "a confluence of wretches and ignominy."[28] In the "light" that both precedes and succeeds this period, on the other hand, "culture," according to Mommsen, is able to flourish.

Panofsky understands, then, that in the fourteenth and fifteenth centuries emerged a change of consciousness hitherto impossible in Western Europe. In the "9th and in the 12th Centuries it would have been unthinkable—" Panofsky writes, "or, if thinkable, plainly heretical—to divide history into two eras of light separated by one of darkness, and thereby to affix the stigma of obscuration to the advent of Christianity."[29] This temporal divide is so strong that Panofsky suggests in his conclusion that "if you hand a telescope to the 13th Century nothing happens at all; if you hand it to the 17th there will ensue a new interpretation of the world which will lead to the idea of the infinity of interstellar space…"[30]

His phrasing here is far from immaterial: more than just proposing "a theory of the Italian Renaissance" by the above lines, Panofsky highlights a connection endemic to the radical shift he sees in the development of the autonomy of subjective thought: one that extends from the material figure of "the telescope" to the abstract presupposition of "the infinity of… space." In the former we have the mechanical apparatus (or, to use a McLuhanism, an ocular prosthesis); in the latter, the "new space" into which the subject might, with a mind demystified of sectarian values, penetrate by the power of rational thought. It is here we begin to see a new manner of

[25] Kleinbauer and America, *Modern Perspectives in Western Art History*, 427.
[26] Ibid., 428.
[27] Mommsen, "Petrarch's Conception of the 'Dark Ages,'" 237.
[28] Ibid., 240.
[29] Kleinbauer and America, *Modern Perspectives in Western Art History*, 428.
[30] Ibid., 429–30.

understanding modernity that surfaces in the very exemplum Panofsky deploys, where "modernity" might be reread as the imposition of new forms of spatiality upon the eye of the observer—much in the way that a telescope draws unto the eye not only *distance* in excess of human comprehension, but also *time* in excess of human comprehension. This same newly minted "ethos of light" in the fourteenth and fifteenth centuries enables a turning outward, so to speak, against the "dark" business of introspection, towards new methodologies of knowledge-production that take as their centerpiece the observation of nature and its qualities.

To put it yet another way, we can think of Panofsky's break as a renovation of what it meant to "observe" from the Medieval to the early Renaissance.[31] According to the OED, before the fourteenth century the verb "to observe" meant exclusively to formalize one's compliance with a religious program—"to observe the doctrine of the Church," for example. The adjective "observant" likewise referred to one's maintenance of particular kinds of conduct (also often religious, although not exclusively so). In the mid-fifteenth century, however, the word "observe" came to acquire new meaning: "To watch or examine by way of augury or divination; to take note of (presages or omens)"; and then in the mid-sixteenth century, simply: "To watch attentively or carefully."[32]

Indeed, one might notice in the above definitions that towards this latter part of its etymological development the verb "to observe," once a highly specific doctrinal imperative, became secularized. But one might also notice that on its way to secularization the concept of "observance" began to register as a *visual* act (as opposed to a private cognitive act) that included perception of the mythic and the spectral ("by way of augury or divination"). As such, when one "observes" in the sixteenth century, it becomes possible that one is not simply obeying, but also actively producing original visual accounts of things both material and spiritual. This latter form of observance—one that bucks its original context—also sanctions the recognition of agency in others, meaning that in the sixteenth century one could finally be said to "observe another person" with one's eyes—and not just their conduct with one's judgment.

Whereas "to observe" in the fourteenth century meant in the broadest sense to engage in an introspective and private activity (adhering to the practices and norms of Lent, for example), "to observe" in the sixteenth century referred as well to the interpersonal act of beholding another person. In the fourteenth century, one might say, "observation" meant to entertain one's own ideological imaginary through one's personal affairs; by the sixteenth, "observation" had become a public activity that, on the one hand, enabled new methods of understanding environments and their subjects, but on the other anticipated novel power relations that would form between observer and the observed. Such "power relations through observation" provided already powerful individuals with yet another means of inscribing their own private ideological imaginaries over of the world-schemata of others. As we will see by way of the examination of the *studioli* of Federico da Montefeltro in the late fifteenth century below, this happens in part through specific capitalizations on new visual strata.

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[31] Take, for example, the etymological trajectory offered by the OED:
Observe, v. Etymology: < Anglo-Norman and Middle French *observer* **to follow the law of Christianity** (*c*1000 in Old French), **to abide by a law** (late 15th cent.), **to examine by way of divination** (1535), **to notice** (1559), **to watch attentively** (1607), **to subject to military surveillance** (1681), **to subject to scientific observation** (1690) <*ob-* OB- *prefix* + *servāre* to watch, keep (see SERVE *v.*[3]).

[32] "Observe, v."

While I wouldn't want to overzealously suggest here that "observation" in the visual sense of the word had not been possible before the 1400s, I would like to make it clear that the word's etymology, in light of Panofsky and Mommsen's accounts, seems to suggest that discourses surrounding observation had not yet come to conflate religious with visual observance. Once "observation" became both secularized and visual, it follows in some respect that knowledge itself, which for so long remained the exclusive domain of religious texts, rites, and readings that one must "observe," could instead come to be found in (and inscribed upon) the world and its occupants merely through acts of looking—a precondition of the very idea of "the virtual," or the relationship between the image and its effects.

The etymology of the word "virtual" has much in common with "observe": in the late Medieval they both refer to moral qualifications (that is: to be "virtual" was to be "virtuous," and by extension to be observant)[33], but they both deviate in the late fifteenth century to become words that connote (and eventually denote) visuality. To elaborate: according to the OED, just before the renaissance, the word "virtual" was used with reference to either (1) effectiveness, potency, and power, or (2) "moral virtue" (now "virtuous").[34] In the word's etymological development over the next century we witness in it an emergent conflation of "virtuality" with "visuality"—perhaps attributable, in part, to the preeminence of the metaphor of "light" in Renaissance thought. The word "virtual" would, over the next six centuries, come to describe a novel kind of spatiality discussed very differently today: "virtual reality," and, by extension "virtual space."

Today we tend to take the phrase "virtual space" for granted. Though one might find the combination of words, when pressed, difficult to explain, most would probably agree that "virtual space" refers to a particular set of visual experiences mediated by technology. Some virtual spaces we could list might include: computer simulations, online chatrooms, console gaming environments, 3D films (or 2D films, for that matter), certain art installations, or even, today, the visual effects produced by head-mounted displays (HMDs). Oft-read contemporary texts on the subject of virtual space, from Janet Murray's *Hamlet on the Holodeck* to Wendy Chun's *Control and Freedom* to Sherry Turkle's *Simulation and its Discontents* all use the phrase "virtual space" (the first of these dozens of times) with the pretext that we know what it means—but what makes a space virtual? How do we know a virtual space when we encounter one? How are virtual spaces mediated? How are they experienced? What forms can they take? All of these questions have been contested at least since Bergson's *Matter and Memory* (or, indeed, since Plato's *Republic*!), and all of them remain pertinent to this investigation as spaces we might describe as "virtual" multiply by the minute. In the midst of such a profound explosion of virtual spaces in the twenty-first century, and in anticipation of these aforementioned questions, we might begin by asking: when did the very notion of a "virtual space" became (1) syntactically meaningful, (2) conceptually meaningful, and (3) technologically manifest?

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[33] Virtual, adj. Etymology: < post-classical Latin *virtualis* of or relating to power or potency (frequently from 12th cent. in British sources), that has the power to produce an effect, potent (13th cent. in British sources), **morally virtuous** (from 13th cent. in British sources) < classical Latin *virtus* virtue n. + -ālis -al suffix1, after classical Latin *virtuōsus* virtuous adj., my emphasis.

[34] The idea that "the virtual" has its conceptual roots in "power," specifically religious power, and "virtue," will inform this project's argument about contemporary rhetoric that has accompanied novel virtual reality technologies today.

The first of these questions proves challenging to answer: consulting, once again, the OED for the phrase "virtual space" yields an earliest result from 1989[35], which will register with some as impossibly recent for a "first usage" of those two words concatenated. Deprecating the phrase further to "virtual reality" (not the same, of course, but sometimes elided with "virtual space") yields earlier results from the late 1970s[36]. If we broaden our understanding of "virtual space" to include literature that anticipates the topic, we are able to recede further in time to a few prescient short stories of science fiction, like Ray Bradbury's "The Veldt" (1950) and Stanley Weinbaum's *Pygmalion's Spectacles* (1935), both of which contain "virtual spaces" as central thematic elements.

Before 1935 it becomes even more difficult to find explicit textual documentation of "virtual space" using these or similar words. A search of Google's massive index of book records extending back to the sixteenth century[37] reveals a few usages of the phrase "virtual space" and "virtual reality" in scientific literature of the mid- to late-1800s. Although none of the phrases found referred to visual or psychic experiences of ulterior spatiality as such, one work did indeed—for what it's worth—discuss the eye.[38] Following up on this search with an examination of Google's Ngram viewer, which allows for the searching of phrases in all thirty millions of Google's collection of scanned texts,[39] one finds, again, neither examples of "virtual space" nor "virtual reality" from before the mid-nineteenth century—but a sharp uptick in usage in the late 1900s:

[35] 1989 *Performing Arts Jrnl.* **11** 131 "The virtual space of globalizing mass culture..cannot possibly project a common desire or fantasy."

[36] 1979 *Programming Announcement.* (IBM Data Processing Div.) 30 Jan. (broadsheet) A base to develop an even more powerful operating system,..designated 'Virtual Reality'...to enable the user to migrate to totally unreal universes.

[37] I offer this data keeping in mind the many limitations search engine-enabled textual research entails, *especially* given that low OCR success rate for print records dating even only to 1800—which, in terms of the standardization of spelling in the English language, was ages ago—makes finding even common phrases less than guaranteed.

[38] Heath, *Heath's Practical Anatomy*. "The posterior chamber, lying behind the iris, is little more than a virtual space, since the iris is usually in contact with the front of the lens." (1873)

[39] For scale, Google has estimated that just under 130 million books have been published in total to date (or 129,864,880, their exact estimate), making Google's collection an impressive—but simultaneously "mere"—23%. (Parr, "Google.")

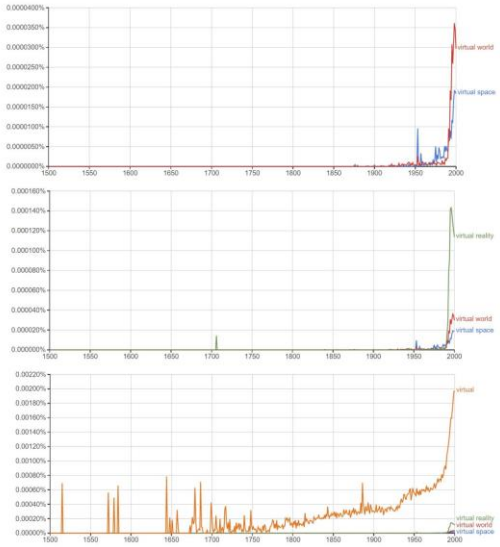

Figure 5: Google Ngram viewer's relative word frequencies in published works for the phrases "virtual world," "virtual space," "virtual reality," and the disambiguated phrase "virtual," with a range of 500 years and a smoothing of zero. Accessed December 2, 2018.

The data gathered from "distant reading" here only offers us so much: we can see that the word "virtual" was certainly in use dating back to the 1500s, and that its relative frequency (given the low volume of published texts in the 1500s and 1600s) seems high, possibly because of its association with religious texts, which would have doubtless made up a higher percentage of published volumes during the first three centuries of the existence of the printing press. Syntactically, it seems, the entrance of "virtual space" into English-language lexicons does not take place until the mid-to-late 1900s, when the relative frequency of words and phrases alluding to virtual space skyrockets.

The latter two questions above, however—those pertaining to when "virtual space" became contextually meaningful and technologically manifest—are a bit more salient, and perhaps more readily explored. Though "the virtual" has become well-trodden philosophical territory in the late nineteenth and twentieth centuries by Bergson, Deleuze, Marcuse, Baudrillard, Debord, and other contemporary expositors on the nature of hyperreality, this project finds reason to begin, instead, in the fifteenth century—long in advance of contemporary philosophical discussions of the virtual. Here we must "zoom in" (to deploy, once more, Panofsky's telescopic metaphor) and observe a particular moment during this cultural shift: 1476, Palazzo Ducale, Urbino—the *studiolo*.

Enter the Studiolo

The 1470s—which fall equally between an age of ecclesiastical witch-hunting hysteria then hitting its stride in the mid-fifteenth century and the Age of Discovery beginning in earnest in the 1490s—represents one of many possible interstitial moments between the medieval and the renaissance imaginaries in which one might locate the genesis of Modernity: it is a moment post-Gutenberg but pre-Luther; post-Fall of Constantinople but pre-Copernican Revolution.

Federico da Montefeltro, Duke of Urbino, a mercenary known widely for his military successes and ethic of debt loyalty, commissions in two separate locations the construction of two *studioli*, or private, reflective spaces defined by their elaborate decorative *intarsia*. The rooms are built by Luciano Laurana and Francesco di Giorgio Martini between 1474 and 1483—during which time the Duke, alas, dies. According to Robert Kirkbride, "both are tall spaces, fitted with decorated coffered ceilings set five meters above a terra-cotta tiled floor. This configuration," he writes, "provides large wall surfaces at intimate proximity, an ideal arrangement for a bold composition that invites closer inspection of its subtle and exacting craftsmanship."[40] Not only does the verticality of the *studioli* suggest the Duke's devotion to an early-Renaissance appreciation for the loftiness of thought (which would have been a common fifteenth-century humanist aesthetic in such rooms), but as a *public* place it would have compelled visitors into close proximity with its walls—themselves extraordinary, to say the least.

The walls of the *studiolo* at Gubbio, which were acquired by the Metropolitan Museum of Art in 1939 and first displayed from 1941 until 1967, comprise an elaborate *trompe l'oeil* environment originally created in Florence and then sent to and assembled in the Duke's home town. When one beholds the room from the correct orientation ("correct" here meaning in confluence with the room's single-point perspective), its walls, made of mere wood—walnut, beech, rosewood, oak, and fruitwoods—expand into extraordinary three-dimensionality, constituting what this chapter will identify as the first fully-immersive three-dimensional virtual space in the history of Western art.

Figure 6: The Studiolo at Gubbio, installed at the Metropolitan Museum of Art, New York (2010).

"A master craftsman," John Russell writes in the New York Times article accompanying the *studiolo*'s renewed exhibition in 1996,

> ...could make us reach out to touch an armillary sphere in the belief that it must be round and not flat. He could mimic a bookbinding in such a way that we

[40] Kirkbride, *Architecture and Memory*, 21.

> knew at once what kind of leather had been used. And when he positioned an elegantly decorated bench in steep perspective, we are almost fooled into believing that we could actually sit on it.[41]

Indeed, master Italian craftsmen at the time, as Maria Zlinszky-Sternegg writes in *Renaissance Inlay in Old Hungary* (a country which shared with Italy many of the same masters), "were described as maestro di legname [timber], indicating that they were interior designers and cabinet-makers in the modern meaning of these words."[42] It seems significant that the author here finds little distinction to be made between master cabinet makers and masters of what we might call "virtual cabinets," a subtle indication that differentiation between the two kinds of making—of "virtual" and "real" objects separately—had not yet been established. And while decorative *intarsia* was indeed in vogue in the late 1400s in both Hungary and Italy, the ability to produce persuasive three-dimensional *intarsia* would still have been a rare and valuable skill set, as the techniques demanded to create persuasive three-dimensional works of inlaid wood had only been developed into a science forty years prior.

The *studiolo* thus represents a masterwork in linear perspectival technique pioneered by Filippo Brunelleschi in the same century. The walls, with their open cabinets, protruding benches, and three-dimensional instruments and curiosities nearly spilling from the shelves, represents, as this chapter will continue to argue, one of the very first documented immersive three-dimensional spaces designed to produce not just a feeling in the observer of inhabiting a space that's in some way *larger* than that which the viewer expects (this would have been accomplished by the false cabinets that seemed to extended backwards into the solid stone *palazzo* walls), but that same feeling as inextricably linked to humanistic prerogatives of classical-mindedness, contemplation, and the liberal arts. The first "virtual space," much in line with our etymology of the word *virtual*, emerged already wrought with spatial signifiers—a complex mélange of scientific rationalism, new humanist thought, elitist liberalism, Catholic mythos, and the apotheosis of Antiquity. This is to say: "virtual space" had not freed itself of the discursive metrics of "actual" space (as, indeed, it still hasn't). Rather, it retained them precisely, and in some ways even focused their influence.

But what are these so-called discursive metrics of the "actual" space of the *studiolo*, exactly? Or, put another way, what do the cabinets contain?

[41] Russell, "ART VIEW;Secret Retreat for the Ultimate Renaissance Man."
[42] Zlinszky-Sternegg, *Renaissance Inlay in Old Hungary*, 11.

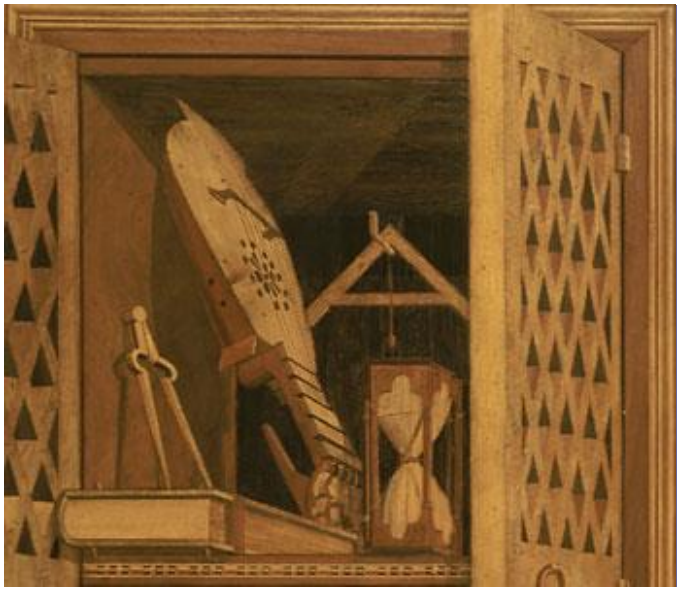

Figure 7: The Studiolo at Gubbio, installed at the Metropolitan Museum of Art, New York (detail).

The cabinets in both the *studiolo* at Urbino and the *studiolo* at Gubbio contain a wide array of objects, from fruit nuts, to images of the Duke and his son, to an ermine, a signifier of "purity" at the time[43]—but what will strike the casual viewer most strongly is the amount of space devoted to instruments. The *studiolo* at Urbino contains 14 musical instruments, 10 of which, as Kirkbride notes, are laid out as if ready to play; whereas at Gubbio a more conservative 13 instruments can be seen in the *intarsia*. But musical instruments aren't the only kind of instruments present: the open cabinets at Urbino, for example, with their excess of instruments of science and warfare in addition to music, seems to portend an "ideal" space that pays tribute to the potential of the future as attainable through labors of the present. For what else does it mean to learn an instrument (whether musical or architectural) than to build "instrumental knowledge" towards greater creative agency? From the middle of the room, for example, one sees "a plumb bob and set square hanging from a peg as well as a sandglass, cittern, and pair of dividers."[44] These instruments, all concerned with measurement and proportion, signify a kind of diorama of "scientificity-in-waiting." "The set square and plumb bob were used as a level by builders and architects," the Met write-up on the show reads:

> The dividers were employed to measure distances on a chart or to determine the scale of a design. The sandglass, an instrument popular in the late Middle Ages, indicated the equal hours . . . During the fifteenth century the theory of musical proportions and the studies of linear perspective and architectural proportions came to be seen as expressions of the same mathematical truth, so even musical instruments such as the cittern depicted here must be understood as an allusion to the theory of music's harmonic proportions.

On this shelf alone, we have representations of "level," "distance," "scale," "time," and "harmonics," all of which, according to the above, indicate the importance of "proportions" to fifteenth-century humanistic thought. But more than merely referencing that which would have

[43] Cheles, *The Studiolo of Urbino*, 81.

[44] "Designed by Francesco Di Giorgio Martini | Studiolo from the Ducal Palace in Gubbio | Italian, Gubbio | The Met."

been ideologically important to the room's benefactors, the tools themselves reference the creation of the *intarsia* panel itself—in addition to the creation of the *studiolo* itself, and the very inception of the idea for the *pallazo ducale* in the minds of its architects as well, for the very *palazzo* had been made possible by these very instruments. The instruments thus come to represent, paradoxically, their own condition of possibility: an ouroboros of creative potential. The virtual space of the *studiolo*, this is to say, keeps in mind the material realities of spatial creation even as it strives to extend the room beyond its own walls.

The openness of the cabinet, too, indicates the availability of these tools—that they were either recently used, or that they are about to be used, and could be taken up at will. Given the public nature of the *studiolo* (despite its pretenses towards private reflection, it was a room that would have been on public display in addition to being used as a study), the representation of "precarious openness" might have signified to the palace's visitors a kind of egalitarianism—an invitation that they, too, might pick up the instruments of the learned Duke and use them to measure and make. The open cabinets insist upon radical possibility: all instruments are ready to be played, used, or operated, just as instruments had been used to produce the intarsia illusion itself in the years before the room's open viewing.

It's important to remember, however, that despite the instruments' impressive and persuasive realism, that to pass through the room would also be to break the illusion of the potentiality of the instruments. Thomas Demand, a contemporary artist known for the fabrication of immersive physical spaces out of cardboard and paper, speaks the following in a video short on the *studiolo*:

> [C]entral perspective is a very new tool [in the early renaissance], and the trick here is that the whole perspective is complete when you step into the room. Only then. But then you go to the window and you see how distorted the bench on the side is. You have one viewpoint and it's actually very unhuman, not inhuman but unhuman, because our head is always moving all the time, so our reception of the world is one of a moving eye… central perspective totally works but it's too clean. You have this translation of the real world into geometry, into mathematics. It's the promise that with the genius of the human brain one can somehow cage the horrors of the daily life. It's a real utopian proposition at the time, the idea of a virtual space. You can still feel the modernity in it.[45]

This passage makes a number of important claims about both the specific space of the *studiolo* at Gubbio and also "virtual space" more broadly as it pertains to this analysis. Demand identifies, first, that the room doesn't become persuasive in its illusionistic qualities until one steps into it. To extrapolate on this point, then, one might say that a virtual space comes into its own spatiality once one has committed oneself to the experience of the technology; in the Met's exhibition of the *studiolo*, this means stepping into the room gives the room its power to discursively reconfigure the viewing subject's spatialized reality. Demand calls this a "trick," but also insinuates that the "whole trick" is *incomplete* without the addition of the viewer, who acts as a keystone to the experience. He implies that the virtual space doesn't become a virtual space in anticipation of its perception, but, importantly, by virtue of it. The implication seems to be that

[45] *Thomas Demand on the Gubbio Studiolo | The Artist Project Season 1 | The Metropolitan Museum of Art*.

the scene "tricks" perception, while yet the scene also depends upon and is made manifest by perception: the human "makes" the experience just as the experience dehumanizes the human.

Demand proceeds to the window. Though the window in the Met only references the *studiolo*'s original window (the room being surrounded by other galleries, the window, in lieu of a view, offers yellow light through semi-translucent glass), it here serves as a figurative counterpoint to the room. A window, this is to say, in most circumstances serves to make a three-dimensional reality "flat" through a process of framing, much as the *studiolo*'s walls serve to make two-dimensional images "real" through perspectivalism. The figure of the window, to put it yet another way, serves as a transitional moment between the world exterior to the Met and the room's interior. It represents more than a portal between one space and another, but rather a portal between the fifteenth and twenty-first centuries, and between the "real" and the "unreal." Being near the window, however, for Demand, turns the experience of the *studiolo* into one that transgresses upon the uncanny. Owing to the room's central point perspective design, one's experience of its spatiality necessarily changes as one moves about the floor. Demand above identifies this experience as "unhuman," presumably as a way of sidestepping the pejorative implications associated with the alternative word he uses: inhuman.

But one must also admit that Demand's effort to avoid the word "inhuman" seems to have a paralepsistic effect of begging the question: how does this prototypical "virtual space" in fact court the inhuman? This question is further invoked when Demand declares the room a "utopian proposition" that implicitly proposes geometry and mathematics as systems to "cage the horrors of daily life." One wonders: how does the room, in Demand's purview, "cage the horrors of daily life"? How does it abolish, yet also invoke, the inhuman?

In its form, the room both liberates and confines its subject: through its illusionistic qualities it is visually expansive, yet has only one doorway and one window, perhaps making the space simultaneously feel open and claustrophobic. In terms of the room's imagistic representations, this impulse towards "the inhuman" might also look, for example, like an image in the north wall depicting a flaming petard—a very early form of grenade. Referring to Nardini's earlier analysis, Luciano Cheles writes of the grenade: "The *impresa* of the burning grenade… symbolizes …. defensive rather than aggressive warfare: the bomb does not explode unless provoked."[46] Though "inhuman" is a tricky word to define across its long history, and though it remains difficult to know exactly how it might mean in the context of primordial experiences of the virtual, suffice it to say that the flaming petard represented in a room so small—and a room meant to sustain the illusion of realism for many of its contained objects—would allude to a novel kind of existential threat in the 1400s—a kind that could change spaces and lives radically of those who experience its effects. The petard, to a guest of the condottieri, would have read as yet another referent to Federico's power over bodies within his regional domain.

The "horrors" of daily life in the late 1400s, which included plague, starvation, and persecution for most individuals in one form or another, could be mitigated by technology, but also exacerbated by it, as the petard reminds us. In form, the room's wood planking too would have done more than strike awe in happy visitors: it would have served to keep the room warmer in the winter and cooler in the summer, as Kirkbride observes in his analysis, employing an early form of climate control to keep the elements at bay.[47] Thus by representing power over bodies,

[46] Cheles, *The Studiolo of Urbino*, 81.
[47] Kirkbride, *Architecture and Memory*, 21.

and by exercising power over climate, the virtual space of the *studiolo* attempted to exercise complete control over its viewing subjects, whether that meant regaling them with images of the weapons and armor used by the Duke himself to reinforce his capacity for physical subjugation, or by controlling the temperature in the room as a way of forestalling thoughts of death, the horrible, and the grotesque.

Demand sees the intarsia paneling as acting in many ways to form a *world apart* from the present. Whether the room represented an "ideal space" or, for a person moving through it, a twisted and "unhuman" space, it nevertheless sought to elicit a reality outside of or beyond itself: an "other space." But the observer's position, as Kirkbride, like Demand, notes, does indeed change one's experience of the room. Unlike Demand, however, Kirkbride doesn't see the addition of movement as a change that turns a visually harmonious experience into a visually discordant one, but rather one that translates the movement of the body into movement in the intarsia paneling.

In his analysis, Kirkbride points out that "[c]loser inspection of the ornamental surrounds of threaded discs suggests an ideal viewpoint approximately one step back into the chamber from the window niche," and also an "ideal height" at which to view the chamber—around 5' 6". That the spatial orthography of the *studiolo* prescribes a specific point from which to view the room seems to necessitate not only a particular witnessing subject, but also a particular orientation of the body towards the instruments that prevail upon that same subject. Moreover, Kirkbride points out that the room, when one moves about it, has "optical effects": "Other objects in the composition," he writes, "such as the flutes and recorders on the bench, appear to 'follow' in concert as we traverse the chamber. Likewise, the latticed cabinet shutters in both *studioli* 'swing' open and close with our movement across the room, evoking the uncanny sensation that the 'contents' of the rooms are being manipulated by our own eyes."[48]

The instruments, when one remains still (if one happens to have an approximate eye height of 5' 6") assume a quality of life. But, as alternatively suggested by Demand, with the introduction of any kind of movement, those same instruments reveal themselves as present-to-hand—as mere signifiers of instrumentality. The tools which augur the forthcoming age of instrumentalization that would be known as the Renaissance, which predict the expansion of humankind's practical and theoretical reach beyond measure, and prefigure the dawning of the age of modernity, provoke the user into a kind of ontological uncanny valley where the benches, able to support the viewer's weight one minute, folding inwards towards the flat walls the next, reveal simultaneously a room of radical possibility and of radical impossibility.

What are the implications of this duality? The *studioli* at Urbino and Gubbio at once, through magnificent symbolic suggestion, naturalized and reinforced the legitimacy of power differentials precipitated through wealth and class, specifically concerning the Duke and his family; disciplined its viewers to regard the palazzo as deceptively large and filled with material, cerebral, and spiritual riches; and also served as a condensed pedagogical crucible in which a visitor would confront all at once those same instruments responsible for reinforcing the Duke's power and reach in the fifteenth century. Finally, the *trompe l'oeil* effect of the study, which was, again, immersive in a way that would have been technologically impossible at any other point in history prior to the *Quattrocento*, at once enabled a visitor to experience a distinctly *other* form of spatiality while simultaneously (and implicitly) undermining that same realism with respect to

[48] Ibid., 53–54.

the subject's movements throughout the room. The first virtual spaces of their kind would have thus both moved their viewers affectively while also disorienting them spatially.

The first part of this chapter tries to identify the general period in which "observation" and "the virtual" begin to cease registering exclusively as non-visual identifiers of adherence to Christian dogma, and instead begin to act as designators of power enshrined in and generated by novel visual strategies (like early scientific discourses of objectivity in observation, and new means of producing virtual space in artistic works like the *studioli*). Perspective as a technique would still have felt extraordinarily new in the 1470s: William Ivins, for example, writing in 1953 argues that perspective, paired other revolutionary technologies in the reproducibility of woodcuts and new theories of relativity and continuity,

> revolutionized both the descriptive sciences and the mathematics on which the science of physics rests, and in addition they are essential to a great deal of modern technology. Their effects on art have been very marked. They were absolutely new things in the world. There was no precedent for them in classical practice or thought of any kind or variety.[49]

While generally speaking it would be difficult to overstate the importance of the advent of linear perspective in Western art, it's also possible that claims that perspective in its entirety was "discovered" by the lone draftsman Brunelleschi forget that 1) much has been lost from the period, weakening any seemingly conclusive arguments, 2) many artists—Ambrogio Lorenzetti, for example—had created works with cohesive perspectival elements more than a century in advance of either Brunelleschi or Alberti, and 3) claims that perspective did not exist in any respect before the 1430s may unfairly delegitimize earlier non-Western innovations in perspectival technique. Panofsky even to some extent anticipates Ivins' strong words by suggesting that "We do not know, although it is probable, whether Brunelleschi was really the first to have produced a mathematically exact linear perspectival procedure…"[50]

But regardless of whether or not linear perspective was discovered by Alberti, Bruneleschi, Lorenzetti, or another artist or mathematician of another time and place, Federico da Montefeltro's *studioli* appear to be among the earliest rooms on record to exploit an unbroken, 360-degree display of perspectivally-locked imagery built into the very fabric of the room. Whereas other illusionistic works of the era were limited by either frames or architectural features that distinguished the works from other surfaces in the room, the *studioli* seek to create a seamless experience of an alternative spatiality that reinforces hierarchies of power through novel visual experiences.

Exit the Camera Obscura

Though the object of no small amount of criticism, Jonathan Crary's *Techniques of the Observer* remains one of the most cited twentieth-century analyses of the effects of perceptual technologies on human subjectivity to date, and he examines at length a number of disruptive challenges to the visuospatial conditioning of the early nineteenth century Western observer.

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[49] Ivins, *Prints and Visual Communication*, 24.
[50] Panofsky, *Perspective as Symbolic Form*, 62.

Starting with the *camera obscura*, Crary maps a discursive realignment of the observer's relationship with that which she observes. In his remapping, vision itself, once taken for granted as occurring outside of the observing body, shifts *into* the observing body, and so becomes subject to its erroneous perceptions, misreadings, and procedural inconsistencies.

The *camera obscura*, a phenomenon Crary identifies as at least two thousand years old (predating Renaissance *intarsia* works by more than a millennium), thus represents a historical way of thinking about the body in relation to images. "Thinkers as remote from each other as Euclid, Aristotle, Alhazen, Roger Bacon, Leonardo, and Kepler," he writes, "noted this phenomenon and speculated in various ways how it might or might not be analogous to the functioning of human vision."[51] He follows this point with a less equivocal one, arguing that "[d]uring the seventeenth and eighteenth centuries the *camera obscura* was without question the most widely used model for explaining human vision, and for representing the relation of a perceiver and the position of a knowing subject to an external world."[52] In the historical model of the *camera obscura* as it has been documented so often throughout humankind's understanding of the phenomenon, the observer sits within a dark room; light passes through a small aperture, and an image is subsequently projected complete (albeit upside-down) on the wall opposite the tiny opening. What is important for Crary here is that the image is produced not by virtue of an observer's eyes or mind, according to the *camera obscura* model, but merely *outside* of the subject, allowing the subject to internalize a relationship with the image that lends credence and stability to observed phenomena. The responsibility for image production, divorced from the viewer herself, instead becomes coupled with external natural processes. The human's role is entirely one of reception.

"But in the nineteenth century," Crary ripostes,

> ...such a notion became incompatible with a field organized around exchange and flux, in which a knowledge bound up in touch would have been irreconcilable with the centrality of mobile signs and commodities whose identity is exclusively optical. The stereoscope, as I will show, became a crucial indication of the remapping and subsumption of the tactile within the optical.[53]

In Crary's reading of the history of visual modernity, certain visual technologies like the stereoscope, the kaleidoscope, the phenakistoscope, and the thaumatrope all emerged concurrently in the early- to mid-1800s, shattering a stable relationship that had remained unchallenged for all of visual history. Each of these technologies receives careful treatment in *Techniques of the Observer*: the thaumatrope, a disk rotated rapidly to turn two images into one, for example, demonstrated the "fabricated and hallucinatory nature of its image and the rupture between perception and its object"[54]; the phenakistoscope, on the other hand, which comprised two wheels rotating at different speeds in parallel to produce a ghostly reversed spinning effect, "disclosed an increasing divergence between appearances and their external causes."[55] And so, with abundant proof that the eye and mind both play crucial parts in the construction of images, a

[51] Crary, *Techniques of the Observer*, 34.
[52] Ibid., 27.
[53] Ibid., 62.
[54] Ibid., 106.
[55] Ibid., 112.

nineteenth century observer would be forced to come to terms with the responsibility for image-production as part of the subjective space of their own observing gaze. This, once again, represents the fundamental break described in *Techniques of the Observer*—a break that disorients and destabilizes the observer from their very function of observing. Crary's history of this break begins in the nineteenth century, but indeed we observe it occurring centuries in advance of this date.

Though no one can know with certainty how Federico da Montefeltro's *studioli* were received *in situ* by his guests, one expects that the visual effect of the rooms on their observing subjects must have been profound: as one enters the room one witnesses the walls and their sundry contents shift into position before one's eyes, demonstrating further the kinds of acrobatics the mind must perform to make sense of newly abnormal spaces. And though some key differences loom—that the user of the stereoscope's physical orientation vis-à-vis the machine is defined and permanent, for example, whereas one experiencing the *studiolo* moves freely throughout the room; or that the experience of the stereoscope is mediated by mirrors, whereas one's experience of the *studiolo* remains unmediated by any small and specific device, to name another—both the stereoscope and the *studiolo* use the production of three-dimensional space from two-dimensional surfaces to challenge the viewing public's perceptive organs. One might even argue that the *studiolo*, though it remains inextricably bound in liberal humanist ideologies and a politics of imperial despotism, effectively anticipates the early nineteenth century visual apparatuses responsible for the break that Crary postulates in the visuospatial fabric of human experience—and by a margin of nearly four hundred years, no less!

This is not to reduce Crary's claim about the massively influential effects of new technologies of vision in the 1800s, especially when one considers that such devices, which were small, portable, and—most importantly—reproducible *en mass*, at least when compared with one-of-a-kind intarsia paneling, would have affected a far broader cross-section of society than the *studiolo* ever could have, even accounting for the Duke's unusual utilization of his *palazzo* as an open space of public learning. And when one considers that the stereoscope in our contemporary moment has resurfaced as one of the most explosive and promising emerging technologies of the early twenty-first century, one realizes that the visual devices Crary identifies in *Techniques of the Observer* indeed form an umbrella that spans all of modernity.

In Crary's argument, the stereoscope permits a kind of vision that reveals the extent to which "the observed" does not necessarily map exactly onto "the real." But the device also demonstrates the convoluted manners by which an image might be introduced into the mind. Wheatstone's first device, for example, differed from future versions of the stereoscope in that each eye, rather than examining images in front of the viewer adjacent to each other, looked through their own mirrors to examine images variously perpendicular to the right and left of the user's viewing axis. What he had discovered with this experiment was that the mind, when confronted with two like images, will seek to reconcile those images with each other provided that eyes lack recourse to observing each other's optical axes. By separating an individual's optical axes from one another one could, in short, disassemble and then reassemble the viewed image. And one might even create an illusion of additional space.

Charles Wheatstone, the principle investigator of what came to be known in the late 1830s as the "Wheatstone Stereoscope," wrote of his device that:

> When an object is viewed at so great a distance that the optic axes of both eyes are sensibly parallel when directed towards it, the perspective projections of it, seen by each eye separately, and the appearance to the two eyes is precisely the same as when the object is seen by one eye only.[56]

Wheatstone also discovered, then, that the distance of objects from one's body along one's gaze seemed to correspond in a "natural" and mathematical way to the convergence or divergence of the optical axes before the viewer. And from this information one could "trick" the eyes into reading different kinds of spatiality onto two-dimensional images. "Thus physical proximity," Crary writes of this discovery,

> ...brings binocular vision into play as an operation of reconciling disparity, of making two distinct views appear as one... Its 'realism' presupposes perceptual experience to be essentially an apprehension of differences. The relation of the observer to the object is not one of identity but an experience of disjunct or divergent images.[57]

The *studioli* of Federico da Montefeltro, too, confront the viewer with a "disjunct" or a "disparity," prompting both Thomas Demand and Robert Kirkbride to identify the room as appearing to be in motion at various points in their examinations. And though the "disparity" produced by the *studiolo* differs from the "disparity" introduced by the stereoscope in that the mediating technologies (or *techne,* in the case of the *studiolo*) are invisible in the latter, visible in the former, nevertheless the viewer must leave the room with their understanding of visual experience writ large implicitly and irrevocably changed.

Though *Techniques of the Observer* spends most of its time in the early nineteenth century, the text opens with some prescient remarks on the twenty-first—namely that we have found ourselves in our current epoch within one of the most massive upheavals of visuality since the advent of the *camera obscura* (and, might I add, since the advent of linear perspective), and that to examine the history of visuality is to examine how, more and more with each passing year, "visuality will be situated on a cybernetic and electromagnetic terrain where abstract visual and linguistic elements coincide and are consumed, circulated, and exchanged globally."[58] Both the *studiolo* and the other instruments of visual heterodoxy discussed in *Techniques of the Observer* establish an alternative psychovisual understanding to which we as seeing subjects must necessarily cling, and which has itself informed an eruption of other heterodox instruments of alternative visualities in our contemporary moment.

Crary refers to, and indeed lists, the many ways in the late twentieth century that people come to mediate their gazes through electronic surfaces and projected images that produce illusions of space: "Computer-aided design, synthetic holography, flight simulators, computer animation, robotic image recognition, ray tracing, texture mapping, motion control, virtual environment helmets, magnetic resonance imaging, and multispectral sensors"[59] to name a few.

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[56] "XVIII. Contributions to the Physiology of Vision. —Part the First. On Some Remarkable, and Hitherto Unobserved, Phenomena of Binocular Vision," 371.
[57] Crary, *Techniques of the Observer*, 120.
[58] Ibid., 2.
[59] Ibid., 1.

And nearly twenty years after the publication of his seventh edition we could add to his list countless other examples: augmented reality, computer-mediated reality, MMORPGs, transvirtual gaming, HCI, haptics, LIDAR scanning, camera-equipped UAVs and RPASs, and many more. It seems that Crary's anticipation of the greater trend towards virtualization is not by a long stretch unfounded. The debate about the extent to which all reality has or has not been subsumed by the virtual—whether or not all experience isn't already comprised of "abstract visual and linguistic elements," going back to Baudrillard's simulacrum, continues. And some of that discussion will be addressed in the following pages of this document.

Whether we use Crary's text to think further about the *studiolo*, the stereoscope, or virtual reality ("VR") headsets, *Techniques of the Observer* impels us consider the condition of the body of the observer at historical moments of disruptive changes in the very fabric of visuality: "How is the body, including the observing body, becoming a component of new machines, economies, apparatuses, whether social, libidinal, or technological?" he asks in his first chapter of the book. "In what ways is subjectivity becoming a precarious condition of interface between rationalized systems of exchange and networks of information?"[60] The intersection of "rationalized systems of exchange" and "networks of information" summons to the twenty-first-century reader visions of data crisscrossing landscapes, and illegible, fast-paced matrices of zeros and ones clouding the atmosphere. As a thought experiment, if one were to strip away the virtual cabinets in the *studioli*—and, not the wood paneling, but the virtual cabinets themselves, along with all of their contents—what would one see?

In one respect, the question is nonsensical: the cabinets cannot be stripped away because they do not "exist" (but only have effects). But in another respect, one might answer that one would expect to see an empty and abstract space—one that proceeds further into the stone walls of the Ducal palace, but which is not the stone walls themselves. Returning to the present: to what extent has the "visual order" changed once again such that data, paradoxically both a maximally and minimally abstract medium for understanding the world, has already registered its dominion over the physical? One can't help but think of popular dystopian films from the late twentieth century like *The Matrix* and its visualization of the omnipresent green surface of data that comprises all things physical, or of the detextured gridded virtual landscapes of movies like *The Thirteenth Floor* and *Tron*, or *Star Trek*'s holodeck, or the digital interactive media object *Assassin's Creed* with its white, decontextualized, gridded loading screen in which one can move here and there while one waits between playable scenes:

[60] Ibid., 2.

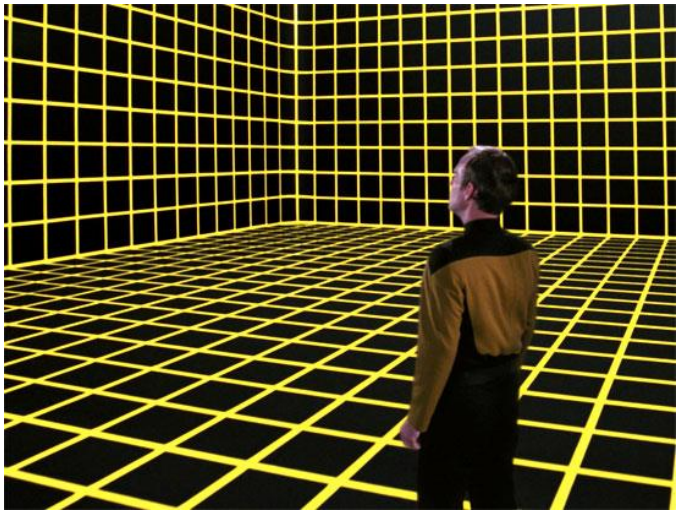

Figure 8: Still from Star Trek: The Next Generation, "Hollow Pursuits" (1990).

Figure 9: Still from The Matrix (1999).

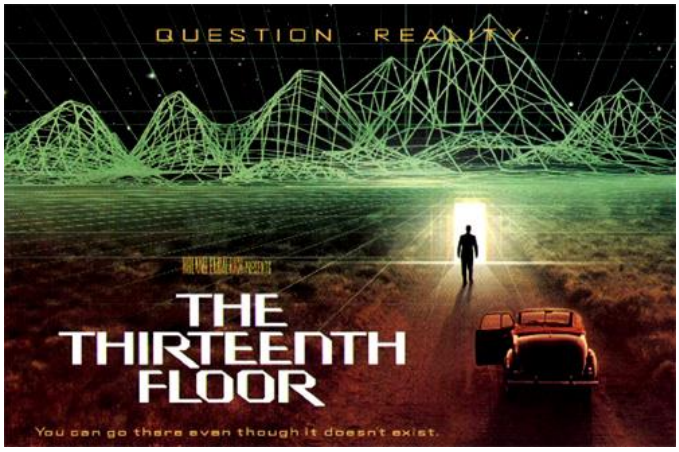

Figure 10: Poster for The Thirteenth Floor (1999).

Figure 11: Loading screen of Assassin's Creed: Syndicate (2015).

Are these examples manifestations of a new "regime of the void" taking the place of the "regime of the destabilized observer"? Have the figures in these images lost or gained capacities of visual comprehension within their open but abstract landscapes? And, to take the discussion yet another technological medium forward in time: what happens to the body of the observer during moments of "presence," or the visual and cerebral experience of perceiving a simulated world as being *viscerally more substantive* and "present" than the quotidian space of physicalist reality which one has "left behind"?

Much in the way that the heterodoxical visual technologies of the early nineteenth century unself-consciously pay tribute to the primordial virtual space of the *studiolo*, these "wireframe worlds," each using the figure of the grid overlay as a signifier of both "partial rendering" and infinite potential, pay tribute to a far older technical step towards the realization of (or, more precisely, "virtualization of") rendered space from the early fifteenth century—one that predates the *studioli* by around forty years: Alberti's window.

Here this argument will take one more step back in time in the long history of virtual space—which, it will by now be safe to admit, can likely be said to extend further back than either the novel visual devices of the 1800s or Federico da Montefeltro's *studioli*. Indeed, debates about perspectivalism in the Early Modern period frequently situate the first articulation of a *theory* of perspective, meaning a specifically a theory of geometric linear perspective, in an experiment performed by Filippo Brunelleschi in 1425, and subsequently expanded upon in the writings of his contemporary Leon Battista Alberti a decade later.

Alberti, who, according to Samuel Edgerton, "return[ed] to Florence after a lifetime of exile" in 1428, seems an apropos visionary to codify and tame three-dimensional space: an architect and scholar of ancient ruins, he maintained both occupational and personal interest in the development of public spaces throughout his life. In 1435 he began his first great work, *Della pittura*, and "formally recorded" the principles that had a decade earlier been established by Brunelleschi.[61] As such, he produced the first manual that any artist who had been educated to some extent in mathematics and artistic media could follow to create the illusion of a "real space" on a two-dimensional surface. This illusion gave the viewer of the image the sense of occupying the exact vantage point of the painter-observer—and, if that viewer were to remain stationary, a sense of standing before a window which opened onto the subject at hand.

Anne Friedberg's 2006 analysis of the history of "virtual space" in *The Virtual Window: From Alberti to Microsoft*, begins at this very moment in 1435, thirty years before Federico da Montefeltro started work on his *studioli*. "In his 1435 treatise on painting and perspective, *De*

[61] Edgerton, *The Renaissance Rediscovery of Linear Perspective*, 5–6.

pictura," she writes, "Leon Battista Alberti—painter, architect, scholar of antiquity, quintessential Renaissance man—famously instructed the painter to 'regard' the rectangular frame of the painting as an open window (*apierta finestra*)."[62] Friedberg considers this description the first documented evidence of the systematization of a particular kind of conversion from two-dimensional to three-dimensional perception. This is not to say artists had never achieved convincing likeness, but rather that a functional process for illustrating spaces that could satisfactorily persuade their observers of their dimensionality had never before been formalized in writing.

Much in the way that Crary emblematizes the *camera obscura* at the beginning of *Techniques of the Observer*, Friedberg argues in *The Virtual Window* that "Alberti's Renaissance metaphor of the window has haunted centuries of subsequent thinking about the humanist subject of perspective."[63] The figure of the window, both an aperture and frame; both a surface and an absence—represents not only the emergence of a new suite of possibilities regarding three-dimensional representation, but also a prescriptivist approach to image comprehension that "placed new restrictions on a viewer who was, as one writer will describe, 'immobilized by the logic of the system'."[64] One can't help but be reminded again of the *studiolo*, which not only insists upon a particular viewing space and height within the central-point perspective-designed chamber, but which, with the closing of its entryway, traps and "immobilizes" the viewer inside the *studiolo*'s actual and virtual spaces themselves. What did the new visual logic of Alberti's treatise really change about spatial reception?

The Stereoscopic Regime

Martin Jay's "Scopic Regimes of Modernity," the first essay found in Hal Foster's 1988 landmark collection *Vision and Visuality*, explores this tension found between identifying visuality as modernity's single hegemonic sensorial mode, and identifying visuality instead as a "contested terrain" of competing sensorial modes. Jay prepares his argument by offering some of the history described above as "a rough consensus" on which most scholars of perspective can agree—for example, that "Brunelleschi is traditionally accorded the honor of being [linear perspective's] practical inventor or discoverer, while Alberti is almost universally acknowledged as its first theoretical interpreter."[65] He also leads with another well-established claim that linear perspective as a strategy for artistic representation emerges as a result of the Renaissance's profound and renewed interest in rays of light: "...light as *divine lux* rather than perceived *lumen*," he specifies. "... [L]inear perspective came to symbolize a harmony between the mathematical regularities in optics and God's will."[66] Cartesian perspectivalism, according to Jay, arrives on the scene as a sanctified religious and scientific achievement for representation—and, moreover, as a disruptive technology capable of blurring the boundary between the real and the virtual.

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[62] Friedberg, *The Virtual Window*, 1.
[63] Ibid.
[64] Ibid., 35.
[65] Foster, *Vision and Visuality*, 5.
[66] Ibid., 5–6.

This new "scopic regime" precipitated by the rise of linear perspective found itself in the twentieth century the subject of an extraordinary amount of scrutiny. Scholars including "Ivins, Panofsky, and Krautheimer to Edgerton, White, and Kubovy…" Jay writes, "have investigated virtually every aspect of the perspectivalist revolution, technical, aesthetic, psychological, religious, even economic and political."[67] Nevertheless, Jay proposes to question to what extent these accounts have often reduced a complex interchange of visual paradigms for one that only *appears* monolithic. Again, the *studiolo* registers as a perfect example of Jay's argument: a room allegedly built in such a way as to be viewed from a single point at first seems to court a monadic perspectival understanding (a perspective that, as above, "immobilizes" the viewer), but practical experience of the room—to which, once again, Demand and Kirkbride both testify—involves ebbs and flows of spatial reconfiguration: one moment the benches align, the next moment the cabinet doors swing open, and the next the benches collapse, all according to one's changing position in the room.

It's important here that the room doesn't itself change, but rather one's changing position in the room discursively redetermines the constitution of one's subjectivity within the room. When one moves while examining the intarsia panels the walls seem to shift in concert, reflecting the vocative relationship between subject and object that destabilizes the viewed environment and situates responsibility for the production of space within the viewer. When one remains still at the center of the room, on the other hand, one commits to being articulated by the space. But the reality of one's experience turns out to be somewhere in between, as to be received as "human" into the space (yes, a problematic qualification!) is to have both movement and stillness encoded into the relationship—a relationship which elicits both visual discordance and feelings of awe. The room arrests its viewer, but only for an instant, and then releases them to movement the next in a kind of alternating current of stereoscopic configuration of the subject.

In contrast with the broadly-scribed "scopic regime" of modern criticism, Jay proposes the more specific "baroque scopic regime," which—as he puts it—describes what "a long tradition of aesthetics called the sublime, in contrast to the beautiful, because of its yearning for a presence that can never be fulfilled."[68] By pointing out another more precise "scopic regime," Jay makes it possible for us to think of the *studiolo* as a signifier of a *third* scopic regime: a "stereoscopic regime" that could have influenced the visuo-cultural realm in parallel with the development of central-point perspective. Whereas central point perspective presumes a viewer to be spatially fixed (or, to use Crary's example, as reminiscent of one sitting within the *camera obscura* and passively receiving its images), the stereoscopic regime incorporates the same rapid binary flux that gives rise to the "living" quality of the *studiolo*. In the digital age one might experience this flux easily by quickly flipping between two similar photographs of a scene with some depth of field and a slight positional difference of the camera.[69] If the photographs were taken from points in space near each other under similar conditions, this action will simulate the depth of field which each two-dimensional image alone necessarily lacks. The stereoscopic regime exists wherever technologies of vision enable this *articulation of spatial difference* in order to produce "living" spaces, as observed in the *studiolo*.

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[67] Ibid., 5.
[68] Ibid., 18.
[69] "Boomerang," a popular app debuted by Instagram in 2015, owes to this effect its entire raison d'être; Apple's "Live Photos," available on the 2015 iPhone S6, takes short videos accompanying each photo, also introducing the stereoscopic regime into the quotidian process of taking pictures.

What other works from the renaissance might serve as examples of such early discursive ingresses made by the stereoscopic regime? While the *studioli* were among the first rooms to make a concerted effort to create a fully-enclosed, highly detailed, hermetic experience of an alternative spatiality, they were certainly not the only attempts. Andrea Mantegna's *Camera Degli Sposi*, commissioned and painted—like the *studioli*—in the mid-fifteenth century, falls into a tradition of work *di sotto in sù*, or "seen from below"—a strategy known since antiquity, but developed further in the *quattrocento*. The *Camera*, a wedding chamber in the Ducal Palace at Mantua made for Ludovico III Gonzaga's son, Francesco Gonzaga, completely surrounds the inhabitant of the room with scenic frescoes that achieve a high degree of perspectival realism. Like the *studioli*, the frescos deploy early central-point perspectival techniques in order to create a sense of spatiality that exceeds the room. Unlike the *studioli*, however, these frescoes foreground important narrative events in the lives of the family members for whom the room was commissioned, and thus forestall the same visual effect produced by the *studioli's* still, life-sized objects.

Another example of a work that reinforces the stereoscopic regime can be found in *The Dome of Sant'Ignazio*—which, painted in *trompe l'oeil* relief in the 1680s, sought to convey to its observer a sense of greater loftiness than was architecturally true of the building itself. For the illusion of the dome to be at its most convincing, one would stand on a particular marble disk that served to mark the optimal viewing location, and gaze upwards. The dome follows in the fashion of *di sotto in sù* frescoes, which were typically painted on ceilings to give an enclosed room a greater sense of loftiness, or otherwise an openness to the heavens. But it also falls within a then-relatively new tradition of *quadratura*, for which artists would add architectural elements into their frescoes to further blur the line between work and life.

It's once again important to note, Panofsky's "break" of the Dark Ages notwithstanding, that many of Jay's scopic regimes come tethered to ideological functions and premises—in this case, to religious discourses that are either explicitly expressed (as with the Catholic Church-inspired iconography in the *studioli*) or implicitly suggested (as represented by the more muted and, according to Jay, deeply faith-inspired gridded and conical trajectories of ink) in the diagrams of Alberti's *De Pictura*. Is it possible that the dominant visuo-structural paradigm of the last five hundred years is not, in fact, linear perspective, but religious iconography? That is to say: perhaps "the virtual" never in fact left its roots in religiosity behind, but rather remains to this day preternaturally wedded to a vernacular of faith.

One can easily observe the relationship between transcendentalist spatial expectations of the spiritual realm and new ways of registering public space in Western art. Take the well-known example of Perugino's "Christ Giving the Keys of the Kingdom to Saint Peter":

Figure 12: "Christ Giving the Keys of the Kingdom to Saint Peter," Pietro Perugino, 1481–1482.

This work, which can be found to one's right as one enters the Sistine Chapel, was painted between 1481 and 1483, demonstrating the extent to which Alberti's *De Pictura* had influenced Western artistic practice even just shy of fifty years following its publication. In the painting Christ can be seen giving the "keys to the kingdom of heaven" to Peter, who kneels before him. The most prominent "character" in the painting is, to wit, the gridded landscape, which stands in stark contrast with the detailed architectural monuments and dynamic figures populating the foreground and background.

What would this wide-open gridded landscape—this strange utopic landscape—have meant in the context of the rapidly-evolving stereoscopic regime of the Renaissance? If we are to think of works that create the illusion of additive spatiality as "producers of space," are we to also believe that viewers of such images felt a concomitant expansion in their own psycho-visual understandings of the space of the image? Does it read as an optimistic illustration of "possibility-spatialized," or as a more specific and ideologically-delimitated Kingdom of Heaven expanded through the use of artistic *techne* before the very eyes of the observer? Do the space's inhabitants appear lost or detached from the landscape? Does the grid function to liberate or enmesh? The answer to this last question, this argument suggests, is both.

However the image might have registered to its viewers at the time of its making, Perugino's painting would have unequivocally been taken to make explicit reference to its religious content. It's easy to see why "the production of virtual space" alluded to by the gridded foundation of the work would feel tied to religious idealism, especially given the work's assumption that we owe the very production of three-dimensional space itself *quite literally* to the figure at the center of the painting. Today one need not dig very far to see this same substratum of religiosity accompanying allusions to the Cartesian grid system in current fiction. What is the 1999 film *The Matrix*, to cite an obvious example, with its abounding green Cartesian grids, except a paean to saviorism and the supremacy of the afterlife? What is the grid from *Star Trek*'s Holodeck except reality's point of contrast with the boundless promise of the distant future?

It will behoove this project to examine more closely the distinctions it hopes to make between the virtual, the real, and the actual, and moreover identify how such distinctions came to be introduced into the conversation surrounding the long history of the virtual in the first place. For now, this study hopes to have shown that 1) the very idea of technologically-enabled immersive "virtual space" can be traced back to a very specific landmark of artistry constructed in Italy in the 1470s and 80s; that 2) "the virtual" expands out of (and also retains) fifteenth-

century ideological qualifications about the mythic origins of space and its creator; and 3) that a "stereographic regime" beginning in the 1400s helped to overthrow the static metaphor of the *camera obscura*, producing instead the conditions for the formulation of free subjects, meanwhile simultaneously providing for a new means of social oppression through novel forms of visuality.

CHAPTER 2: MAPPING AND NAVIGATING THE VIRTUAL

The Screensaver Metaphor: Breaking and Entering

The year is 1995: the screen flickers, revealing a new place. Though characterized by a low level of detail, and though we are compelled forward through the space's corridors by forces unseen, we are able to make out a few of this particular maze's qualities: red brick walls; gray cinderblock floors; sandy yellow ceilings; massive, silently roving rats; floating polygonal orbs; and here and there a wall painted with an image—the only image—of the earth: a low-resolution circle of blues and greens. If we could slow down to look at the image we might recognize it as of a globe made from LEGOs. The globe sits on a table, in the image, before a window through which is visible a tree against the evening sky.

Figure 13: Screencap from the Windows 95 Screensaver, "Windows 3D Maze."

The scene, carceral, yet, owing to the building blocks, "filled with creative potential," is only visible for a moment. We are compelled forward and turned upside-down. The gray cinderblock floor becomes the ceiling, the yellow ceiling the floor, and you are forced onwards. The pace tells us little of how we "feel" in the maze: does the mazegoer navigate its virtual corridors with assuredness, despite the space's capricious gravity, rodent infestation, and maddening homogeneity of the surroundings, or does the maze's occupant engage in a panicked, desperate, and futile rush through a universe without meaning and without end?

The above describes a virtual world so common in the mid- to late-'90s that it seemed to transgress upon all social spaces at once: it could be found in classrooms, studios, libraries, homes, and places of business across the developed world, proliferating and multiplying as an effect of the success of its maker, Microsoft Corporation. The "Windows Maze" screensaver, standard on all Windows 95 PCs, was designed to prevent phosphor burn-in in cathode ray tube and plasma monitors by exercising pixels uniformly across the screen's surface—or, to put it another way, by "keeping the screen's image in motion." While it was neither the first screensaver nor the most iconic from the 90s,[70] the Windows Maze performed its function doggedly: by keeping the perspective of the implicit subject ever-advancing, ushering the viewer

[70] The *After Dark* suite and its flying toasters should take this honor.

steadily through the brick-walled corridors, the computer protected its own visual apparatus—the monitor—from degradation. In a way, the fatigue that would inevitably come to affect the screen if it were to "hold still" is thereby transferred to the viewer, who internalizes the experience of running through the Bartleby-esque redbrick corridors alone.

This point bears restating: by translating the affective experience of running through a perspectival maze from the surface of the CRT monitor to the surface of a viewer's retinas, the monitor protects itself from harm while exhausting the eye's biological components and placing the human in a state of vigilance and attentiveness. One can imagine that many people growing up in places where computers had, by the mid-90s, become ubiquitous, will remember in a visceral way the pace of the maze-runner: brisk, but consistent; murine, maybe, but also tenacious. One is vaguely reminded of a feeling experienced when watching Ridley Scott's *Alien*, where Sigourney Weaver navigates dark passageways on the *Nostromo* under constant threat of the unknown.

The small irony of the "Windows Maze" name is of course that the maze contains only a single texture that signifies as a window, and it does so unconvincingly. The image above—the mural (for lack of a better term) of the globe sitting on a table before a "window"—given its low resolution and odd, static perspective, reads as an image textured over the brick wall. Even in a realm that begs one to reconsider the very nature of the image, the texture in question proves impossibly opaque, a "mere image" of a window behind which one will invariably find yet another impenetrable surface. In a way, the texture even seems to represent its own kind of screenic intervention into the unsettlingly Gothic maze: as the only wall to really come across as pixelated (the others are less ambitious in what they strive to resolve), it might be said to register as a "wall that becomes a screen," implying a narrative in which *signifiers of transparency*, rather than transparent objects themselves, predominate the virtual environment. If one were able to look closely enough at this image, after all, one would be able to read "OPEN GL" in the letters spilled on the table, identifying a popular vector graphics API that doubles both to emphasize the "openness" of the image (*OPEN* GL) and also pay tribute Microsoft's vision regarding the unlimited potential of 3D graphical processing. Finally, we understand the "globe" made from Legos on the table to resonate as a "made world." Who made it? Whoever is trapped in the maze, of course: "we did."

The maze as a form, generally speaking, presumes a space defined against two points: one of entrance and one of escape. In this way mazes are always "open," and when one enters into a maze one is also entering into a contract predicated on a beginning and on an ending. The form of the maze thus has spatial and temporal teloses: the end of a maze—sometimes an opening among lines on a sheet of paper, sometimes a gap in a row of hedges or corn stalks—defines the end of a spatial negotiation characterized by some level of complexity, relieving the mazegoer of a spatial obligation and allowing them to reflect on the experience as a unit—a journey that began with one's entrance into the maze and ended with one's completion of the maze. In the Windows maze, however, one experiences less a "point of entry" or "point of escape" than a "point of repetition" when the maze simply begins anew. Completion entails a renewal of the maze-process, and a space without escape. If the "window" texture does not act as a window and, as such, does not act as an escape, how does it act? What would a window to the outside look like in this virtual space, anyway? What would one see through it?

This does not mean, however, that there is no outside to the maze system, and that all kinds of "openness" must be expressed through lexical and visual representations of potential

space. At the screensaver's onset, if one watches closely, one sees that the viewer "begins" by standing on a wide—but critically non-infinite—plane, before walls emerge from the floor to enclose the viewer. At each "temporal" disturbance in the screensaver's performance (that is, if one either causes the screensaver to fail or, as happens sometimes, one completes the maze), there follows a "spatial" disturbance insofar as for a brief few seconds one can see the void in which the maze has populated itself.

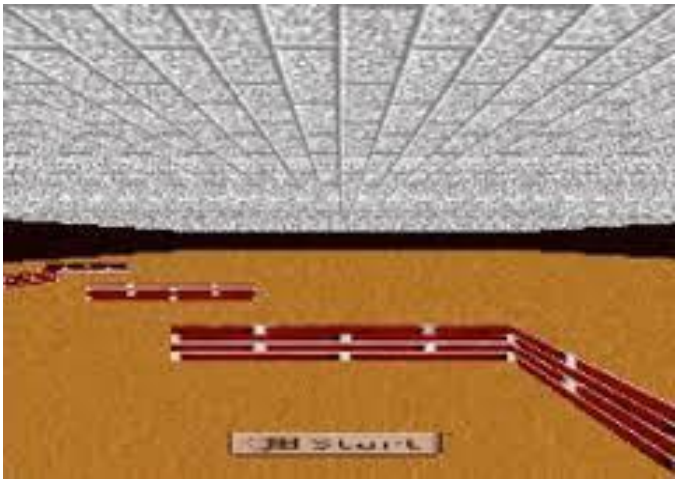

Figure 14: Screencap from the Windows 95 Screensaver, "Windows 3D Maze," as it self-populates.

How does this "void" remand our idea of the postmodern subject in relation to the other spaces she inhabits? How are narratives of "inside" and "outside" troubled by techniques of world-making, modding, game-breaking, glitching, and narratives that expose the player as player and the game as game? And what do the "seams" characteristic of virtual spaces tell us about postmodern virtual geographies?

The Windows 95 Maze serves as a perfect illustration of the frail edges of constructed worlds and the relationships between diegetic, extradiegetic, and intradiegetic moments that trouble the surfaces of screens around the turn of the twenty-first century. One drama of the screensaver is, for example, the fragility of its various simulations, and how easily those simulations shatter, revealing the "desktop," yet another virtual space, beneath. Another drama is the viewer's understanding of a propinquity between the screen-watcher's experience and the maze-runner's experience. In a way, the Windows 95 Maze speaks to an additional contrast highlighted in this chapter: the interplay of "distance," represented in the maze metaphor by the dark world in which the maze is spawned—and "confinement," represented by the narrowness of the maze's passages.

This interplay, a version of the stereoscopic regime of chapter 1, points to a boundary condition this thesis has called "virtual seams," or the borders that emerge between the virtual and the real, or between the static and the animated. The introduction to this project identifies a number of types of virtual spaces, among them "expansive" and "contractive" virtual spaces; the actual and the virtual. The Windows Maze is "real" but not "concrete," and so naturally must be virtual; it is expansive; the computer desktop contractive. They represent different "game spaces," with independent logics and means of navigation. The screensaver demands stillness of the body; the desktop demands motion; the screensaver prioritizes motion, the desktop, investigation. Yet there seems always to be a moment of transition between the above states in

which all characteristics switch places: this liminal moment—the instant in which one world is moribund while another is imminent, is a *virtual seam*.

One such moment of juxtaposition happens, in this example, when the computer both "sleeps" and "wakes up." If you're quick enough to take a screencap of the screensaver, you will see through its structure as its pieces assemble at its onset. At moments like these—that is, when the screensaver "resets" or first starts—one can see, from a variety of angles, that the maze-space only extends so far in a world of darkness, before it closes its occupant into itself. This is to say: the screensaver is programmed to start on a timer, but also to momentarily reveal its limited, closed, entrapping structure. If the world is free-floating, one realizes, it could just as easily be reorienting itself around the static user (as opposed to the user "walking through" it). The distinction, of course, is moot: when the body's sensorium lacks all senses but vision, exclusive movement of one object or another cannot be meaningfully discerned, and relativistically does not matter.

Indeed, in contemporary digital media rendering, the "virtual seams" often take place just beyond the human periphery. In a writeup on the making of 2017's digital game *Horizon Zero Dawn*, for example, Kotaku draws attention to some of the techniques used by game developers to "save memory" in order to provide a more detailed graphical experience to players. One of these techniques, called frustum culling and in use in most 3D games since the early 1980s, is to only render assets in a truncated field-of-view pyramid (the "frustum") that extends outwards from a character model's face. The effect, which can be seen in motion on the Kotaku website[71] demonstrates how a virtual world is created and destroyed around the periphery of human experience, revealing the void just beyond the simulation.

Figure 15: Frustum culling, evidenced by the blue area in the lower half of the image, removes graphical elements "behind" a player-character and out of their visual range.

Though frustum culling has been in use by developers for decades, the gif from which this still was taken found itself trending on reddit in April 2017, with some of the most upvoted comments drawing parallels with our broader experience of the world. One redditer writes, "Now prove that isn't what happens in real life." Another chimes in: "now i'm gonna be anxious every time i walk backwards in these games, knowing the void is always just behind me."[72] Indeed, as this document has deigned to show, the existence of information outside our individual sensorium has been an epistemological problem for centuries. Our "frustum of

[71] Schreier, "Horizon Zero Dawn Uses All Sorts Of Clever Tricks To Look So Good."
[72] "R/Gaming - Here's What's Happening in Horizon." (Accessed August 16, 2019)

intelligibility," moreover, does not simply "cut off"—it has a periphery: information to which we're only liminally exposed. What happens where different kinds of spaces—virtual and actual spaces, known and unknown spaces, expansive and contractive spaces—meet? Far from understanding these moments as mere sites of disorientation, this thesis argues such moments of transition, often characterized as exclusive to the postmodern era, have in fact defined human experience for centuries.

Figure 16: "Videogames World Map," illustrated by Edison Yan for the 2015 D.I.C.E Awards, combines 100 digital "virtual worlds" created between 1980 and 2015 into a single cartographic representation of virtual space.

If chapter 1 explored the extent to which a rejuvenated fascination in "rays of light" as a classical illustration of divine presence, and a simultaneous reinvestment in the virtual-idealism of antiquity, provided the foundation and impetus for the technical development of linear perspective by Brunelleschi and Alberti in the mid-fifteenth century, then chapter 2 strives to show how virtual spaces have come to populate and—in many cases—preclude the world, paying specific attention to our own efforts to map virtual spaces cartographically.

"The world" is a problematic term, of course: how do we differentiate between and among worlds, and what even constitutes a "world" apart from other spatial categories, like "domain," "community," "realm," or "environment." In the early 1630s, Descartes describes what he calls the "actual world," which is filled at every point with matter, by contrasting it with an "imaginary" world of his own creation, subordinating the virtual to the actual. In 1697, Leibniz calls the world "the collection of finite things," and "the plurality of things… which have shown not to be metaphysically necessary,[73] and argues that "space is nothing other than an order of the existence of things observed in their simultaneity."[74] If "actual space" is simply an ordering of things, what is "virtual space"? An ordering of "virtual things"? And while Leibniz is well known for postulating an infinite number of "possible worlds," or worlds that might have been generated by an all-powerful deity, he is careful to coronate his own (and presumably our own) experiential reality as the "best of all possible worlds."[75] Though other worlds may "exist," insofar as categorical possibilities exist, according to Leibniz, it is only our own that has been spatialized and filled with matter that we perceive with our senses.

The stereoscopic regime, however, overturns the notion that space is flatly interpreted by the mind's eye, and enumerates a great variety of experiences we might mistakenly classify as "real," or beyond what has been generated by "nature"—much in the way we might temporarily classify a dream as real. One might experience this qualitative difference with the following

[73] Leibniz, "The Ultimate Origin of Things," 2.
[74] Northrop, "Leibniz's Theory of Space," 433–34.
[75] Leibniz, *Theodicy*, 151.

experiment: challenge a person uncomfortable with the idea of heights, if they are able, to (1) observe a photograph taken from a perspective of height; (2) watch a clip from James Marsh's 2008 *Man On Wire*; (3) play a level of Senta Jakobsen's 2008 skyscraper free running game *Mirror's Edge*; and, at last, (4) explore *Dreamdeck*, an immersive virtual heights simulator, on the Oculus Rift VR headset.

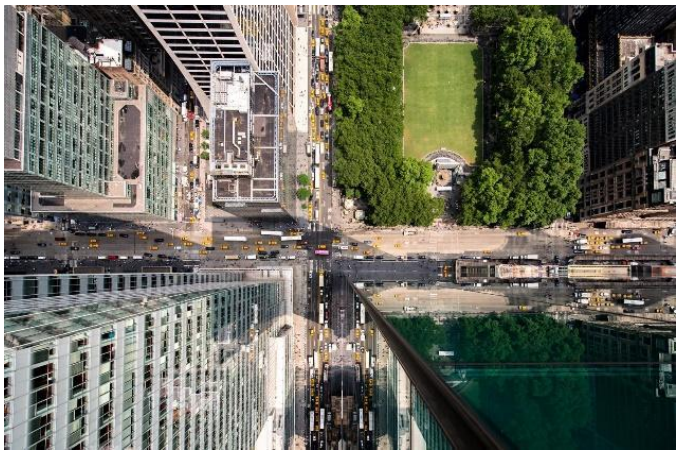

Figure 17: "Looking straight down on 6th Ave and 42nd St from a 600ft skyscraper," a photograph by Navid Baraty.

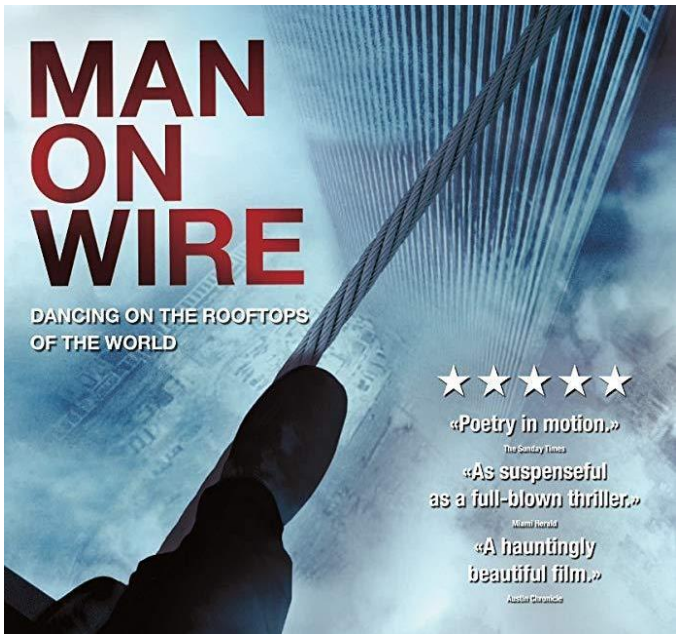

Figure 18: The title image for Marsh's 2008 film Man On Wire.

Figure 19: A screen capture from Jakobsen's 2008 game Mirror's Edge.

Figure 20: A screen capture from Oculus Rift's "Dreamdeck" scene from their 2016 product demonstration reel.

What such an experiment illustrates extends beyond the mere fact that the eye is easy to fool. Indeed, that psychosomatic responses can be induced through visual illusions has been demonstrated for hundreds of years, as discussed in chapter 1. The legend of the Lumière brothers' first film additionally comes to mind—that an audience of moviegoers fled in mortal terror from the first film of a moving train projected onto a screen. And while Martin Loiperdinger shows in 2004 that this exaggeration would have surely been the work of sensationalist journalism, and not part of the historical record,[76] it's not a challenging leap to believe that the more closely technologies of vision approximate the norms of human eyesight, the more moved, disturbed, or simply persuaded an observer might be by the experience. While the first and second of the above four-part experiment will likely cause unease, the third, more potent as a result of transference between avatar and player, will, at least for individuals sensitive to heights, "turn a stomach"; and the fourth (according to more than one account) might even reduce some "to their hands and knees."[77]

Chapter 4 explores the bodily effects of virtual space on the human frame in greater depth, but it is important to note at this point that twenty-first-century life is a hypertext of virtual realities: we hop from display to display, psychically embedding ourselves in alternative worlds with their own systems of governance and comprehension—their own scopic regimes—and yet we still, for the time being, resume ourselves to the "actual world" of cartesian properties and material forms to take anchor.

[76] Loiperdinger and Elzer, "Lumiere's Arrival of the Train."
[77] UK, "The New Oculus Rift 'Dreamdeck' Demo Is so Good It Literally Had Me on My Hands and Knees."

Nevertheless, "the virtual," running parallel with the actual on so many axes, *expands relentlessly*. It was once argued that "speed"—technologically precipitated by the steam engine, combustion engine, jet engine—would be the end of the human. Writes Paul Virilio: "The instantaneity of ubiquity results in the atopia of a singular interface. After the spatial and temporal distances, speed distance obliterates the notion of physical dimension."[78] The "volume" of virtual space permeates a diminishing sphere of actuality, quite literally, at light speed: how does the figure of the human adapt?

One possible answer is that "the human" expands to accommodate these novel spatialities. When confronted with new volumes of space and new technologies by which to arrive at those spaces, humans have historically set out to occupy those new domains. "When people move from one country to another," Edward Castronova writes in *Exodus to the Virtual World*, "both countries change." He continues: "In 1893, historian Frederick Jackson Turner wrote that the closing of the American frontier changed the country forever. The reopening will be just as dramatic."[79] Does the human impel the expansion of virtual space, or does the expansion of virtual space *draw in* the human—like a balloon climbing into a rarefied atmosphere, expanding as if to try and fill the new space?

This chapter continues to examine strategies of representing three-dimensional space that have evolved to account for the exponential increase in "volume" of virtual space generated each day. How does one even begin to measure the "amount" of virtual space available to prospective denizens?

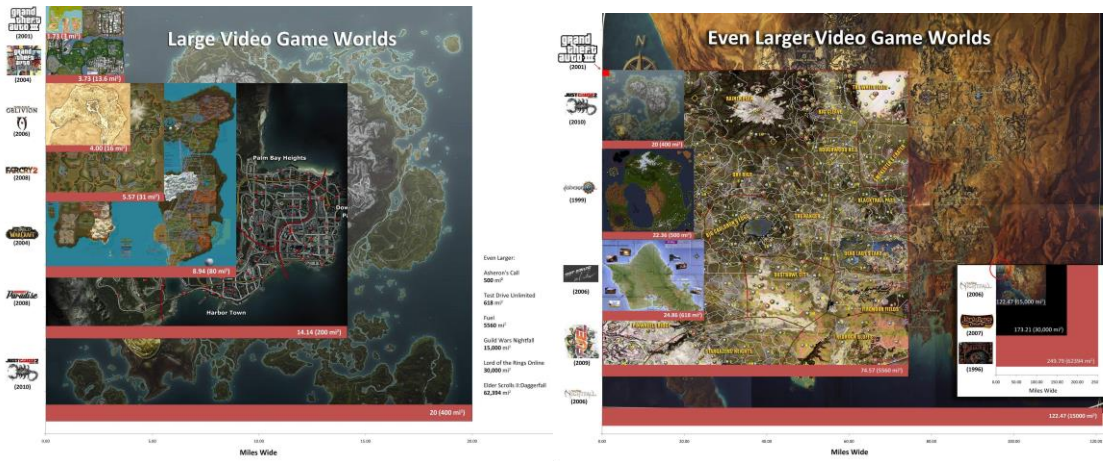

Figure 21: Illustration of expansion of spatialized virtual environments, in units of total square mileage, between 2003 and 2010 in selected "open world games."

What about square mileage? "Normative" virtual spaces—i.e. those that simulate human ambulatory experience in world-like digital environments, allowing avatars to walk, run, or drive from location to location across digital terrain—might be measurable in square miles from a game development standpoint. Note that this is a subset of games, which are themselves a subset of virtual environments. But square mileage seems to make sense as a starting point: what better way to map Euclidean space, even if it is digital Euclidean space, than with a two-dimensional topographical map?

[78] Virilio, *The Paul Virilio Reader*, 91.
[79] Castronova, *Exodus to the Virtual World*, 14–15.

The above comparative size analysis of thirteen virtual spaces demonstrates both the transference of typical cartographic conventions when it comes to mapping digital environments, and also the volumetric increase in virtual space over time. The smallest space listed, *Grand Theft Auto III*'s "Liberty City" (2001) rings in at approximately three miles^2. Liberty City, while not the first open-world game environment, drew acclaim for the size of its explorable space, and also ire for the kinds of delinquent behaviors permissible within its borders, lending another dimension to the phrase "open world." Walking one's avatar end-to-end on land, just over a mile nominally, takes around fourteen minutes.[80] In contrast, *Grand Theft Auto III: San Andreas* (2004), with its more serpentine streets, takes approximately an hour and a half to cross its 13.6 miles^2, while *Grand Theft Auto V* (2013, not included in the above illustrations) will take over two hours to walk its 49 miles^2 end-to-end.

These impressive and detailed virtual spaces, to state the obvious, don't just constitute straight lines, either, but use buildings, mountains, valleys, radio towers, and helicopters to exploit the verticality of these open worlds. And these virtual environments don't even come close to holding any titles vis-à-vis most virtual real estate. *Daggerfall*, the largest digital environment illustrated above, took one player **over 69 hours** to trundle across the whole thing.[81] And this is to say nothing of Minecraft's 60,000 km^2 of "buildable" space (bigger, indeed, than Neptune), or EVE Online's *155 sextillion miles^2* of putatively accessible playable space (equal to about 1/100th the diameter of our own observable universe)—an incomprehensible amount of walking, to say the least.

These largest virtual worlds complicate processes of measuring virtual space. Size in such environments is in many respects a property of one's speed: if an avatar is jogging, sprinting, driving, or flying, or if they break the rules of the game using cheats or glitches, the space becomes smaller, even to the point of insignificance. Open world games, moreover, aren't the only kinds of virtual spaces, and many virtual spaces cannot be negotiated "on foot," further complicating efforts at this sort of quantitative analysis.

[80] One relatively recent response to open world games has been for users to take "walks" from one end of the environment to the other—a virtual *dérive*, if you will. This has, in recent years, morphed from an activity of world appreciation to one of physical and psychological endurance as virtual spaces have grown ever larger. See the above example at: https://www.youtube.com/watch?v=gjUg8Z56D7I accessed 9/25/2018

[81] https://www.youtube.com/watch?v=A2mM0PqY4Sk accessed 9/25/2018

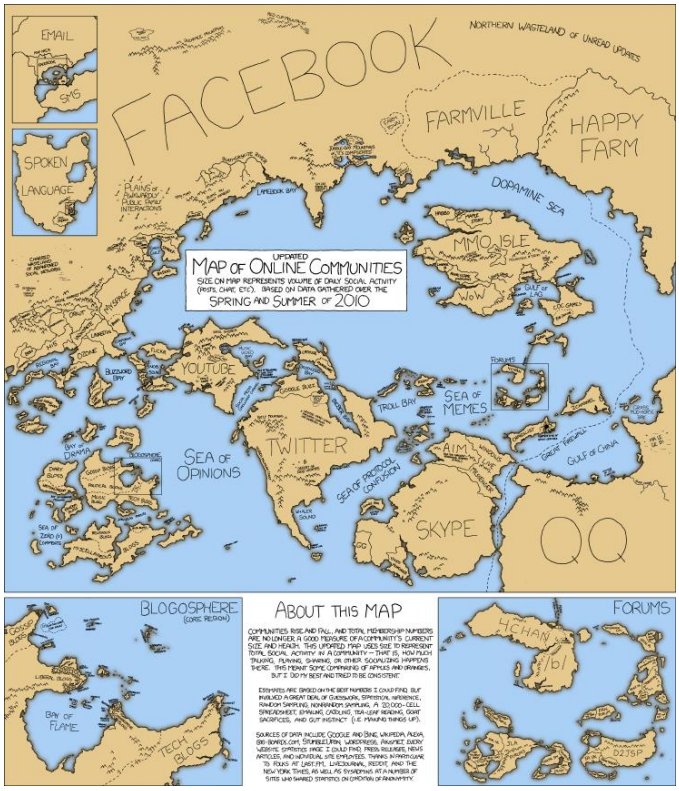

Figure 22: "Online Communities 2," a map of virtual spaces by webcomic artist XKCD.

How can more abstractly defined online communities be understood spatially? In 2010, webcomic artist Randall Munroe (of XKCD fame) set about to "map" online communities as if they were land masses and bodies of water on a fictional planet. "This updated map," he writes in his description, "uses size to represent total social activity in a community—that is, how much talking, playing, sharing, or other socializing happens there." Like any representation, Munroe's map makes choices in the service of legibility, with perhaps the most obvious being that "virtual spaces" have no geographies—or at least, not in the same way that nation states, for example, have geographies. The Internet, where all of the included spaces reside, exists in a global distribution of servers, or even more abstractly as an ever-changing configuration of electrons strewn among countless transistors.[82]

And yet somehow we as users know when we're "in" a virtual space; or maybe it occurs to us upon our reemergence into actuality. When we're engrossed in a TV miniseries, for example, or playing a game on social media, or messaging coworkers in a Slack channel—with "in" and "channel" being the operative spatial signifiers here—we enter into participatory compacts where our actions and understandings take place within the circumstances and

[82] According to Russell Seitz, Senior Research Fellow at The Climate Institute, the total combined weight of all of the electrons that comprise the Internet in 2011 might have come in at around 50 grams—or the heft of a large strawberry.

conditions of the virtual space. Reminiscent of Jonah Huizinga's 1938 theory of the "magic circle," virtual spaces delimit social experiences by virtue of their narrative isolation—not just by function of their physical square bounding boxes—and can therefore help to compartmentalize lived experience more narrowly. The magic circle, for Huizinga, produces "temporary worlds within the ordinary world, dedicated to the performance of an act apart."[83] This compartmentalization of worlds can produce "worlds" in parallel: a game of chess played alongside a game of billiards, for example. Or they can exist in series. In order to play Pazaak, a card game developed specifically for inclusion in BioWare's 2003 digital role-playing game *Star Wars: Knights of the Old Republic*, for example, one must progress through the narrative arc of the "shell game" for several hours. After this time, one will finally arrive at the cantina, and will only then be able to sit down at a table and engage in a game of cards structurally dissimilar from all preceding moments in the run-and-gun game.

Compartmentalization of worlds, with their own communities, logics, rules, and subworlds, be they parallel or nested, will help subjects keep track of the rules and norms that govern individual social situations and platforms. Migrating from Facebook to LinkedIn, much like moving from one's own house to one's place of employment, will entail changes to one's overall demeanor, one's expectations of the services provided by others, and understandings of what is possible and impossible given the dialectical constraints of society, and the non-dialectical constraints of physics. Disruption of this compartmentalization, however, can conversely mean the exclusion or neglect of worldspace inhabited by our corporeal bodies—which, in extreme cases, can threaten the health and wellbeing of those involved.[84]

Munroe's map, which zooms in on social media sites in the broader context of "spoken language" (or "language" more inclusively) is easy to lose oneself in, so to speak, and though it requires a high level of digital literacy to fully unpack, even the infrequent occupant of virtual spaces will get the idea that online communities are expansive, dynamic, and nuanced sites of social engagement. But what's so interesting about this example for our current study is that this image presents the metaphor of the map as conceit for navigating virtual space as "intuitive": how else should one map the virtual than by recourse to how we map the real: two-dimensionally, with sacrifices to verisimilitude in the service of legibility, and with a "key" that describes what exactly is transpiring in the map?

But virtual space is not reducible to physical space: does Munroe make his map of the virtual world reminiscent of physical cartography due to a failure of the imagination? No, obviously not. Or at least, this is the wrong question. "Mapping" isn't actually about the production of verisimilitudinous spaces, or spaces that are like real spaces, per-se, but rather about the production of logics and knowledges that attest to and consolidate the lived-real—and which also emerge from the lived-real. David Turnbull puts it well in *Masons, Tricksters, and Cartographers* when he writes that the question "what is a map?" is hard to answer because

[83] Huizinga, *Homo Ludens*, 10.

[84] Dozens of deaths following prolonged gaming sessions have been recorded since the 80s. Additionally we might remember the especially disturbing 2010 case of the couple so engaged in raising a virtual child online, that they allowed their real infant to starve. https://www.vice.com/en_us/article/4w5g7d/gaming-in-virtual-reality-could-be-the-very-real-death-of-you-911 (Accessed August 16, 2019).

> ...maps are the paradigmatic examples of the kind of spatial knowledge that is produced in the knowledge space we inhabit. Not only do we create spaces by linking people, practices and places, thus enabling knowledge to be produced, we also assemble the diverse elements of knowledge by spatial means.[85]

Maps, even those produced by satellites, lidar, and advanced imaging in the twenty-first century, arrive with implicit temporal and local understandings of space and time, metrics of accuracy, attention or inattention to detail and subject, often as a very immutable function of the moment of reduction that begets the map in the first place; they are subject to and products of the very scopic regimes that affect our vision itself. In Munroe's map we read the centrality of some virtual spaces against the marginality of others; the selection of "seas" versus "lands" for the various domains; the "limits of knowledge" that accompany either the confinement or lack thereof of any particular entity within the map's borders. We see likenesses between and among other maps with which we are already familiar. We zoom in on some section, but not others; borders are emphasized, but topography is limited (though not absent). Stepping back, we notice that even mere attentiveness to "the virtual" in this exact respect is not something that could have happened in the same way forty years ago, before megalithic companies like Facebook and Google occupied any virtual territory at all. The lands themselves register as relatively uncharted, but the map function itself draws from deeply rooted scopic regimes that implicitly emphasize territoriality, dominion, and colonial desire.

The map communicates time, place, and import not only of its subject, but of both its making and maker as well. "The bay of grammar pedantry," for example, while not overtly temporally confined, has a self-conscious ring to it, and smacks of an author familiar with YouTube comment sections and reddit threads. The peninsula of "SarahPalinUSA," on the other hand, which hovers just north of a small island labeled "Russia (LJ)," hearkens to a very specific moment in US political history. These virtual spaces—the first, Sarah Palin's twitter handle, the second, LiveJournal, which had recently been sold to a Russian media company—are called out not only because they occupied virtual space in 2010, but because political satire figures heavily in this particular webcomic's oeuvre, and a joke about Palin's being able to "see Russia from [her] house," while necessarily oft-trotted-out, pairs well with the author's left-leaning ideological alignment and reader base.

2019, eight years removed from the production of this particular map, would see a staggeringly different landscape unfold in Munroe's geography—and not just because the technological world is different, but because *Munroe* is nine years different as well. We should not think of this as a limitation of the cartographic genre for representing space, however, but as a qualifying feature of the map. Maps illustrate, define, and reproduce power relations in space; but they do not "simulate" space. Simulation, in contrast, "threatens the difference between the 'true' and the 'false,' the 'real' and the 'imaginary'"[86]; or, in Sherry Turkle's words, "simulations want, even demand, immersion."[87] Maps don't seek immersion: if anything they seek interpretation—or, even better, concession. They want to be followed to their limits, and to be expanded upon in the service of the domains they chart.

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[85] Turnbull, *Masons, Tricksters and Cartographers*, 91.
[86] Baudrillard, *Simulacra and Simulation*, 4.
[87] Turkle et al., *Simulation and Its Discontents*, 6.

We don't need to examine the entire history of mapmaking to illustrate this point, but a key historical example will be illuminating here:

Figure 23: Juan de la Cosa's mappa mundi, *1500.*

The above map, painted by Juan de la Cosa in 1500, represents the earliest surviving depiction of the "new world" by an eyewitness to its shores. De la Cosa, as captain and partial owner of the *Santa María*, was present for at least the first two voyages of Christopher Columbus to the Americas, and set down the above map between crossings.

While it might feel somehow unseemly to contrast de la Cosa's richly historical map with Munroe's send-up-slash-quasi-analysis of virtual space, it's worth noting that both bear the signatures of traditional cartographic representation: prominent borders; descriptive labels; and margins that frame their authors' regions of expertise. De la Cosa's map, we should note, according to Dr. Pauline Moffit Watts in her chapter "The European Religious Worldview and Its Influence on Mapping," "is in fact dominated by an oversized iconic figure of Columbus bearing the Christ child across a turbulent river."[88] De la Cosa's map reads as an especially clear example of how early *mappa mundi* naturally conflated the physical and the virtual, often in the service of colonialism. Not only would this map be useful for "pioneers" tacking their way towards the shores of the Americas, whose resources and people, Columbus argued in letters published on his return to Lisbon, were "ripe for conversion" (i.e. colonization and enslavement); but it would overlay the "virtual utopic space" inhabited by Christ across the actual land masses present in the western hemisphere, producing a "religio-virtual space" for the public's new-world-imaginary.

In his letter to Doña Juana de Torres in 1500, Columbus, as if to illustrate this point, references several times a passage from Revelations 21:1, which reads: "Then I saw a new heaven and a new earth, for the first heaven and the first earth had vanished, and there was no longer any sea."[89] Columbus firmly believed that it was his divine mission to help bring about the end of the world (which he mathematically derived in 1501 as having 155 years remaining to it) through conversion. Accordingly, Watts writes: "Of paramount importance to Columbus was

[88] *The History of Cartography, Volume 3*, 387.
[89] Rev 21:1 (NRSV)

the recovery of the Holy Land and the evangelization and conversion of all heathen peoples."[90] The Holy Land, as if by virtue of its unknownness, acted as "new heaven and new earth" in order to countervail the known-space of Europe with the "virtual" space of the uncolonized West.

Later in the letter to Torres, written (notably) during his return to Spain as a prisoner, he explores his motives: "... and to alleviate in some measure the sorrows which death[91] had caused [Queen Isabella], I undertook a fresh voyage to the new heaven and earth which up to that time had remained hidden…"[92] Columbus' self-aggrandizement notwithstanding, we can read into his reference the obvious allusion to the Americas as a "virtual space" at once utopic, dystopic, and capable of exceeding and overwhelming the "real space" of his origin. How better for Columbus to explain his malfeasances in the colonies except through the delegitimization of (or the "virtualization" of) the new space he had found. How could King Ferdinand and Queen Isabella expect the same rules to apply in the "new heaven and earth"?

One might remember, in light of Columbus' "new heaven and earth," the end of e e cummings' poem, "pity this busy monster, manunkind":

> ...We doctors know
>
> > a hopeless case if — listen: there's a hell
> > of a good universe next door; let's go

The exigencies of exploration seem forever and intractably linked with dissatisfaction with actuality; the same must be said for worlds both actual and virtual.

The Americas are twofold virtual spaces: they exist, for Columbus and the other conquistadors, as "actual" spaces capable of absorbing relentless psychosomatic displacement of the horrors of everyday life; but they are also signifiers of pure potential, denoted as such by troubled borders on the maps they draw. Like the *studioli*, which were still in their infancy in 1500, such maps elided the nuanced suffering of the fifteenth and sixteenth centuries, instead emphasizing the future in all of its anticipatory richness. This "richness" is, needless to say, spiritual as well as material in nature—Columbus inquired about gold on every island where he set foot—but this, too, seems to register as a kind of utopianism characteristic of colonial hegemony, where every undiscovered city is the city of gold.

Both maps then, it seems, depict "virtual spaces," Munroe's as a meditation on the expansive "wilderness" of the Internet, and de la Cosa's as a meditation on the expansive wilderness of the so-called New World. But simultaneously the maps themselves also both behave as virtual spaces in which one might become immersed. The map as a figure *compresses* "the real" for purposes of both utility and ideological transfer, and by doing so prevails upon its reader that space can be infinitely nested in progressively smaller and smaller units of abstraction. The map is therefore one of the strongest examples of "compressive virtual spaces," outlined in the taxonomy described in the above introduction.

Munroe's map does not necessarily betray the same level of insights into the author's hopes and values—it is, after all, a very different kind of "virtual space" than the *studioli*, insofar as it captivates its reader's imagination without recourse to either a physical built environment or

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[90] *The History of Cartography, Volume 3*, 386.
[91] The death of Queen Isabella's infant son, Prince John, in 1497.
[92] Thacher, *Christopher Columbus*, 431.

a stereoscopic virtual display. Satire, moreover, eludes interpretation *by definition*. Only a very small portion of the landmasses Munroe includes represent virtual spaces directly comparable to the *studioli* (he couches these spaces in "MMO Isle" in the upper right), and, though he's an especially prescient thinker, and no doubt conceptually aware of virtual reality, he could probably not have anticipated with perfect clarity its commercial revival in 2012.

Following chapter One, we might try to characterize "virtual space" as it emerges from the Renaissance as being defined by its effort towards the "immersiveness" of representation (often vis-à-vis the deployment of Euclidean geometry and central-point perspective) while still striving for an element of transcendence, supplied both by the flux in the space's own contents and illusionistic properties, and also by the subjects selected for representation: in the case of the *studioli*, instruments of science, music, art, and religiosity.

The first chapter also argued, moreover, that this first fully-immersive, room-sized artifact sought to elicit "virtual space" as both as an aspirational reference to Platonic idealism, and a technologically advanced means of social control through the visuospatial destabilization of otherwise common architectural environments: the six walls of the room fold in and out according to how one orients oneself within the space; the open cabinets and benches, apparently shifting all in their own right, identify the viewer and the viewer's eye as responsible for the mental articulation of the space, and also gesture to the powers held by the owner of the room over space itself—for if the Duke of Urbino is able to control the very metrics of space, then he must also be able to control those individuals inhabiting that space.

These conditions, in turn, gave rise to what I have called the "stereoscopic regime," which builds upon the other scopic regimes proposed by Martin Jay in "Scopic Regimes of Modernity" to highlight the nuanced distinction between monocular and binocular perceptions of illusionistic spaces. By virtue of the stereoscopic regime, Brunelleschi's two-dimensional representation of three-dimensionality, ground-breaking in their own right, could once again be expanded back outwards with the deployment of "immersive" architectural and ocular technologies. Stereoscopic spaces furthermore challenged the eye—or, more accurately, the eyes—and reinforced the endemic instability between the real and one's perception thereof that would come to characterize postmodernity centuries later. Indeed, each eye independently receives an image of the world; but when we take them together, we not only introduce "difference" into the space between them, but make room for time and technology as well.

Over the following centuries the fetishization of likeness in Europe would advance at a feverish pace, eventually arriving in many guises, including, to name a few examples: Robert Barker's "panorama"—another room-sized corollary to the *studiolo*, also created in Italy, in 1789; the "diorama," a building-sized simulation of three-dimensional landscapes, patented and developed by Daguerre 1822[93]; and the explosion of photography in the mid-nineteenth century, which upended representation as we know it.

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[93] In "Technologies of Nature: The Natural History Diorama and the Preserve of Environmental Consciousness" Bryan Rasmussen describes the diorama as a "full-body experience" in a "purpose-built building" where "landscapes were painted on transparent linen, which allowed for a combination of translucency and opacity that could be manipulated through lighting delivered from behind and above. Using pulleys and weights, colored translucent screens could be interposed between the scene and the natural light to imitate effects from sunshine to fog. Paintings were recessed in a long tunnel that cropped the margins, giving viewers the sense of *looking through a window onto faraway places*" (Rasmussen, "Technologies of Nature." 258, *My italics.*). He also cites *L. J. M. Daguerre: The History of the Diorama and the Daguerreotype*, wherein Helmut and Alison Gernsheim describe the

From the Virtual to the Hyperreal

Just as the definition of "the virtual" changed slowly but dramatically over the five centuries following the *quattrocento*, so too did the notion of space itself: great migrations toward cities, rapid advancements in technological achievements on both macro and micro scales, the interplay of novel communication technologies, and the geopolitical reorganization of power and government are just a few categories of social change that affected the way space was perceived following the Renaissance and throughout the industrial revolution.

One text that seems to effortlessly unite a variety of common themes across the mapping of virtual space—and which incidentally remains one of the most frequently-invoked literary explorations of the virtual in the last sixty years—is Borges' "On Exactitude in Science," a short prose piece that owes at least some of its notoriety to Baudrillard's treatment of the text in his chapter "The Precession of Simulacra" in *Simulacra and Simulation.* Baudrillard uses the piece to ask and answer a number of questions regarding representation—especially representation in postmodernity: does reproduction always entail loss? How do we characterize what is lost in the absence of reference to the real? What distinguishes a space from its map, and what is the function of a map when the space does not exist? Who controls the means of reproduction, and what understandings, confusions, biases, and laws come built-into facsimiles as we know them? "Today abstraction is no longer that of the map, the double, the mirror, or the concept," he writes. "… It is the generation by models of a real without origin or reality: a hyperreal."[94]

Borges' text, more salient each year with the digitization of all worldly products and institutions, tells the story of the Cartographers Guilds of 1658, the members of which prepare a map with a one-to-one correspondence to the empire; the map, useless in its verisimilitude, soon falls to ruin. "In the Deserts of the West, still today," the story's fictional author Suarez Miranda writes, "there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography."[95] According to Baudrillard, we live on this map—the simulacrum, or the hyperreal—and what we once called "the real" has long disappeared, with the irony being of course that the "relic" of the disciplines of geography is none other than space itself: the map on which we animals and beggars are yet sustained.

This is the very reason the Borgesian map of infinite verisimilitude deteriorates on its completion: the short story reminds us that maps are representations, *not* replications, and a map that replicates space to such an extent that it becomes "livable" is not a map at all, but a "simulation"—or, indeed, a "virtual space." To put it another way: virtual spaces are maps of the real that become inhabitable, as they conspire to wrap around us into three-dimensionality, and must be redefined accordingly as "virtual spaces." But what is "inhabitability," and what conditions must be upheld for a space to be inhabitable? Does "mental-space" suffice in this regard? Do fictive spaces sustain us?

The tone Baudrillard establishes regarding representation in modernity—much like the tone established by so many other French philosophers in the twentieth century—registers as nothing less than apocalyptic: "Gone even the Borgesian Utopia," he writes,

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experience: "Placed in semi-darkness, and at the center of a circular painting illuminated from above and embracing a continuous view of an entire region, the spectator *lost all judgment of distance and space*" (Gernsheim, *L. J. M. Daguerre*, 6. *My emphasis.*)

[94] Baudrillard, *Simulacra and Simulation*, 1.

[95] Borges, *Collected Fictions*, 325.

> …of the map coextensive with the territory and doubling it in its entirety: today the simulacrum no longer goes by way of the double and of duplication, but by way of genetic miniaturization. End of representation and implosion, there also, of the whole space in an infinitesimal memory, which forgets nothing, and which belongs to no one. Simulation of an immanent, increasingly dense, irreversible order, one that is potentially saturated and that will never again witness the liberating explosion.[96]

By "the whole space in an infinitesimal memory, which forgets nothing," Baudrillard is referring to the Internet, and what it might take to map a space of near infinitesimalitude. How does one map "the whole space in an infinitesimal memory"?

As luck would have it, Munroe made another, earlier attempt at a map of virtual space:

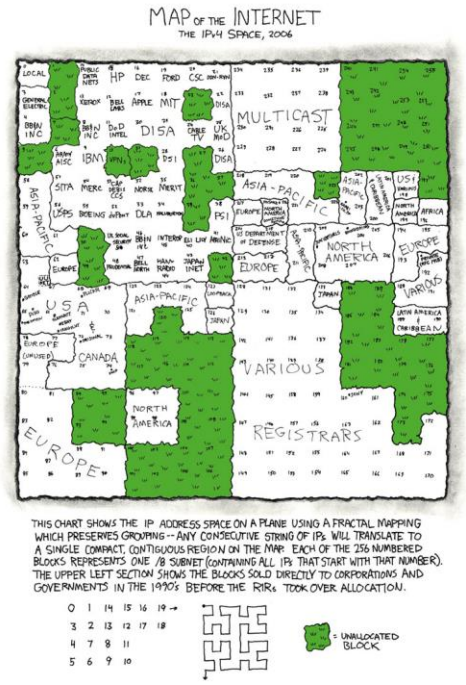

Figure 24: "Map of the Internet: the IPv4 Space, 2006" by Randall Munroe.

Gone here are *most* of the trappings of the canonical geographical map that he renders in his latter attempt, though we interestingly have a grass texture for "unallocated space" (or "empty lots," writ spatially), a "key" as a common practice towards legibility, and the rumpled borders of a well-used piece of parchment. This alternative representation of cyberspace illustrates the allocation of IP addresses in 2006, and is yet another way of "spatializing" the almost literally spaceless. Is it mimetic? Yes and no: the grass simulates "plots"; the lattice structure alludes to the microscopic organization of transistors.

Baudrillard is not charitable when it comes to the idea of mapping this infinitesimilitude: in the above excerpt words like "end," "implosion," "nothing," "no one," "irreversible," "never

[96] Baudrillard, *Simulacra and Simulation*, 71.

again," and "explosion," seem to disclose Baudrillard's concerns that representation itself is under threat, and that the rise of "virtual representations" have led to some kind of negation or ending. What would Baudrillard have made of the *studioli*? Are they simply carefully-rendered three-dimensional simulacra, or, by virtue of their pretense towards function, early simulations of lived-spaces (with their carelessly left-ajar cabinets)? Representation "stems from the principle of the equivalence of the sign and of the real (even if this equivalence is utopian...)" he writes; "Simulation, on the contrary, stems from the utopia of the principle of equivalence, *from the radical negation of the sign as value*, from the sign as the reversion and death sentence of every reference."[97] Within the order of simulacra, do we call the *studioli* a "reflection of profound reality," or do they "mask and denature a profound reality"? Do they mask "the *absence* of a profound reality" or have no relation to any reality whatsoever?

It is difficult to know for certain, as there are few documents accounting for how exactly individuals entering the room would have responded to its level of detail and the novelty of its design. To what extent would the *studioli*'s interlocutors have been "fooled" by the intarsia paneling? One's sense here is that *simulation*, which for Baudrillard entails mechanization, process, or "movement," might register as a stretch—and yet, as far as simulation goes, the room does at least *intimate* at "threaten[ing] the difference between the 'true' and the 'false,' the 'real' and the 'imaginary.'" One's suspicion is that, not as a simulation but as a simulacrum, the room at the very least "masked and denatured" the profound reality of the space in which it was installed: a cold, drafty, stone chamber of the meagerest comfort, and made bearable with dissimulation the ultimate truth of the *quattrocento*: that corporeal satisfaction was fleeting, and that nature remained ever inimical to human grasping at comfort.

One's sense is that Baudrillard's hyperreality, unlike what we have thus far called "the virtual," *depended* upon the advent of perspectivalism, but took centuries—at least until the manifestation of the photograph in the nineteenth century—to witness the next evolution of virtual space: the photographic index. And there is perhaps no more nuanced thinker on the effects of the photograph, a "virtual window," to be sure, than Walter Benjamin.

Photography, or Representing the Real at the Turn of the Twentieth Century

Representation takes many forms, and while it wouldn't be precise to elide the nouns "representation" and "map," they do seem to share some core features. Chapter 2 has discussed the "map" as, at first, representing the real as a form of utility, only to eventually inform the real, bound the real, and exceed the real. Chapter 1 similarly discussed one particular kind of representation and how the beliefs and advancements of Brunelleschi and Alberti, amplified by the resources of Federico da Montefeltro and his team of Florentine artisans in the 1460s and '70s, allowed for the technical production of one of the earliest and best-preserved panoramic "virtual spaces" in Western art, insofar as that space "exceeded" actual space. This map of the wealthy Duke's priorities, so to speak, according to Robert Kirkbride, "might have served more as a rhetorical medium for stimulating thought than as representations of a "complete" body of knowledge."[98] It's not important, in this example, that the virtual space be a "complete" space, but only that it represents an array of selected characteristics, much like a map, that then come to

[97] Ibid., 6.
[98] Kirkbride, *Architecture and Memory*, 129.

dominate the psyches of the space's inhabitants. This particular technologically-enabled illusory space, the chapter discusses, following in the Renaissance tradition from which it was borne, thus arrives already wedded to a variety of positions commonly held by the ruling class during the time of its creation: commitment to the Liberal Arts and other humanist ideals; moral imperiousness; and even a specific kind of elite saviorism related to power, means, and certainty in one's personal affordance of eternity in heaven as a result of one's own good deeds, education, and wealth.

But what unites all of these disciplinarily specific understandings of virtual space is the singular idea that such representations can be understood as speculative exaggerations of actual space, which then allow their interlocutors to inhabit and reify the resulting variations. Novel technologies yield new and ever more extraordinary exaggerations, increasing opportunities for creative habitation: the *studiolo*, by this logic, uses a novel technology of vision—perspective—to produce an exaggerated and expanded room; maps of the New World behave as exaggerations of the Known World to produce an exaggerated and mythologized extension of Europe; and the photograph comes into being as a technological gateway to an exaggerated hyperreality originated upon, but no longer subject to, actual lived-space.

Our understanding of virtual space realizes a concept of representation itself that is ultimately fluid: representations, like maps (or maps, as representations) draw out specificities of the real and make them pronounced. One might even say that "virtual spaces" are in fact no more "spatial" than ideology itself: "virtual space," then, might be again described as a fabric of thought; a lattice of power relations; or the influence of present relational power dynamics on future relational power dynamics as "the real" becomes resource limited and deprived of its wealth-generating utility.

The rediscovery of linear perspective in the fifteenth century led to the pursuit of dimensional fidelity in artistic rendering. Yet the technological apparatuses used for achieving this fidelity still depended on the manual skill of the human operator: draftsmanship towards perspectival image-making required a lifetime of practical experience. The nineteenth century therefore witnesses the second most important invention to the history of virtual space: the photograph. Benjamin's 1931 meditation on *aura* in his seminal essay "A Short History of Photography" proceeds from his examination of the work of Eugené Atget, whose turn-of-the-century photographs of Paris streets Benjamin describes as "[stripping] the makeup from reality."[99] For Benjamin, like Baudrillard, a kind of idyllic presence of the photographed object exists beneath a fog of modernity. Unlike Baudrillard, however, Benjamin argues that the image, in the hands of a great photographer, can be used to "strip away" the pretense of the real, whereas for Baudrillard the image itself is already an abstraction that inhibits access to reality in its own right.

This distinction matters because the photograph in the nineteenth century rejuvenates a conversation about indexicality only infrequently advanced since the discovery of the *camera obscura*. That is: the photograph, for perhaps the first time in known history, like Borges' map, gives the sense of being able to replicate reality on a one-to-one basis by reproducing that reality in its exact verisimilitude; and for any "history of the virtual," this innovation will also register as a breakthrough in the history of mapping.

The primary event in Benjamin's understanding of the history of representation in the nineteenth century is the dissolution of what he calls "aura," a quality of originality of artistic

[99] Trachtenberg, *Classic Essays on Photography*, 208.

representations up until the point of photography's invention. Atget's images, which might otherwise have been read as eerie in their absence of human actors, Benjamin instead reads as pregnant with potentiality: "They are not lonely but voiceless; the city in these pictures is swept clean like a house which has not yet found its new tenant."[100] The old tenant, now evidently deceased, is forgotten; instead we are invited to look forward at what the space of the house—a virtual space—might contain. From the throat of the new tenant of this space, for Benjamin, will issue the "voice" of the art. Atget's images, far from acting as mere aesthetic objects, also for Benjamin "[open] the field for politically educated sight,"[101] permitting the parallel emergence of photography as both aesthetic medium and political practice which collectively "[strip] the makeup from" the necrotized real.

To belabor the point here: Atget's images, read obliquely, "strip away" the complexity of urban experience (the human presence) to revel the streets below: the spatial substrata, laid bare as a "key" of Paris. And if this isn't a crude definition of the process of mapmaking, then what is? Lattices and lines divide Paris into quadrants; divide the photograph into thirds; divide the map into longitude and latitude; divide virtual space into gridded voids. But are these new maps of the real—these virtualized representations of city streets—generative and living works of art, as Benjamin argues, or the knell of the end of reality, as Baudrillard forebodes?

Benjamin's reading, which emphasizes birth over decay, futurity over apocalypse, and potential over stagnation, speaks in contrast to the case made by Andre Bazin fourteen years later in his 1945 essay, "The Ontology of the Photographic Image." Bazin begins his counterpoint by locating the history of the plastic arts in ancient Egyptian procedures of embalming. Embalming, for Bazin, represents the work of art's ability to stop time, "rescuing it simply from its proper corruption."[102] The photograph, like the other plastic arts of sculpture and painting, he argues, "is the object itself, the object freed from conditions of time and space that govern it."[103] These "conditions of time and space" prove interesting to think about alongside the "strange web of time and space" that for Benjamin defines the aura. But whereas for Benjamin time and space combine to form a "web" in which the pre-nineteenth century work of art remains invariably ensnared, for Bazin it is the unique privilege of all of the plastic arts to transcend the grip of time and space.

We might therefore think of Benjamin's articulation of the victory of the photograph, unique to the medium, as coincident with the image's release from the tyranny of the aura characteristic of the other plastic arts. Bazin, on the contrary, valorizes photography in its capacity to revitalize the privileged arts of painting and sculpture by taking over the menial work of reproduction. Thus, for Bazin, the success of the photograph has little to do with the birth of an aesthetic practice divorced from the confines of pre-industrial originality, but more to do with how it liberates painting to pursue its own loftier goals. Photography becomes the condition of possibility for painting, but little more in its own right than a technology for the industrial replication of objects—or, indeed, spaces.

To what extent do photographs replicate or extend space? The sensorium, as demonstrated in Crary's analysis of disruptive technologies of vision in the early nineteenth century, is insensitive at some degree of fidelity to the difference between scenes, whether "real"

[100] Ibid., 210.
[101] Ibid.
[102] Ibid., 242.
[103] Ibid., 241.

or “artificial.” One can be made to believe that two-dimensional surfaces are three-dimensional scenes, given the right conditions. One sees a landscape; then one sees an “image” of a landscape through a stereoscope—does the former convey a greater sense of space than the latter? To what degree does the lone image perform the functions of the multiplicity? Can one be “moved” by single images as one might be by images in parallel (stereoscopically-rendered), or images in series (moving images)?

Arguably the most viewed photograph of all time, “Bliss,” was used as the default Windows desktop background on all PCs distributed with the Windows XP operating system for over a decade. The author of the photo, Charles O’Rear, estimates that this photo has been seen by well over a billion people. On the point he has said: “I’m sure in the Kremlin the computers have this photo. They use Microsoft programs. I think every corner of the globe, every culture, every country, has been exposed to it.”[104]

Figure 25: “Bliss,” default desktop background for Windows XP.

The photograph, like the lived-scene, engages the sensorium while generating and participating in its own networks of meaning and memory. If spatial understanding is established through “images” rendered onto the body (through stereopsis and the rest of the human sensorium) then what differentiates our beholding of this photograph and, say, driving to the same Sonoma hill fourteen years later to experience the space in its lived-reality?

[104] Younger, “Finding the State of ‘Bliss.’”

Figure 26: The hills of "Bliss" in 2010, now the location of a vineyard.

Similar in both cases are the fact of seeing and the fact of feeling: we observe the surfaces and colors of the photographed hill in an image much as we do the "lived" hill: the environment, as argued by Bergson, is an image just as our body is an image, and one image acts upon the other in both cases. We also internalize the scene contextually: a wind might blow across the hill itself, or a wind might blow through an open window into the room where one is looking at one's desktop. Smells, sounds, and the feel of proximal objects may all be "divorced" from the scene when beholding a photograph, but nevertheless witnessing a photograph entails the reception of proximal objects which then become naturalized elements of the setting in which one absorbs the photo.

One might argue, as does Bergson, that matter is "the aggregate of images, and perception of matter these same images referred to the eventual action of one particular image, my body,"[105] and thus speculate that whether I am looking at a hill or a photograph of a hill, the same process is necessarily taking place. For Bergson, human understanding arrives via this image-oriented multiplicity, or a sort of "all-at-onceness" that perception renders manageable.

Before unduly committing to the elision of all experience, however, we should note that, in our viewing of the photograph, a stereoscopic understanding of distance within the photographed space is lost, and can never be regained from a still image. In a photo, duration is reduced to zero: the lack of time embedded in the medium has consequences for the spatiality of the image. And yet in those zero-duration instants of looking at an image, the eyes can still be said to receive refracted light and generalize about what it means to be confronted by a three-dimensional space. The body *extends* into both spaces; thoughts of inhabiting the scene flash through the mind. What else explains the selection of this peaceful image? Vision takes precedence over other senses, and we can sometimes even mistake, in memory, having seen a photograph for having been in a place—say, when remembering events that happened during childhood.

The spirit of photography is, between Benjamin and Bazin, torn between the practical and the political, the effusive and the contingent. Jonathan Crary's argument from *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*, explored at greater length in

[105] Bergson, *Matter and Memory*, 22.

chapter 1, tables conversations about the place of photography as an art practice, instead deliberating on the evolution of the viewer capable of reading photographs in the first place. He writes, for example, about the "'separation of the senses' and industrial remapping of the body in the nineteenth century"[106] that isolated the visual from the tactile. Where once the physical would be experienced through both the senses of touch and sight, the "society of the spectacle" (a phrase Crary knowingly deploys from the writing of Debord) emerges conterminously with a "rebuilding of an observer fitted for the tasks of 'spectacular' consumption… [enabling] the new objects of vision (whether commodities, photographs, or the act of perception itself) to assume a mystified and abstract identity…"[107] Photographs, laying aside the tactility of the medium on which they're inscribed, are made possible by the sundering of the visual from the tactile—the vision from its object. Benjamin's aura, which depends on the physical certainty of an original, withers precisely because of this schism.

If indeed "the real" becomes real by virtue of its being indexed—by virtue of its being mapped—then "the mapping of virtual spaces," in one sense (to Baudrillard's disconcertion), makes them real: in mapping, we generate proportion, scale, and thresholds of importance; in selecting what is photographed, we select what is mapped, and therefore both what is "real," and also what is preserved.

Crary's historicization of viewing technologies serves to distance "the object" from "the image" by providing grounds for doubting the stability of the object in general, favoring, instead, the viewer in the mid-nineteenth century as the material constant of signification. How thereafter do our notions of photography's functions around the turn of the century change? According to Marshall McLuhan, the history of the observer might be characterized, instead, as a history of subject-interpellation by the medium of photography. In *Understanding Media*, for example, he argues that "the complete transformation of human sense-awareness by this form involves a development of self-consciousness that alters facial expression and cosmetic makeup as immediately as it does our bodily stance, in public or in private."[108] The photograph, more than providing humans with a new political or aesthetic mode expression, and more than merely preparing the observer for the viewing of photographs (as argued by Crary), upsets in a more spectacular way human ontology. The photographic medium disciplines denizens of the nineteenth century into becoming photographed (and photographing) subjects themselves.

This new ontology affects both subjects and objects. "[The] photograph," McLuhan argues, "has reversed the purpose of travel, which until now had been to encounter the strange and unfamiliar."[109] By implying that the new purpose of travel is to see the familiar, rather than the unfamiliar, McLuhan offers an alternative theory of the relationship between photographs and objects to that posited by Benjamin: whereas for Benjamin, the photograph "strips the makeup from" the real—and is therefore itself actually (first) a replica with its own distinct value—for McLuhan the photograph actually becomes the original of experience. With reasoning akin to that offered by thinkers from Baudrillard to Marcuse, he finds that "the object" only exists insofar as it pre-exists in images. The original object, in the metaphysics of the simulacrum, may even no longer exist at all. Indeed, insofar as all objects are discovered through the same sensorium, "the object" may never have existed in the first place.

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[106] Crary, *Techniques of the Observer*, 19.
[107] Ibid.
[108] McLuhan and Lapham, *Understanding Media*, 197.
[109] Ibid.

On the one hand, this change manifests itself on the smaller, interpersonal scale: one's "observance" of one's comportment, for example, including posture and appearance, in a way that was impossible before photography. The "virtual," once characterized by religious introspection, transforms into a fastidious attention to the body. In a more sinister attitude, the new ontology positions living subjects as nonessential objects in the emerging virtualization (or remapping) of the real. The human both absent from and anticipated by the photography of Atget is yet brought close for inspection in the work that follows: "Both the monocle and camera tend to turn people into things," he writes, "and the photograph extends and multiplies the human image to the proportions of mass-produced merchandise."[110] This realization of the human as object revises Benjamin's complex understanding of the photograph as clearing away the portraiture-as-objects of the nineteenth century. In Benjamin, the *human* benefits from the generative capacity of photography; in McLuhan, *photography* benefits from the generative capacity of the human.

Yet for McLuhan, despite its transformation of humans into a type of currency, the photograph still invariably presents itself additionally as an extension subordinated to the interests of the human. Similar to "language" following Saussure's pronouncement regarding our woeful ineffectuality at artificially guiding its evolution, "media" too seem to emerge and grow independent of human efforts. Nevertheless the effects of photography, McLuhan writes, are such that "the world itself becomes a sort of museum of objects that have been encountered before in some other medium."[111] Photography, like other map-making processes, makes history of the world's objects, rather than comporting the object away from history. That is to say: the birth of photography, rather than expecting a future more utopic than the past (as the *studioli* doubtlessly did), actually flattens the visual into the past—and not just the past, but the past we have time and time again witnessed.

Though the social implications for photography in McLuhan's text tend to feel extensive, the political implications for the image under McLuhan, as under Bazin, fail to anticipate a future for the aesthetic or political possibilities of photography as an art. In many ways he seconds Bazin's work when he suggests that

> ...the great revolution produced by photograph [sic] was in the traditional arts. The painter could no longer depict a world that had been much photographed… the novelist could no longer describe objects or happenings for readers who already knew what was happening by photo, press, film, and radio.[112]

McLuhan does allow, however, that the "work" of photography (that is, its aesthetic and political potentiality) should arise out of the photograph's capacity for interrogating the microbial, the invisible, the "inner gestures and postures of both body and mind."[113]

This is fortunate for strategies for mapping virtual space, as the internet—the contemporary nexus of virtual spaces—is itself "microbial," "invisible," and contains within it "inner gestures and postures of both body and mind." Representation in the digital age, if we are to look at it uncharitably, indeed *does* supplant the real; but it also prevails in engendering all

[110] Ibid., 189.
[111] Ibid., 198.
[112] Ibid., 194.
[113] Ibid., 202.

manner of novel and "living" qualities of the human, generating new and extended realms into which the human is able to expand.

What does it mean for the human to expand into virtual space? Chapter 3 explores two case studies in photographic portraiture as metaphor for "inhabiting virtual spaces," while chapter 4 examines the final frontiers of the expansion of virtual spaces: digital interfaces and the Head-Mounted Display.

CHAPTER 3: INHABITING IMAGES: PORTRAITURE AND THE VIRTUAL SUBJECT

Thus far our project has advanced as follows: simulated spaces "exist" insofar as they can be perceived through the sensorium; they emerge technologically-mediated from "actual" spaces, exaggerating them, sometimes subtly, and sometimes to the point of unrecognizability. Characteristics of the "actual" spaces that engender simulated spaces are carried forward, with each concomitant advance further estranging the past, and giving rise to "virtual spaces," ideologically-charged states of belonging. Philosophical discourses, moreover, have been developed for describing many of the precepts of simulated space, but less has been said about what it is qualitatively like to "occupy" virtual spaces. How is the deployment of our psychic selves into a digital marketplace like Amazon different from, say, our deployment of our physical selves to a supermarket like Acme? Phenomenologically these activities require wildly different embodied actions, but are comparable as they achieve similar ends, are both subject to the same logics of capital, similar narrative structures, and the satisfaction of similar desires. Both activities are also visually inundating: whether walking through the store or negotiating browser tabs, we are confronted by hybrid spaces, or "hypertextual realities" in the guise of ads, brands, fliers, and endless glimpses of the interpellating signs of postmodernity.

The first two chapters provide some historical context for what would become the building blocks of twenty-first century virtuality: the image. Cinema, digital entertainment, and VR head-mounted displays are all themselves iterations on the image, and indeed act as a refrain on Bergson's original idea that reality itself is comprised of images received in rapid effect. Per Bergson, images arrive *in series*; but for Foucault, as we will soon discover, the contemporary era becomes one of "simultaneity" and "multiplicity": that is, images arriving in parallel. Whether images of the world arrive in series or simultaneously, theorists like Borstein, Marcuse, Debord, Barthes, Lyotard, Derrida, and Foucault all posit the image as a constitutive element of the present era.

Chapter 3 looks at a number of additional examples of image production and how such images—portraits, especially—exaggerate actual spaces, altering the subject positions of their viewers such that those viewers come to inhabit the virtual spaces that result. But what does it mean to inhabit a new virtual space? And what does it mean to be "dislocated" from one virtual space to another in an instant? We remember that "the virtual" must also describe a specific type of attentiveness that diminishes the human body as a constitutive part of subject experience and identity. Portraits, quite unlike mirrors, don't relocate the viewing subject within the subject's own actual surrounding space, but endeavor to draw the viewing subject into the world inhabited by the subject depicted, and assume new paradigms of that experience. The viewer's specific form, location, temporality, and desires fade, and are replaced by those of the image at hand. The image transforms the individual's subjectivity across the real and into the virtual, where it becomes pursuant to novel governances and expectations.

Of Other Spaces: Displacement and Dislocation in Virtual Space

Lefebvre's *The Production of Space* catalyzed a movement that sought to discover what it would mean for an ontology to privilege space over time, but it is also a text with many antecedents. In a 1948 series of radio broadcasts for a program called "The French Culture

Hour," for example, Merleau-Ponty, considering Cezanne's landscapes, offers that "space is no longer a medium of simultaneous objects capable of being apprehended by an absolute observer who is equally close to them all." He continues, "[a]s Jean Paulhan remarked recently, the space of modern painting is 'space which the heart feels', space in which we too are located, space which is close to us and with which we are organically connected."[114] Modernity saw Euclidean geometry, once thought to be regular all through time and space, warped by Einstein's theory of relativity. Following Einstein, space itself was reconstituted into a heterogeneous fabric that, on top of being heterogenous, also fluctuates according to the matter occupying it, and which is moreover subjectively-experienced through perception. Cezanne's paintings, for Merleau-Ponty, are therefore more closely tuned to the unfolding of human perception of the universe. And most importantly for our study, such paintings become "space in which we too are located." By virtue of their capturing the heterogeneity of space, we are compelled—even "relocated"—into their frames.

Merleau-Ponty concludes the same lecture by noting that "for the first time, we come across the idea that rather than a mind *and* a body, man is a mind *with* a body, a being who can only get to the truth of things because its body is, as it were, embedded in those things."[115] The body is the touchstone for all reality: knowledge is gained through the perceptual faculties of the human form.

We are here confronted with a minor paradox: on the one hand, modernity reframes spatiality in terms of subjective experience: for Merleau-Ponty, this means an empirical understanding of the world that depends on sense-data. On the other hand, he makes claims that our sense data is precisely what allows the viewer to be transported into the space of, in this example, a painting—a synthetic (and indeed "virtual") environment. For Merleau-Ponty, "virtual space" isn't actually a problem; all of lived experience is "real" and relational: "The things of the world are not simply neutral *objects* which stand before us for our contemplation. Each one of them symbolizes or recalls a particular way of behaving, provoking in us reactions which are either favourable or unfavourable."[116] Reality emerges from perception, and insofar as art objects (painting, cinema, literature, etc.) are perceived, they are entitled to be read as relational elements of the real.

What we might take away from this brief look at Merleau-Ponty's lectures is the deprivileging of "actual space" in any prefigured hierarchy of spatial experience. Paintings are different, but not spatially less real. "So painting does not imitate the world but is a world of its own,"[117] he writes. Such alternative spatialities, it also seems, can be "occupied" or "inhabited," provided they can be processed by human perceptual organs.

Foucault, too, becomes an early and prescient thinker on the habitation of virtual spaces. In his 1967 essay, "Of Other Places: Utopias and Heterotopias," he suggests that, while the nineteenth century found itself preoccupied by an "obsessive dread" of history, the twentieth confronts us as an "age of the simultaneous, of juxtaposition, the near and the far, the side by side and the scattered." In short, for Foucault, the twentieth century had by 1967 transitioned into an era of *space*, in contrast to the era of time from which it departed. Though he for obvious reasons could not then have known the extent to which the late twentieth century would

[114] Merleau-Ponty, *The World of Perception*, 41.
[115] Ibid., 43.
[116] Ibid., 48.
[117] Ibid., 71.

reproduce the "different arrangements" (or "spatial incongruities") he envisioned as defining his present, we might nevertheless hazard the tentative suggestion that the "heterogeneity of space" he perceived as collecting in prisons, public restrooms, and boarding schools nearly fifty years ago has only become more pronounced following the expansion of the populations affected by such spaces.

Yet we might use Foucault's articulation of the heterotopia to inform a more detailed exploration of the status of space as it pertains to today. But in order to ask, "Where do we find the heterotopia of the twenty-first century?" we might preliminarily ask, "Where does Foucault find heterotopias in the twentieth?" Foucault's first example of this unusual measurement, which he defines as a kind of space that serves its occupants with unique and irreproducible techniques of being, is the mirror. The mirror, he argues, is heterotopic because the utopic space produced by the surface of the mirror comes into being at the precise moment that one begins gazing outwards at the place one once occupied. The mirror therefore serves Foucault as the first point of access into heterotopic space. He describes this experience as follows:

> Starting from that gaze which to some extent is brought to bear on me, from the depths of that virtual space which is on the other side of the mirror, I turn back on myself, beginning to turn my eyes on myself and reconstitute myself where I am in reality.[118]

The experience of the mirror as virtual space for Foucault comes to be one of both recognition and difference: the mirror functions as a heterotopia insofar as it reconstitutes the space of Foucault's presence as *another* space, thereby revealing before his gaze his own strange occupation of that other space. In his discussion of the study of spatial particularities he calls "heterotopology" that follows, he describes other heterotopias in terms that emphasize the abilities of certain spaces to produce non-normatively-oriented ontologies. The mirror serves as Foucault's first example of the heterotopic event partially because it is so commonplace, and partly because the perfect heterotopia, it seems, is at once private, personal, efficient, and enclosed. And what space evidences these qualities more explicitly than a mirror?

The trope of the mirror now finds itself vying for its place as reflective surface *par excellence*. A combination of industrial demands for the development of post-WWII human-machine feedback technologies and the twenty-first century's perfection of biopolitical modes of surveillance has produced for the late twentieth and early twenty-first centuries a new kind of mirror: the screen. The screen, ever increasing in ubiquity, has in many ways taken the place of the mirror as point of access for spaces of alterity. Books like Anne Friedberg's *The Virtual Window,* Branden Hookway's *Interface,* Wendy Chun's *Control and Freedom,* Alexander Galloway's *The Interface Effect,* and Jay David Bolter and Diane Gromala's *Windows and Mirrors* characterize this metaphorical transfiguration conditioned upon the development of screen-culture as "window-culture," where to engage with a display is to be *transported* to another place entirely. Like Foucault's heterotopic mirror, the screen—referred to frequently in the above texts by alternative names of "interface" and "display," and by way of metaphors including "portals," "windows," and "gateways"—opens upon realities with properties unlike those possessed by the space one currently inhabits, or at least so it often seems. Screens, like mirrors, present themselves as apolitical, secular, and otherwise "neutral" lenses of perception,

[118] Foucault and Miskowiec, "Of Other Spaces," 24.

pointing always towards their interiors—their "content"—as the stuff of ideology. As a medium, screens have saturated public and private life in many parts of the world, other theorists like Fred Turner and Lisa Nakamura remind us, and for these reasons in large part have avoided intense interrogation.

The turn in media studies to materialism led by Katherine Hayles suggests that we start here with the properties of screens. What are their specificities? Screens have aspect ratios; they are "mute" and "framed"; their borders are broken most frequently by cameras that regard the faces of their users from between six and sixty inches, monitoring this side and that of the heterotopic interface. The screen is most commonly a layering of potassium-infused glass, transparent conductive surfaces, adhesives, and LCD display technologies. The LCD layer is itself composed of a matrix of pixels that, while for most of their history have remained from reasonable distances perceptible, have by the mid-2010s all but receded into imperceptibility (the "retina display," for example), granting the user seemingly uninhibited access to the media within the medium.

In many ways the screen is very much like a mirror, especially when one considers our current preoccupation with the selfie (or, indeed, the use of the front-facing camera to check one's appearance). Yet even when powered off, screens are able to reflect their would-be users in obsidian shades. Much in the way Foucault calls the "train car" or the "honeymoon suite" heterotopias "without geographical coordinates" for their ability to provide their users with untraceable spaces reserved for moments of crisis and deviance, the screen sequesters instants of growth and decay from non-heterotopic communal spaces: a child's discovery of pornography, for example, or an adult's researching of possibly endured medical ailments. The screen for the twenty-first century has become, among other things, the heterotopia to replace all heterotopias.

Here we have a collision of two principles central to this text: the stereographic regime responsible for the postmodern subject's reception of images, and the screen-as-heterotopia that embodies safety and support in a two-dimensional chassis. Here we might ask more broadly what thinking about virtual spaces—whatever their mode of production—alongside other theoretical interrogations of spatiality can tell us about a particular set of new worlds that have come into being as places of refuge, deviance, sociality, activism, play, and withdrawal.

Part of the reason for this inquiry is to address the limitations of Foucault's account of the heterotopia for the twenty-first century. For example, he writes:

> [W]e do not live in a kind of void, inside of which we could place individuals and things. We do not live inside a void that could be colored with diverse shades of light, we live inside a set of relations that delineates sites which are irreducible to one another and absolutely not superimposable on one another.[119]

But is this "void, inside of which we could place individuals and things" not precisely the "spatial imaginary" of the twenty-first century? Open up a spreadsheet, limitless along two axes, and "place" your text within; bring up Google street view and move through it incrementally, exploring every alley and vista across the developed world; activate Photoshop, Blender, or Unity—virtual spatial development platforms—and you'll be confronted by the X, Y, and Z-axes of blank, open spaces and their infinite, empty worlds. Space as "void" has been a common trope in popular representations of futurity for years and is in fact the latest iteration of postmodern

[119] Ibid., 23.

spatial ontology. Alexander Galloway points out in his book *The Interface Effect*, for example, the potency of the "antiseptic, white nowhere land that would later become a staple of science fiction films like *THX 1138* or *The Matrix*."[120] These blank spaces represent computational possibility, but also act as spaces of violence, uncertainty, and the horror of abjection.

When we imagine "simulated spaces" we therefore picture several relations simultaneously: we experience feelings of possibility and futurity insofar as, in simulation, any "possible world" can be made into a "lived world." We might imagine, for example, our actual world, only without war, and so endeavor to structure a simulation that would relegate our actual world to being only the *second best* of all possible worlds; or we might imagine our actual world without war *or* disease, making our current world only the *third best* of all possible worlds—and so on and so forth.

But "simulated spaces" also by their very nature as procedural realities, always exist against the backdrop of their own non-existence—the "void" that they will become once the simulation stops running. This "void" represents the abject fear of *failing to be*—the existential threat at the end of all simulation, as, for example, momentarily experienced during the obliteration of the Windows Maze. Imagine once again Foucault's heterotopia of the mirror, through which one validates and registers one's existence in actual space. What if the mirror, behaving as a screen, simply "turned off?" The disappearance of the virtual image of the self—the virtual image that makes one's subjectivity manifest in actuality—would unsettle the very idea of representation in the actual world.

Images of Absence: Portraiture as Séance

In *The Emancipated Spectator*, Rancière writes:

> The images of art do not supply weapons for battles. They help sketch new configurations of what can be seen, what can be said and what can be thought and, consequently, a new landscape of the possible.[121]

What are the effects of "effacing the image" in service to the void? In early 2011, artist Taryn Simon published a photographic project called *A Living Man Declared Dead and Other Chapters I-XVIII*, a collection of portraits from towns, villages and cities from around the world cataloging familial bloodlines through pictures of living family members. The images themselves are mounted on white backgrounds, ordered horizontally by relationship and read from left to right, top to bottom, like text in a book.

[120] Galloway, *The Interface Effect*, 35.
[121] Rancière, *The Emancipated Spectator*, 103.

Figure 27: "A Living Man Declared Dead and Other Chapters I-XVIII," Chapter VII: Victims of Srebrenica massacre, 2011.

Where family members could not be photographed—because of illness, absence, or unwillingness to participate—Simon inserts a blank portrait, explaining the vacancy in a caption below each set. In one instance a man sits with his back to the camera, unwilling to have his face immortalized; in another set, courtesy of China's State Council Information Office, every member of one 29-person Chinese lineage is present and in best attire; and in another series—the only series in which Simon visually represents the dead—the artist displays pictures of a family violently affected by the 1995 Srebrenica genocide in eastern Bosnia and Herzegovina's eponymous town. In the top left of this set are 62-year-old Zumra and her father, followed to the right by the remains of her four children: one is represented by an anthropologically arranged set of bones, and the other three as single teeth from which DNA evidence had been extracted for matching in the exhumation process.

Figure 28: "A Living Man Declared Dead and Other Chapters I-XVIII," Chapter VII: Victims of Srebrenica massacre, 2011 (detail).

How do we use photography to remember? to re-present the dead? to assemble archives of lineages and trauma? Broadly speaking, how do we use portraiture to establish virtual spaces of tribute and memory? The above works of art speak to several themes established in this document so far: the significance of the grid, for example, which gestures towards multiplicity, sequence, and extension, in its representation of space; the gaze of the photographed subject, looking outwards towards their presumed viewer; and the extent to which each panel could also read as a mirror. The effect of *Chapter VII* is to create virtual spaces of preservation, where, at best, a subject's visage, outfit, and mannerisms can continue to operate; or at worst, a tooth, bone, or the fact of absence itself attest to a collapsing of the subject-positions that once existed and are no longer accessible to the living.

In his book *Camera Lucida*, Barthes asks similar questions about what remains in a photo, having encountered an old picture of his mother, whom he describes in part two of his book:

> Here, around 1913, is my mother dressed up—hat, her 'chic' belied by the sweetness and simplicity of her expression. This is the only time I have seen her like this, caught in a History (of tastes, fashions, fabrics): my attention is distracted from her by accessories which have perished; for clothing is perishable, it makes a second grave for the loved being."[122]

Always, for Barthes, the photograph is accompanied by the *spectrum*—the spectacle, or the subject photographed, but also "the return of the dead"[123]: the *specter*. He imagines above,

[122] Barthes, *Camera Lucida*, 64.
[123] Ibid., 9.

even in his description of the photograph, his mother's clothes participating in her death, providing a "second grave" for the photographed subject. Barthes thus calls attention to a startling number of deaths implied by the image: first is his mother's actual, homeostatic death; second, the photograph's presumption of holding someone virtually in time—an endless teleological deprivation (she is "caught"—Barthes calls this *parenthesis*); followed by the death of the photographed subject during the shooting itself. But there are also a number of other suggested deaths: Barthes starts the sentence with "Here" in an effort to transport himself back to 1913, during the absence of his life, and what we might consider a thanatotic desire to explore the history before his own birth: to explore the always unwitnessable "History." In a sense, Barthes's mother also lives and dies each time her picture is observed, and Barthes, by looking at the picture, performs a sort of ritual sacrifice with each glance. The photographic representations are thus always looked upon, looked out from, and always saturated with mnesiological and eschatological significance.

The co-contingency photography has with the deaths and the remembering of its subjects offers a lens through which we might read Simon's photographic collection: as an attempt at preemptively remembering death, much like the *memento mori* poems of the seventeenth century metaphysical poets, or some aspects of Mexico's *Día de los Muertos*. After all, though each photograph on a material level contains nothing (nothing but ink, that is), every photograph evokes, according to Barthes, both memory and death. But how? We might first ask, in the course of analysis, how photography creates an unwitnessable pre-photographic subject we presume to be alive and with memory—the necessary antithesis of a past photographic subject always already absent and without memory: a "virtual subject" occupying a "virtual space." Ultimately, however, what this chapter seeks to accomplish is to embed the study of photography and its relationship with the figure of the specter into discourse surrounding the archive, and to ask whether or not the archive is not thereafter by definition a crypt, accessing it always a form of séance, and whether or not the technology of photography persists only as a means of re-membering history—that is, putting back together the dis-located parts of the archive which always represents a body of knowledge inanimate and irreconcilable.

Simon's project explicitly references the conceptual mausoleum at the heart of photos of lineage. The mausoleum (*fig. 29*) is constructed by the artist—the lineages, after all, don't really exist to the spectator before the artist forms them first in her camera and more cogently in the gallery. We also remember that four of her subjects, while technically alive during the time of the photographing, were in fact legally dead, being caught in an imbroglio in which corrupted authorities recorded them as such to change patterns of inheritance. In the case of the "living man declared dead," otherwise a farmer by the name of Shivdutt Yadav (*fig. 30)*, the photograph at once forms a sort of testimony to his aliveness and, in the same instant, isolates his image in time like a slide in a microscope. This isolation, according to our reading of Barthes, does the paradoxical work of both preserving his life and rendering him dead—that is, "caught in a History." The room is filled with portraits of strangers, and one realizes that the title of the show in which the images are displayed, "A Living Man Declared Dead and Other Chapters I-XVIII," does not describe the singular instance of an Indian man's legal deadness, but the gallery's effort to, through the technology of photography, declare alive, *but also paradoxically declare dead*, all subjects in its purview. Nor does it escape the viewer that, by referring to these scenes as "chapters," the show narratologically identifies these lives as, like stories, having prescribed beginnings, middles, and endings.

Figure 29: "A Living Man Declared Dead and Other Chapters I-XVIII" gallery space.

Figure 30: Shivdutt Yadav, left, was legally declared dead so relatives could inherit his land.

This simultaneous preponderance of virtual realities suggested by each representation seems to me the critical effect of the photographic image: to give rise to histories that variously restore and deny subjectivity through representation. It is also difficult to determine, in equal measure, the relationship of the viewer vis-à-vis both the photographed subjects and the artist. Does the viewer of a photograph—the viewer of Simon's gallery exhibition, for example, or Barthes looking at his mother—deliver life to the photograph through observance or, on the contrary, retain subjectivity and ultimately withhold life from the photograph to, by order of difference, remind oneself of one's own vitality through processes of abjection? In *Camera Lucida* Barthes speaks to the problem of one's relationship to the living subject and history. "History is hysterical," he says: "it is constituted only if we consider it, only if we look at it—and in order to look at it, we must be excluded from it. As a living soul, I am the very contrary of History, I am what belies it, destroys it for the sake of my own history."[124]

Thus, to examine the photograph, which is always historical, one necessarily opposes it and destroys it as history. As one walks around the gallery one is alive and living in "the actual": this is one message of the dead photographs on the walls, but also the goal of the observer—to

[124] Ibid., 65.

perform livingness against the circumscribed inanimacy. And yet the room, bright in its luminescence, quiet in resonance, still in aspect, grave in mien, threatens also to testify to one's own deadness. One observes the silence in which one stares at the images—images which look back like mirrors. Still, to consider these bloodlines is to participate in their rendering. Looking, in this way, is not separate, as Barthes would have it be, from "doing" (the three possible actions being: "to do, to undergo, to look"[125]), but is, like Rancière will argue in "The Intolerable Image," a *type* of doing.[126] Looking in the gallery is therefore vitalizing insofar as looking substantiates the viewer by acknowledging a type of action in looking, but also insofar as looking substantiates the photographed subjects: in memory, in agency, in distant living thought. Barthes too argues "… the photograph is never anything but an antiphon of 'Look,' 'See,' 'Here it is'."[127]: thus, to look is to accede to the bequest of another, to ascribe subjectivity to another, and is therefore an act of creativity and generation. The technology of the camera is, one might argue, by definition generative—hence Simon's emphasis on generations and lineage.

But to look, according to Barthes, is at last not only to recognize the pastness of an image (The *noeme* of Photography, "That has been,"[128] prevails), but also to destroy it; to fail to recognize; to "mortify"[129]; to *im-mortalize,* both conferring death upon and invoking the fossilization of; and in looking to create an expectation of having known when no reality substantiates such expectations. The camera resurrects and the camera kills in the same equivocal gesture: the other always gazes back from a state of unknowability, and, despite Simon's choreographing of relatives beside each other to try and triangulate on some sort of subject-knowledge through lineage, one realizes that all portraits are portraits of the memorialized dead.

This is where the technology of the camera and the archive come in, because to remember is to "re-member"—to assemble again what has been torn apart. Recall the way in which Zumra's murdered son is "re-membered": put back together from the pieces into which he had been separated—not to make a living being, but rather, as human rights scholar and anthropologist Eric Stover suggests of a different body in similar circumstances, merely to *represent* the body of the deceased. In Stover's story he describes his team of archaeologist's preparation for a meeting in which an exhumed body of a victim of the Srebrenica massacre would be presented to the victim's mother and sister, and the ensuing discussion about whether to arrange the bones anthropologically or display them as a de-anthropomorphized pile or organization, say, by bone size or shape.[130] Likewise, photography represents not "just" a means by which to give peace to the loved ones, but a means by which to build an archive—a body—in which to house the specters that are images. And so it is as more victims are exhumed from the Srebrenica massacre that the archive grows in amalgamated depth and significance.

Simon's work not only re-members bodies, but re-members whole lineages through archive, accumulating and organizing the photographically dead in black-framed rectangular mausoleums with white, luminescent interiors, to preserve and accumulate not living bodies but the once-dead as *specters*. This is a term Derrida uses in *Archive Fever*, but that he defines more thoroughly in *Spectres of Marx*. Therein he says of this form:

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[125] Ibid., 9.
[126] Rancière, *The Emancipated Spectator*, 87–88.
[127] Barthes, *Camera Lucida*, 5.
[128] Ibid., 115.
[129] Ibid., 11.
[130] Stover, In Conversation: Eric Stover and Michael Mascuch. 2012.

> [T]he specter is a paradoxical incorporation, the becoming-body, a certain phenomenal and carnal form of the spirit. It becomes, rather, some "thing" that remains difficult to name: neither soul nor body, and both one and the other. For it is flesh and phenomenality that give to the spirit its spectral apparition, but which disappear right away in the apparition, in the very coming of the revenant or the return of the specter. There is something disappeared, departed in the apparition itself as reapparition of the departed.[131]

Herein Derrida describes the ghost of Hamlet senior, but just as easily describes Barthes's mother: she becomes, through the medium of photography, a "paradoxical incorporation," "phenomenal" insofar as she is *really* experienced—or really virtually experienced, we could add—and present to Barthes, and yet also "there is something disappeared" or "departed" about the image: she becomes what Derrida calls the *revenant*, or that which returns. (In a way that which is departed from the image serves as arche-punctum: if the punctum is that which is most palpably present in an image, the departed is that which is non-present.) It is the returning which implicates the intermittency or absence of the subject, and guarantees the death thereof.

The technological ground of possibility of photography, Simon's work suggests, goes as far as to preclude the living subject, preferring the revenant and the re-membered (which implies, at some point, a dis-membering) in the creation of image and, by extension, the archive. It may be that the archive, like our expanding compendium of virtual spaces, is always trying to become the whole: recall how Hamlet Sr. wishes to see a wholeness created by the natural procession of royal lineage; how Barthes reinvigorates (attempts to bring to living wholeness) his deceased mother by suggesting the *punctum* of the image, her "hat, her 'chic'"; how, to offer a contemporary example, Google's Image search function seeds a nearly endless number of images to approximate one's search term, but by definition fails at overcoming the metaphorical gulf between thoughts, signs, and corresponding images. Concerning the images of Simon: indeed, "the photograph of the missing being, as Sontag says, will touch [one] like the delayed rays of a star."[132] But the star, because it is far away, is always unknowable, and always already deceased.

The issue of the *revenant* specter in Derrida's *Spectres of Marx* resonates with his opening chapter on the archive, "Exergue," the title of which describes the space on the coin on which the federal reserve mints the date and place of its creation. Using the term *Exergue* he calls attention to "the violence of the archive itself, *as archive*, as *archival violence.*"[133] The archive, in this case, does violence both to the physical coin, stamping it at its inception and pre-valuation. The stamping motion adds immediate value to the metal by transforming it into valid currency. The action also informs the future of its value by citing a permanent year in which it became valid (imagine, say, the relative worth of two similar coins stamped in 1908 and 2008). The coin is revenant insofar as the physical object remains a site into which value is revenant—returns, and then departs from, depending on the condition of the coin or its geopolitical location—or, even, in the form of luck value determined by its orientation when picked up by a child—heads, of course, is the luckier side. The archive at once values all contents similarly: all

[131] Derrida, *Specters of Marx*, 5.
[132] Barthes, *Camera Lucida*, 80–81.
[133] Derrida, *Archive Fever*, 12.

pennies in principle, for example, are worth the same; and yet certain types of accumulation—of time, of quantity—make certain sites of the archive more fertile space for the appearance of spectral meaning.

What does this have to do with Simon's work, our conception of the archive, and indeed our understanding of virtual spaces? Her portraits, like coins, each bear similarities to others nearby—most of her subjects, except for the backwards-sitting gentleman, use the same seated position, for example, and don similar expressions. Also, because several of the series represent people of the same lineage, many vary not as much in look but by age—say, between fathers and sons, or among siblings—as if difference were determined only by exergual date. Nevertheless they are also different enough (in clothing, in posture, in expression) to invoke variety. In this way the portraits become a type of currency (after all, a currency, like a signature, takes its value from the fact that not all are exactly identical, but different, as Derrida argues of the signature in "Signature Event Context"[134]). The archive thus depends on similarity and also variety—for would an archive of a thousand exact copies be an archive? Rather, a critical component of that which we consider to be archival material is each piece's uniqueness; thus what is recorded in the archive, or among virtual worlds, is not just information, but difference.

Virtual space thus gives rise to a virtual world insofar as it confers difference upon the actual—difference which then gives the space value. The gridded landscape, in this way, seems to reference the possibility that each separate square along each visible axis could indeed represent a novel perspective. Perhaps this is one reason the Met's *Studiolo* exhibit includes a tiled floor (*fig. 6*): to take a step in any direction yields a different perspective, a different space, a different subject position, a different rendering of lived reality, and an altogether entirely different and unfolding set of potential readings.

If the archive is equipped to record difference, can it record both the living and the dead independently of each other? Earlier we concluded that the archive could only reassemble, recollect, remember, that which has already been disassembled, disbursed, dismembered, either by or before (nearby or in front of) the camera: Zumra's sons are archived as dismembered, memorialized, but also forms without memories; indeed, Zumra herself, according to the above analysis of Barthes, has suffered many deaths during the photographing process. Even our "mental archives," our memories, which we might think of as the aggregate residue of the past, formulate histories in terms of difference: we only know one memory is not another by the ways in which they differ. It would behoove us to ask not just how to photograph and archive life, but if it is even possible to do so—and, thereafter, whether photographing death is not also impossible without the counterpoint of photographed life. The effects of this would be a medium by which the only photographable entities are neither living nor dead: they are specters.

In *Archive Fever* Derrida introduces Freud's *Thanatos*, or the death drive, and the archival equivalent, the *archiviolithic drive*, to provide an "outside" to the archival drive—the impulse to archive. In this reading, the archival drive is Simon's as she seeks to catalogue bloodlines, whereas the archiviolithic drive, perhaps unrepresentable in art practice, would silently destroy the archive at its inception. Derrida says the archiviolithic drive "is never present in person, neither in itself nor in its effects"[135]—it is *amnesic*, erasing memory. This reminds one of Barthes's concern about the photograph: that it is "never, in essence, a memory … but it

[134] Derrida, *Limited Inc*.
[135] Derrida, *Archive Fever*, 14.

actually blocks memory, quickly becomes a counter-memory… The Photograph is violent: not because it shows violent things, but because on each occasion it fills the sight by force, and because in it nothing can be refused or transformed."[136] Photography, for Barthes, often manifests the same sort of violence as does the archive—it becomes a form that makes demands upon its viewer, refuses to allow for alternative memory, and which forcibly transforms the viewing subject into the virtual space of the portrait. This is why Barthes says he is left bereft of memory after viewing many photographs: they expand to push out one's independent memory. (We are reminded of the specter of Hamlet's ghost again, who while present constrains Hamlet Jr.'s volition of thought, which only returns slowly after the ghost vanishes in presence and mind.)

Is this not true, as well, of other virtual spaces? For example: when we spend so much time watching a TV series, playing digital games, or looking at photographs, do not those spaces become more familiar to us than our own backyards? Through exposure, we develop relationships with fictional characters such that we mourn when their stories are over. "The lived" does not depend on "liveness," but on familiarity and degree of belonging.

Simon's exhibition seems to argue that to become invested in a photograph makes the photograph's interlocutor a sort of photo-nerterologist—one who studies the effects of light on the dead. This includes both the dead appearing to us as shadows within the frames and viewfinders of our lenses, but also from within the mirror-that-is-photographic representation. As observers we are always performing a type of séance, summoning a virtual parade of specters with our mere gazes. The recognition for which we strive when observing others is, in fact, a "re-cognition"—the abstract knowing of another *again*, which in a way implies the intermediate unknowing of that other. Of course, this paradigm could be turned around if our goal is also always to recognize not others, but ourselves in others, in which case the specter we seek to bring into wholeness would not be the "Others" in Simon's work, but our own images as subjects. Are we not also, in fact, specters? For whom is the séance?

Let us finally define the séance: a séance is "a place where ghosts are summoned in order that we may come to (speaking) terms with them"[137]; or, "A meeting for the investigation or exhibition of spiritualistic phenomena."[138] In the first case the operative words are "place" in that the séance becomes a place, rather than an activity, and "(speaking)," which includes but subordinates the actual communication one has with such ghosts. In the second definition we highlight "investigation" and "exhibition" as distinct activities: in the former the entity profiting from the observation is the observer or a concerned participant; in the latter, the population indulges in the link formed between worlds. But there are third and fourth definitions common in the late nineteenth and early twentieth centuries, too: these are either "a 'sitting' for medical treatment," or "a 'sitting' for a photograph."[139]

Historically the word séance has thus been used to describe the act of sitting before a camera, but comes to apply as well (in this reading, especially) to the act of sitting before and considering an image. In either case one negotiates a relationship with a technology: in the first, it is the technology of the camera, in front of which one would sit for between two and twenty

[136] Barthes, *Camera Lucida*, 91.
[137] Ruitenberg, "Education as Séance," 1.
[138] "Séance, n."
[139] Ibid.

seconds—long enough to have to consider the machine and its significance. If it is the late nineteenth century, the machine indeed "shoots" the photographed subject. The first written evidence of this phraseology—the equation of the shooting of a gun with the capturing of a camera—is 1890.[140] One might also consider the subsequent redundancy of the moment; the freezing of time; the death of the individual subject. To sit for a photograph in this sense is not to be alive, but to be meeting in a séance—a *place* in which one not only communicates with what is revenant, or what is past and returned, but a place in which one courts one's own death.

Within the usage of séance, however, is also a medical application implying the addition of health and virility. When carried to the remaining definitions one imagines a type of séance invested not in reanimating the dead, nor in providing a place in which one can become the dead, but in reanimating the living subject. The images, like the photograph of Barthes's mother, offer to reanimate their observers. Ruitenberg's thoughtful "come to (speaking) terms with," in which "coming to terms with" signifies a type of regaining of one's own life over the reanimation of another's, gains metaphorical loft here. One remembers the photographs of Zumra, her father, and the remains of her four children: in a way the séance that is their sitting in observance of us can be *joined* by us as participants, and the reanimation becomes mutual and the healing becomes public. The virtual meets and affects the actual, changing it positively and irrevocably.

The pictures of the victims of the Srebrenica massacre are unusual in Simon's larger series because they provide us with visual representations of the dead more explicitly than the others, which may only implicitly resonate with themes of mortality. Are bones adequate and justifiable as stand-in visual representations of people who once lived? Stover, author of *The Graves,* indicates to us that his work with Gilles Peress exhuming, photographing, and writing about the individuals killed during the Srebrenica massacre has three purposes: 1) to return the remains to grieving families; 2) as evidence in criminal trials of accused participants in the massacre; and 3) to "preserve history."[141] Most curious in this list is the third: what does it mean to preserve history? Is history perishable and/or mortal? Furthermore, is it, as the metaphor supplies, always already present or in need of construction?

In a sense, all photography seeks to preserve history insofar as the moment during which a photograph is made represents that moment by default. But each photograph greedily seeks to represent more than a moment: a picture of a tooth, for example, seeks to represent a whole person; a picture of a five-year-old Mrs. Barthes seeks to represent *a whole history* of Barthes. As we add images—two more teeth and an anthropologically displayed skeleton, for example, we expect a greater, more complete narrative. If we imagine the logical ends of Eric Stover's exhumation of victims of the Srebrenica genocide, we imagine eight thousand images each representing a single victim, combined to create a massive archive of the dead—a séance hosting eight-thousand ghosts and as many viewers as will engage with those eight-thousand present specters.

The significance of Stover's project seems too overwhelming to be interpreted. Taryn Simon only represents the dead in one instance, and only the bodies caused by the events of the massacre. But what if she visually represented the dead of, say, all other relatives of this family,

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[140] "Shoot, v." f. transferred. intransitive and transitive. To take a snapshot (of) with a camera; to photograph (a scene, action, person, etc.) with a cinematographic camera; to take (cinematographic film), to film; occasionally with the actor as subject. Earliest example, 1890, Internat. Ann. Anthonys Photogr. Bull. 3: "Beside him is another sort of shutter operator with an ordinary camera and fairly good shutter... Does he shoot when his companion did?"
[141] Stover, In Conversation: Eric Stover and Michael Mascuch.

going back generations—what would it look like? Marianne Hirsch engages with Susan Sontag's argument that surfeit impels apathy in her essay "Surviving Images: Holocaust Photographs and the Work of Postmemory." In it she presents a number of other writers who support Sontag's claim that we have lost our ability to empathize with individual images, having seen too many. On the contrary, Hirsch claims that violent or otherwise affective imagery does not cause numbness in its witnesses, but trauma:

> Postmemory offers us a model for reading both the striking fact of repetition, and the particular canonized images themselves. I will argue that for us in the second generation … repetition does not have the effect of desensitizing us to horror, or shielding us from shock, thus demanding an endless escalation of disturbing imagery, as the first generation might fear… Thus, I would suggest that while the reduction of the archive of images and their endless repetition might seem problematic in the abstract, the postmemorial generation—in displacing and recontextualizing these well-known images in their artistic work—has been able to make repetition not an instrument of fixity or paralysis or simple retraumatization (as it often is for survivors of trauma), but a mostly helpful vehicle of working through a traumatic past.[142]

Stover's *The Graves*, which narrativizes the genocide at Srebrenica in the interlude between two hundred pages of sometimes graphic and highly-charged photographs, need not worry, if we are persuaded by Hirsch's argument, that its images provide surfeit and therefore provoke apathy. Indeed, apathy in the face of such images would evidence a different sort of mortality in conversation with images of death. Rather, the many images of death allow for a type of catharsis that is life-affirming and also works for both first- and second-generation survivors. The re-membering of bones into bodies gives them a specter-ship that allows for a participation in séance; the subsequent reconstruction of specific histories associated with their coming-to-be bones provides the image with a past against which the specter can be present—the archive from which agency can be summoned to provide comfort, to testify to a crime, or even to merely furnish the past with moments of "'Look,' 'See,' 'Here it is'."

Still, not all think of photographic ghosts as mere willing participants in the pursuit of justice. "There is, in each survivor," Laub argues in *Testimony: Crises of Witnessing in Literature, Psychoanalysis, and History*, "an imperative need to *tell* and thus to come to *know* one's story, unimpeded by ghosts from the past against which one has to protect oneself. One has to know one's buried truth in order to be able to live one's life."[143] For Laub, "living one's life" is contingent upon protecting oneself against "ghosts from the past." In this instance the re-membered specter—or remembering at all—is antithetical to one's forward momentum in time. The revenant not only comes back, but holds one back. Thus when Derrida says that "haunting belongs to the structure of every hegemony,"[144] he's not just talking about Post-Marxism after the cessation of Cold War Europe, but also the power of the image over the witness—a type of virulent nostalgia; the power of Barthes's mother over him; the power of Zumra over us. It is not the photographed who are summoned to us, but we in our thoughts and bodies who are

[142] Hirsch, "Surviving Images," 8–9.
[143] Felman and MD, *Testimony*, 78.
[144] Derrida, *Specters of Marx*, 46.

summoned into images. The question, again, is: for whom is the séance? The answer may very well be: for the *virtual* subject.

Let us look at and attempt to include in analysis one additional brief example of contemporary image-making and its relationship with both death and the archive to try to come to some speculative conclusions about these themes.

To make his most recent series of portraits entitled "Family Tree," Bobby Neel Adams photographs two close family members (mother and daughter, father and son, sister and brother) before re-sizing the photographs such that, ripped in half, they line up to form a single dissonant, though often oddly confluent, portrait (*figs. 31 and 32*). They are at once images of lineage—grandparents beget parents; parents beget children—and also images of the failure thereof, as each adult *is* the child, in a perverse, time-altering way. In another similar series entitled "Age Maps," pictures from a person's youth are spliced onto their current face (*figs. 33 and 34*). In many cases the latter, older face, always because of technological progress the higher resolution image, becomes no more than a ghostly parasite on the other, while the younger becomes no more than a memory of the former. Adams's images seem to both pay tribute to history (when, for example, an image of an older person absorbs the yellowed, faded style of the picture of the younger) and also offer a promise of what time will make of a youthful body. This "promise" of the archive Derrida calls "a *pledge*, and like every pledge, a token of the future."[145] In a sense the pledge of the images of Adams is not one of a future at all, but one of a static time in which all participants are spectral.

Figure 31: "Family Tree," Bobby Neel Adams.

[145] Derrida, *Archive Fever*, 18.

Figure 32: "Family Tree," Bobby Neel Adams.

Figure 33: "Age Maps," Bobby Neel Adams.

Figure 34: "Age Maps," Bobby Neel Adams.

In all cases of image splicing, Adams creates *composites* of people—people who are clearly, irrevocably, horrifically consigned to memory and death. At best, the images are strange; at worst, nightmarish. Adams thus calls attention to the ways in which photographs are always attempts at archiving specters—those always already dead—and producing spaces of alterity in which such beings can exist. Adams has termed his process for producing these pictures "photo-surgery," and says of his work, "The point at which the images are physically torn together

becomes the boundary line (or bridge) between decades of passing time … To me they provide an eerie life-map, staring towards our future."[146]

In a way their "staring towards our future" remembers Georges Didi-Huberman's *Images in Spite of All*, in which he describes a type of Jewish resistance during the holocaust by invoking the voice which says: "We owe it to ourselves […] to stand straight up and not to drag our feet, not out of homage to Prussian discipline, but to stay alive, so as not to start dying."[147] It is this "stand straight up" which Didi-Huberman calls "its simplest 'paleontological' expression, the upright position," affected in Simon's seated but upright subjects, which seeks to create in the image a *resistance* to death; and yet, because such images also resist life, they become the specter.

It seems clear that photography as a course of study must necessarily be an eschatology—a study of life-after-death and a study of the virtual subject. This is not to say the subjects of photographs lack agency; just as Hamlet senior's ghost causes great mental and emotional shifts in thought for young Hamlet, so images re-member history in the formation of archives—places in which the images gather and converse. Implicit in remembering is always the destruction or dismantling of the thing itself; and the act of dismantling necessarily changes the thing, as does the assembling in the first place. The images of Simon, for example, accumulate, sitting upright, in what resonates as a form of resistance. It is this type of resistance Rancière characterizes in "The Intolerable Image": "these images [captured by the *Sonderkommando* from within the gas chamber] were intolerable," he quotes Pagnoux as arguing, "because they were *too real*."[148] We have come to expect of our images the type of virtual immateriality they so often represent, and it is only when they verge on the real, crossing a threshold that breaks down the distinction between the actual and the virtual, that we express our indignation. This is because we, too, are often specters vis-à-vis the image, and it is when the images become material we begin to realize our own immateriality, and it frightens us.

Regarding Salable Subjects: Ad-Portraiture's Embrace of Modernity

We have explored how the image disrupts psychic frameworks of life and death, instantiating with each individual glance "different spatiotemporal systems" in the viewing subject that become part of that subject's lived-reality. Memories are formed that include these systems; lives are lived according to these memories.

But what of "staged" images? Does the staged image also instantiate novel, self-proliferating virtual realities? Rancière reminds us that the image, regardless of its history, intentions, the conditions of its creation, or its ethical preconceptions, produces a space:

> What is called an image is an element in a system that creates a certain sense of reality, a certain common sense…. The point is not to counter-pose reality to its appearances. It is to construct *different realities*, different forms of common

[146] "Would You Like To See Your Own 'Age-Map'?," 1.
[147] Didi-Huberman, *Images in Spite of All,* 43.
[148] Rancière, *The Emancipated Spectator*, 89. *My emphasis*.

sense—that is to say, different spatiotemporal systems, different communities of words and things, forms and meanings.[149]

Let us channel another side of Barthes and consider, for example, the ad-image.

Figure 35: Untitled Louis Vuitton advertisement (2008).

In March of 2008, Louis Vuitton, in collaboration with advertising agency Ogilvy & Mather and photographer Annie Leibovitz, published an ad campaign featuring Keith Richards as the "new face" of Vuitton's formidable selection of high-end handbags and leather goods. The ad (*fig. 35*) showcases the nearly-70-year-old rock star sitting comfortably on a hotel bed, guitar in hand, beside a custom-made Louis Vuitton case. The room is chic yet nondescript, with flowing green draperies, a nearly-illegible baroque portrait of a woman bathing (is it a Watteau? a Fragonard?), and a variety of thick, old-looking books scattered about the room. One of the books lies open on Richards' case, presumably being read between classic chord progressions, and several more rest on each of two nightstands in the image. Only one has a title that is discernible: the first two letters "GO" on the spine, along with a telling color scheme of red and black, reveal that Richards is in possession of Jann Wenner's *Gonzo*, a controversial biography of Hunter S. Thompson and the eponymous brand of journalism he began. Indeed, the image, like all advertisements, does industrial work: it at once associates the retrograde with the ultramodern, encouraging an older fan base to remember their brand loyalties, and also defines the "journey," via the image's literal message, as imagistic and ineffable. The ad succeeds to the extent that it coordinates a portrait of Richards commensurate with high-literacy, class, and a particularly "lived" vitality, and to the extent that it encourages its readers to identify with or

[149] Ibid., 102.

emulate the specific conglomeration of values Richards has come to represent—including, it seems, a penchant for Louis Vuitton merchandise. Already we have the production of specific and coordinated virtual reality—an intimate memory of casual stardom and leisure-time travel.

And yet if one browses through the comment trees located below Leibovitz's production video of the same event[150] one finds a measure of hostility towards the image. Language like "anti-establishment" and "righteous" clashes with words like "pandering," "self-promotional," and "demeaning behavior" to describe how Keith Richards "once was" against how he "now is." An expectation of Richards as anti-consumerist confronts a moment in which he seems to espouse materialism and the commercial. Such discourse makes us aware that a boundary has been transgressed—an ethics breached. The image, beyond provoking an increase in Vuitton's sales, also instigates questions surrounding the status of the image as it speaks to values both within and beyond its frame, both intended by its artist producer (Leibovitz) and by the network of agents that surrounds her (Keith Richards, creative director Christian Reuilly, copywriter Edgard Montjean, Ogilvy and Mather then-president Miles Young, to name just a few). Who is accountable for artistic production in an era of artist networks? By whom, and, of equal exigency, *of* whom, is the portrait?

Richards isn't the only one responsible for the vexing juxtaposition of rock icon and expensive merchandise, though he ends up being the locus of such attacks. Annie Leibovitz, celebrated master of characterization, one-time partner of Susan Sontag, and pioneer of portraiture as a genre (and as something of a rock star herself), becomes reclassified as a producer of the impure, the depthless, and the transgressive. Of course, the reduction of the commercial to the vulgar is not new: the unyielding boundary between art with a capital "A" and advertising with a lower-case "a," though the last half-century has labored over the dissolution of such distinctions, has yet persisted in public discourse. In his "Depth Advertised," for example, Barthes suggests that "…the notion of depth is a general one, present in every advertisement,"[151] impelling us to observe that while the "notion" of depth is present in a perhaps aspirational way, depth as a measure of the ad's *quality*[152] is not. Jameson, in his *Postmodernism or, The Cultural Logic of Late Capitalism*, identifies the problem of depthlessness, superficiality, and "surface" as one affecting not just advertising, but a whole field of postmodernity.[153] "Lack of depth" is deployed both as an observation of a quality of the image—namely, its two-dimensionality—and as a critique entailing "lack of meaning." But dating back to the *studioli* and beyond, the image has contained its own depth, both literally and figuratively, in both its performance of extra-dimensionality and also its layers of meaning.

Despite both Barthes' suggestion that advertising represents a mere "notion" of depth, and despite its own constitutive preconditions as a commercial practice with bottom-line earnings always in mind (earnings always by default aligning themselves with depthlessness, we are supposed to understand), ad-portraiture necessarily challenges Jameson's theory of surface with its own ineluctable rendering of depth. The selection of portraits—some of them even self-

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[150] For example: http://www.youtube.com/watch?v=9bmfPxTK9Js (accessed April 12, 2013)
[151] Barthes, *The Eiffel Tower and Other Mythologies*, 47.
[152] This, too, is a vexing word. In his book *Lila: An Inquiry into Morals*, Robert Pirsig defines quality as "a direct experience independent of and prior to intellectual abstractions" (Pirsig, *Lila*, 73). If we take this as our model thereof, ads must possess quality if and only if they engender a "direct experience," which (paradoxically) seems as though it must be symptomatic of *depth*. This chapter contests that ads *do* offer a "direct experience," therefore permitting the association of "quality" and ads in a way that justifies the ad-portrait as containing legible depth.
[153] Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism*, 20.

portraits—that this chapter discusses exemplify on the one hand an image of postmodernism as Jameson in 1991 defines it, and yet also serve to exemplify modernity's resilience in the age of information. Ad-portraiture, as this section calls it, thus permits what Jameson calls the "cultural dominance" of postmodernism, but nevertheless begs the question: to what extent does the presence of ad-portraiture represent a return to the classically modern, or even the early modern yearning for the "ideal" space as accessible through the image?

How do we determine "depth" in an image? For Heidegger "the work of art emerges within the gap between Earth and World"[154]; for Jameson, it emerges between "the meaningless materiality of the body and nature and the meaning endowment of history and of the social."[155] The photographic work in this especially Marxist rendering is thus defined as a product of two opposing realms: that of the social and that of the material (the former virtual, the latter actual). Yet the photographic advertisement, like the photographic work, also emerges in a space characterized by both the work's socially-defined signification (its World) and the highly terrestrial bodies into which it invests narrative meaning. We have, as Heidegger says of the work of art, a similar confrontation between the production of meaning through association and the material space in which meaning is produced: Richards in his evening pirate regalia, sitting inconsequentially in his hotel suite, is the meaningless social body we invest with World. The advertisement is a story of a brand, yes, but also comes to be a veritable ecosystem of signification. Richards "means" "anti-establishment," "righteousness," "self-promotion," "independence," "rock and roll." His mythology "speaks" from his body's image, despite the literal message's insistence on the journey's ineffability. In short, we have an easy time seeing the difference between Leibovitz's commercial work and her non-commercial work, but a harder time theorizing that difference in a way that denies the former a similar type of cultural currency.

Jameson contextualizes Heidegger's claim by discussing Van Gogh's *A Pair of Shoes* as a piece of high-modernism.[156] The painting occupies the realm of high-modernist art insofar as it is "to be grasped simply as the whole object world of agricultural misery, of stark rural poverty, and the whole rudimentary human world of backbreaking peasant toil…"[157] Jameson highlights an intimacy between the subject (the pair of shoes itself) and the social and material worlds it denotes, contrasting its wealth of signification with the paucity of Warhol's *Diamond Dust Shoes*—which, in his words, "no longer speaks to us with any of the immediacy of Van Gogh's footgear; indeed," he says, "I am tempted to say that it does not really speak to us at all."[158] For Jameson, the difference lies in restoration—whether or not the work can be restored to, or can otherwise speak for, its historical and social contexts. Yet is the ad-portrait, dependent as it is on mercantile forces, even a tenable candidate for the type of status-as-work quality that both pieces by Van Gogh and Warhol command? Perhaps we can for the time being remain indifferent to the distinction in order to call Leibovitz's advertisement unequivocally a work, and moreover (at

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[154] Ibid., 7.
[155] Ibid.
[156] High-modernism, for Jameson, more closely resembles a classical modernism of the late nineteenth century, defined by an earnestness still possible in the pre-war West, than it does the elsewhere-described "high-modernism" of the cold-war era, alternatively characterized by a belief in science and technology as redemptive forces. In this chapter I generally use "high-modernism" and "high-modernity" as Jameson uses them: to describe work similar in aspect to Van Gogh's *A Pair of Shoes*, as opposed to works similar in aspect to Warhol's putatively postmodern *Diamond Dust Shoes*.
[157] Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism*, 7.
[158] Ibid., 8.

least until proven otherwise) a *postmodern* work. Her portrait therefore emerges as divested of theoretical aspirations, depth, and as suffering from Jameson's "waning of affect." It signifies, but what does it signify?

The Leibovitz image, taken alongside its paratextual signifiers, seems at first to foreclose meaning by wedding the imagistic with the commercial: Richards and the Vuitton bag are both focal points: they both sit on the bed, they both mirror each other in angle, and they both dress in browns and blacks, typifying their relationship as symbiotic and relational. The portrait thus bears the marks of late-capitalism's multi-national corporate bottom-line desires. The movement of capital, and the transfiguration of Richards-the-icon into a Pavlovian motivator of bag sales both prefigure our reading. The image may then imply the type of postmodern depthlessness on which Jameson insists. We at least suspect it right away of a type of ideological fraud reserved only for advertisements. Richards seems at first to bear the very face of the waning of affect, with an expression that we can only describe as vacuous. The hotel room, obvious in its white-walled austerity and floral comforter, implies transience, and if we are going to associate the "depth" of high-modernity with a type of temporality, we must resolve to pair transience with shallowness, and intransience (as if shoes could be intransient!) with depth, history, and character. Formally the image also lacks a sort of depth insofar as the curtains remain closed, giving us a depth-of-field of only about fifteen feet. Finally, the added décor of the room engages in what Jameson calls *historicism*, or "the random cannibalization of all the styles of the past, the play of random stylistic allusion, and in general what Henri Lefebvre has called the increasing primacy of the 'neo'."[159] Leibovitz decorates the room with a curved knife and a spyglass, and black, skull-sporting handkerchiefs, establishing an ambiance of the golden-age-of-piracy. This, along with the replica eighteenth-century baroque portrait and twentieth-century glass of what appears to be tang on the nightstand, seems to evidence the Jamesonian "pastiche" that "randomly cannibalizes" the historical to create the "neo."

Yet it would be difficult, too, to say the image cannot aspire to an aesthetics of high-modernity. Depth, after all, is not entirely absent: the image maintains a "depth of field" in the anonymous portrait that graces the room, and what we don't get for depth in the room itself we see not only in the distance allocated by the portrait, but also into *temporal* distance it provides. Though we in turn sense pastiche, we find the image no more alienating than Van Gogh's *A Pair of Shoes* in its relationship with materiality—and certainly less-so than Warhol's *Diamond Dust Shoes*. For what "speaks" more than (and forgive my earnestness here) the depths of Keith Richards' face? his storied wrinkles; his sunken eyes? Hardly can one think of a face on which history has been written more profoundly. The proairetic codes of the opened bathroom door and the half-eaten plates of food moreover arrest the viewer with questions about his solitude. We find a material relationship between the leather product and leathery skin, the allusions to occupation, capital, and the displacement that comes with fame. All such observations court Jameson's prescribed ideals of high-modernity—which, according to him, insists on the work's mediation of "the whole absent world and earth" that are drawn "into revelation around itself."[160] Leibovitz's ad-portraits cite the postmodern, but *also* align themselves with the classically modern in a way that confronts the cultural dominant and periodization as a whole. The work is indeed *restorable* to a time—to the present—and seems to engender "the whole absent world and earth" in the solitude of one of the world's most well-known musicians seated among his bags

[159] Ibid., 18.
[160] Ibid., 8.

and books. The portrait is a World; it is, like Van Gogh's piece, about products of labor, and the alienation that occurs when Richards quietly regards the commodity he has come to represent.

Perhaps this is why the ad's recommendation that "some journeys cannot be put into words" appears as both trite and also trenchant: the journey possesses a shallowness insofar as it masquerades as lived experience (Van Gogh's *A Pair of Shoes* doesn't need to *speak* of journey), whereas the portrait's reference to its roots in the baroque speaks of one type of journey: the material or imagistic journey of the genre, as it existed centuries ago and as it exists now. Leibovitz, working digitally, creates not only an expression of movement through life-time by investing Richards' face with history (history of a journey to the hotel; history of youth in light of old age), but also a tribute to a pre-industrial mode of expression as it shares qualities with the similarly industrial mode of expression of her publications. That is, the backdrop reproduction of a baroque portrait in the top left of the image (for the portrait is not only physically a reproduction, but also probably the work of a follower of a more well-known painter) has been itself reproduced within a highly-distributed magazine advertisement. The ad thus pays homage to the shape of portraiture, arguing that mass production of the image hasn't changed much since the industrialization of reproduction, which many theorists, including Jonathan Crary, cite as a defining characteristic of the beginnings of modernity,[161] *not* postmodernity.

Despite this, the advertising image has yet to do the long slog out of the strange welter of postmodernity into which it is often hastily shunted. For Jameson, "reproducibility" comes to resemble mere decoration[162] or, at the very least, pastiche and fracturing, all three of which he argues constitute the postmodern. On the contrary, in his *Techniques of the Observer: On Vision and Modernity in the 19th Century*, Jonathan Crary argues that

> The standardization of visual imagery in the nineteenth century must be seen then not simply as part of new forms of mechanized reproduction but in relation to a broader process of normalization and subjection of the observer. If there is a revolution in the nature and function of the sign in the nineteenth century, it does not happen independently of the remaking of the subject.[163]

For Crary, reproduction is not a sign of the postmodern but of the beginning of modernity. We might say the distinction is semantic: that "reproduction" is not the same as "mechanical reproduction," and that it here more closely resembles the pure production we assign to classical modernity. Yet Leibovitz's image is not a narrative series but a singularity; it has no brushstrokes, but it does have a grain, or a style, characteristic of her oeuvre as an artist. The photo is produced digitally as information, but in its compositional aspirations it represents the one-of-a-kind. It strives to fit within a mode of production, but insists on its own individuality within that mode.

But Crary is also interested in the extent to which the modern is defined not by new forms of mechanical reproduction but by a repositioning of the onlooker, and a shift in what it means to observe. The question therefore changes: does the work of Leibovitz reference the

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[161] Crary writes: "Thus modernity is inseparable from on one hand a remaking of the observer, and on the other a proliferation of circulating signs and objects whose effects coincide with their visuality, or what Adorno calls *Anschaulichkeit*" (Crary, *Techniques of the Observer*, 11.).

[162] Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism*, 7.

[163] Crary, *Techniques of the Observer*, 17.

restructuring of subjectivity that comes with modernity? In the portraiture of Leibovitz we see the three qualities of modernity Crary lists above: we witness the standardization of visual imagery in the regularity of Leibovitz's style (her subjects are often classically balanced, carefully-composed, well-lit, and of a bold or otherwise imposing posture). Certain signs, like the hotel curtains and the spyglass also refer to their own visual standardization as signifiers of "hotelness" and the roguishly seafaring qualities of her subject. Second, we detect an attentiveness of the ad-portraits to their own modes of mechanical reproduction. In another of Leibovitz's Louis Vuitton advertisements (*fig 33*) she is herself lounging dramatically, golden hair blowing behind her, as she observes a subject she will photograph among those tools she will use to reproduce him. An umbrella provides powerful overhead lighting, suggesting an intensity of the scene unpermitted by the frivolity and depthlessness of the postmodern work. The ad-portrait of Richards also includes such attention to its own production with its reference to three-point lighting (note the three strong sources of light) and a three-quarter turn pose for Richards.

Figure 36: Untitled Louis Vuitton advertisement (2010).

Most importantly for Crary, however, in determining the relationship between a given work and modernity as it arises in the early nineteenth century is the "normalization and subjection of the observer." Where once the technology of the *camera obscura* seemed to justify a belief in the fixedness of the world, he argues, new ways of observing came to move perception *into* the observer, subjectivizing the perceived,[164] explaining why many pieces characteristic of high-modernity challenge realism, or at least critique the narrow visual limitations of perspectivalism. He cites this change in what it means to "see correctly," along with "a pervasive 'separation of the senses,'" as social movements that distance the observer from the observed, and destabilizes their truth-relationship to it.

While the ad-portraiture discussed herein does not, strictly speaking, challenge image-reception at the level of the visual signifier, we are able to see both of these processes—the

[164] Ibid., 24.

denaturalization of realism and the "separation of senses"—in the two Leibovitz images above: in the first, the action of the scene is confused by the intimacy of the viewer's presence, and though the image at first appears to espouse realism in its rendering of Richards, we yet feel self-conscious about our proximity, our imposition into the privacy of the subject, which changes our experience from one inviting the real to one inviting the surreal. That is, we are forced into the scene itself. As with the *studioli* of chapter 1, the exaggerated closeness of the scene's details help make the space an effective medium by which to transfer values.

The latter image also dramatizes "looking" in a way that formalizes our awareness of the subjectivity of the onlooker. The high-intensity lighting on a central space makes it look like a pale fog hovers between the observer and the observed, representing the distortion of the subject's gaze, while the out-of-place objects in the first image (the skull, the spyglass, the pirate flag-like handkerchiefs) defy sensibilities of realism.

Both images also perform a "separation of the senses," or more specifically a loss of touch, in their execution of space. Crary describes further what this means when he suggests that the empirical isolation of vision "enabled the new objects of vision (whether commodities, photographs, or the act of perception itself) to assume a mystified and abstract identity, sundered from any relation to the observer's position within a cognitively unified field."[165] This seems to be both true and false in the images in question. On the one hand, the latter image "sunders" the viewer from the viewed, negotiating the relationship between the two without recourse to touch. Where they could be embracing (Leibovitz, left, and Mikhail Baryshnikov, right, were close friends, after all) the former instead regards the latter. In the first image we "feel" the qualities of the image's materials visually, but also examine the space as intruders, and not one to be touched. Thus, at least by Crary's definition of modernity, Leibovitz's images seem once again modern in affect, linking them more to *Renaissance trompe l'oeil* than to Warhol's *Diamond Dust Shoes*.

Beyond the formal qualities of the images, we continue to find ways in which the realism of Leibovitz's ads courts the high modern. Associatively, we are disturbed by our recognition of Richards' body as one both familiar and unknown; as a rock star, images of Richards' youth, more common than those of his aging body, obscure his current presence. As a contemporary he feels far away, and if not out of his time (he still tours, as of 2019) then out of his element. Our gaze feels "modern" in its self-consciousness; one remains eminently aware of the "industrial remapping of the body"[166] that takes place in Richard's transition from performer who "does," to body that is "witnessed." Just as we cannot look at Van Gogh's *A Pair of Shoes* without recourse to the material, we cannot observe Richards' body without being aware of the extent to which it is also material and maintains a place within late capitalism. We even feel that the tension of the piece somehow rests in the danger of the body's materiality vanishing entirely. In the second image, we yet feel the same strange sense of imposition: that we've stumbled across a moment of intimacy that could result in disappearance: the door is open, the body is frail. It also happens that the intimacy occurs as a type of performed observation. In the second image, Leibovitz looks upon world-class dancer Baryshnikov as an object sculpted by his occupation. We note, especially in the second image, how we find the action of it within the *looking* that Leibovitz does. But if modernity, for Crary, is defined by a repositioning of the locus of perception in the early nineteenth century, what then can we say postmodernism does to forms of observation?

[165] Ibid., 27.
[166] Ibid.

If Warhol's *Diamond Dust Shoes* is to be our guide, then postmodernism necessarily obliterates the subject position entirely: commodity effaces the human; it is *too* close, *too* colorful; intimacy is replaced by a combination of rapture and irony. The same may go for Warhol's Marilyn prints, which Jameson says present us with stars which are "themselves commodified and transformed into their own images."[167] Yet in the ad-portraiture of Leibovitz, the commodification of the subject doesn't occur at the expense of the human. We begin to see how Keith Richards' expression is not only of indifference and absence, but also of weariness; how he doesn't unapologetically embrace the corporation that supports him, but how he turns his back to the Louis Vuitton case and covers it with other cultural artifacts. The ad-portrait distances itself from the hyper-postmodern style of Warhol's Marilyn prints to mimic a softer, more serious type of high modernism that hasn't been thought possible under the conditions of the postmodern.

Jameson of course contrasts Warhol's Marilyn prints with Edward Munch's "The Scream," which he calls "a canonical expression of the great modernist thematics of alienation, anomie, solitude, social fragmentation, and isolation, a virtually programmatic emblem of what used to be called the age of anxiety."[168] And while I don't wish to overstate my point (though perhaps it demands overstatement), it seems that the work of Leibovitz engages with themes of alienation, anomie, solitude, social fragmentation, and isolation as well "as a virtual deconstruction of the very aesthetic of expression itself,"[169] implying that, following Warhol—at least as far as advertising portraiture is concerned—we have embraced the modern in a way that seems to rebel against the current postmodernist aesthetic in general.

Interestingly, Warhol features prominently in the work of another contemporary ad-portrait artist, Greg Gorman, whose campaign for l. a. Eyeworks has been anthologized in his 2012 book "FRAMED: Greg Gorman for l.a.Eyeworks." Since 1982, Gorman has shot hundreds of artists, politicians, and celebrities in a classical black-and-white headshot series of advertisements for the eyeglass manufacturer, always with the same caption: "A face is like a work of art. It deserves a great frame." In 1985, charmed by the campaign, the rumor goes, Warhol himself asked to be photographed by Gorman for an ad, which at the time was running in Warhol's *Interview* magazine. Warhol was of course no stranger to advertising—indeed, David James notes in his article "The Unsecret Life: A Warhol Advertisement" that the artist "either designed or appeared in many purely commercial projects: a billboard and album cover for the Rolling Stones; a car painted for BMW… rum ads with Margaret Trudeau; a commercial for New York Airlines"[170] and many more. This leads James to conclude that "his return to advertising after the establishment of his status as an artist was quite unique; but no more so than his claim that in his own practice—and by implication in the world at large—the two were inseparable."[171]

[167] Jameson, *Postmodernism, or, The Cultural Logic of Late Capitalism*, 17.
[168] Ibid., 11.
[169] Ibid.
[170] James, "The Unsecret Life," 23–24.
[171] Ibid.

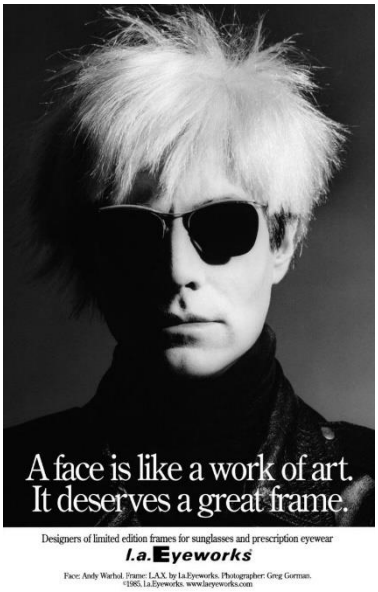

Figure 37: Greg Gorman, l. a. Eyeworks advertisement, 1985.

I suspect Jameson, if not Crary as well, would associate this inseparability of the commercial and the artistic with the postmodern, for in the postmodern work regarding consumer culture always expresses both the commercial and the aesthetic simultaneously. And yet the image of Warhol (*fig 34*), with his dark shades and brilliantly white hair, looks not so different from other more traditionally modernist portraiture from the early twentieth century. E.O. Hoppé's portrait of Tilly Losch (*fig 35*), Austrian-born dancer and actress, for example, employs a similarly intense composition: both use high-angled spot lighting to create dramatic shadows across the face; both focus on the subject's eyes, and though the image of Losch allows for a penetrability of the gaze that permits affect, the former's caption allows us to read the pair of glasses as that which presents Warhol to us—as "framing" him—rather than as that which prohibits us from accessing Warhol at all. We remember, too, that Warhol's fame by this point makes him recognizable as the face of the postmodern movement, and so we find him accessible as a "known subject," with depth and history, despite the glasses. Yet, given Warhol's iconic status as an embodiment of the postmodern, how can one argue Gorman's portrait aspires to an aesthetics of high-modernism?

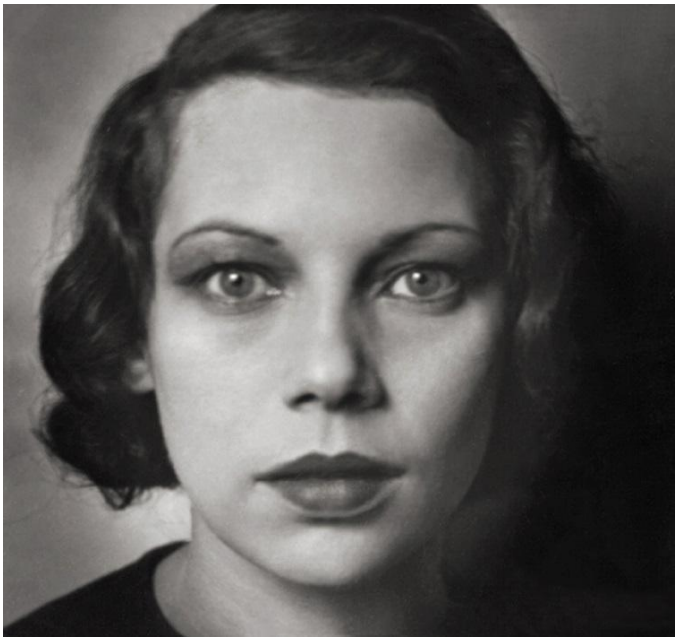

Figure 38: E. O. Hoppé, "Portrait of Tilly Losch," 1928.

Put another way: can an advertising image featuring Warhol be anything but postmodern? The image appears to present us with a number of Jameson's tenets of postmodernism: the waning of affect, the "surface" quality, the realism that seems to be in the service of its ineluctable depthlessness. And yet we can also compare it to a (decidedly modern) self-portrait of Jean Arp (*fig. 39*), an artist himself best known for his surrealist sculpture and for participating in the founding of the Dada movement. Both images offer themselves in black and white, which, while not the utopian explosion of color common of modernist painting, still denies the superficiality of a realist palette. Black and white, moreover, tends to register an image's shadows (its depths) more profoundly. Both images also focus on the extent to which portraits both do and do not return the gaze of the viewer—Warhol's by obscuring his eyes with dark shades, Arp's by occluding one eye with a strange, monocle-like circle. All three portraits, however, suppose a distinction between interior and exterior that characterizes the modern: Losch with a look of expectancy and desire, and with eyes that appear to "mean"; and Warhol and Arp by presenting us with an exterior that demands our imagination of an interior, and which thus prefigure our subjective creation of that interior. Warhol's face, moreover, "is like a work of art" insofar as it serves as an "inside" sign system that "deserves a great frame," or what we might otherwise call an exterior. We are led to confront the virtual subject in terms of its implicit depth, its history, and its life apart.

Figure 39: Jean Arp, self-portrait, ca. 1922.

One might find, however, an inevitability in this argument: how, then, can a portrait *fail* to imply depth? Are not all portraits, including ad-portraits, committed to both affect (surface) and also the implication of an interior? Doesn't the gaze alone imply depth? In his introduction to *The Postmodern Condition: A Report on Knowledge*, Lyotard defines the *modern* as "any science that legitimates itself with reference to a metadiscourse …[by] making an explicit appeal to some grand narrative, such as the dialectics of Spirit, the hermeneutics of meaning, the emancipation of the rational or working subject, or the creation of wealth." On the contrary, he defines the *postmodern* as "incredulity toward metanarratives."[172] If we are to define an image's status as either modern or postmodern by these criteria, we must look for their treatment of metanarrative.

It is perhaps patent by now that Leibovitz's images for Louis Vuitton depend on the structuralist deployment of the "journey" narrative as somehow truth-bearing, while Gorman's images reinforce the bourgeois expectation of class mobility through mere adjustments of optics—that anyone can possess the face of Andy Warhol with the right frame, and the right frame can be acquired for a modest fee. And even these metanarratives conceal the more subversive constant of the hegemony of capitalism that always underwrites advertising images: that real, personal change can occur through the exchange of goods. According to Lyotard, then, ad-portraiture *cannot* be postmodern, even though it is a product of the "postmodern age,"[173] and even though it occurs in post-industrial society, because it is entirely invested in metanarratives. The commercial work of Leibovitz and Gorman is always, already, and forever modern.

But if ad-portraiture is always modern in its service of metanarratives—of narratives of interior and exterior, of class mobility, or at the very least of the baseline functionality of capitalism—then what has the development of the work of Leibovitz, Gorman, or other commercial portrait artists done? What's striking about the work of advertising portrait artists—Sandro Miller, Robert Caplin, Brian Duffy, and even, to some extent, Edward Steichen, to name a few other examples this chapter neglects—is the way in which they have found, in a postmodern ecosystem, a manner of being classically modern that is both unexpected and

[172] Lyotard and Jameson, *The Postmodern Condition*, xxiii.
[173] Ibid., 3.

prescient, and which gives life to the virtual subject. And while Jameson disavows periodization as problematic in its own right, it nevertheless might be helpful to see the ways in which one genre yet longs for—and, I think, achieves—a bygone, and even heroic, aesthetic of art-making and art-reading.

CHAPTER 4: HYBRID EMBODIMENT IN VIRTUAL SPACES

What Does the Cyborg See?

The photographic portrait, as described in chapter 3, confronts the viewer with a deceptively simple scene: a body in a space. The portrait functions as a striking object for the analysis of virtual space because it is at once entirely inaccessible, being but ink on paper or pixels on a screen, and yet held in special regard in our memories. We are, that is to say, affected by photographs, and disproportionately so by photographs of people. A 2011 study, the first of its kind (according to the authors) found that the presence of "other humans" was far and away the most reliable predictor of the memorability of an image in any given random set.[174] Images of patterns, landscapes, buildings, and monuments, all fall along a spectrum of memorability considerably more subdued than the degree to which we remember images containing the human form.

Whether motivated by artistic or commercial interests (or a combination thereof) portraiture inspires in the viewing subject strong affective responses: feelings of fondness, warmth, comfort, frustration, disturbance, and sadness are all possible reactions to an image of another person. These feelings, chapter 3 has argued, occur predominantly owing to the implicit dimensionality of a photograph: the built-in perspective that compels the viewer to suspend disbelief in the porous borders between spaces, and to cross over. Barthes' feeling of "that-has-been," what he deems the photographic index, further enables a transference of subjective understanding regarding photographs through the mechanisms of memory and empathy: one alternately joins and is joined by the subject depicted across the virtual seams that separate our worlds, simply by looking.

One remembers this scene as a reoccurring trope in modern cinema: the cherished photographic portrait, lifted from a wallet, a nightstand, or pulled from a driver-side sun visor. The photograph has the effect of standing in for human history, creating historical duration by contrasting, say, a protagonist's wistful gaze with the photograph's implicit trenchancy. A perfect example takes place in Ridley Scott's 1982 *Blade Runner*, when the replicant Rachel, to prove her humanity, hands Deckard a photo, saying, "Look, it's me with my mother. It's me."[175] The work of the photographic image is, in this scene and so many others, to establish a meaningful bond between a subject position and a dimensional body across time, whether that body is one's own or that of another. There is a slippage from two-dimensionality to three-dimensionality: the photograph isn't metaphor, it's synecdoche: "this is me."

The problematics introduced by the invention and propagation of the photographic image have only been exacerbated by the evolution of computing in the mid-twentieth century. The increasing reproducibility of the image itself is only part of this complication: yes, each image creates a "window," or technological point of access to a novel virtual space, but the power of the computer to simulate functional and interactive environments seems to go well beyond the multiplicative equation of "more images equals more virtual spaces." In fact, the very existence of the computer has challenged the uniqueness and independence of human subjectivity overall. Is the computer merely a prosthesis to human representation, or something more?

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[174] Isola et al., "What Makes an Image Memorable?"
[175] Scott, *Blade Runner*.

Our relationship with the computer as a technology begins with a vexing conflation of terms. In her third and final book in a tripartite series on materiality, cybernetics, and literature, Katherine Hayles begins with a discussion of the origin of the word "computer," noting that during and before the 1930s and 40s the word was used to describe a specific wartime laboring class—composed mostly of women—employed at performing calculations during the infancy of computing technologies. She uses this occupation to inform the title of the book, *My Mother Was a Computer*, describing this sentence early in her text as "a synecdoche for the panoply of issues raised by the relation of Homo sapiens to Robo sapiens, humans to intelligent machines."[176] This synecdoche points not only to a type of being which she in an earlier book calls the "posthuman,"[177] but also points to hybridity as it raises questions about the past and present of gendered bodies. We think, again, of Rachel, whose photographic mother was a simulacrum, but whose "real" mother—insofar as prior versions of the Tyrell Corporation's Replicant technology could be her lineage—would have indeed been a computer.

Published fourteen years before Katherine Hayles' *How We Became Posthuman*, Donna Haraway's *A Cyborg Manifesto* proposes a new resistance to what she calls the "maze of dualisms in which we have explained our bodies and our tools to ourselves."[178] This maze of dualisms has for centuries acted, according to Haraway, as part of a hegemonic scaffolding of religio-historical associations of the feminine with the natural, the passive, the bodily, and, by extension, the un-technological. Descriptions of "Mother Earth," nature goddesses, the ubiquitous articulations of women as "natural," and references to the garden-dwelling antelapsarian archetype of Eve, have facilitated both the oppositional structuring of men as technological, active, complex, and dominant, and provided for the decoupling of the feminine from qualities that denote agency. The lexicon used by Western civilization regarding femininity, Haraway argues, has proven both socially constrictive and politically disastrous for individuals inscribed as female-bodied.

Haraway therefore calls for the discarding of mythologies of the organic, wholistic female body in favor of the body of the cyborg—piecemeal, negotiable, non-innocent. She writes: "The cyborg is a kind of disassembled and reassembled, postmodern collective and personal self. This is the self feminists must code."[179] By "the self feminists must code" we understand Haraway to mean both an injunction for our collective reconstruction of an iconic, socially-determined "self," and the rethinking of selves at the interpersonal level of individual bodies. If indeed the era of computing is to create, to appropriate Ahmed's language once more, "a seamless space, or a space where you can't see the 'stitches' between bodies,"[180] then such a future must be *programmed*. And by whom? Who programs the future? Namely, who controls the creation of contemporary digital virtual environments?

"In the United States, by 1960," Clive Thompson writes in a 2019 New York Times feature, "according to government statistics, more than one in four programmers were women. At M.I.T.'s Lincoln Labs in the 1960s, where [Mary Allen] Wilkes worked, she recalls that most

[176] Hayles, *My Mother Was a Computer*, 1.
[177] Hayles, *How We Became Posthuman*.
[178] Haraway, *Simians, Cyborgs, and Women*, 182.
[179] Ibid., 163.
[180] Ahmed, *The Cultural Politics of Emotion*, 148.

of those the government categorized as 'career programmers' were female."[181] Yet over the last four decades, with more ebb than flow, virtual spaces have become predominantly programmed by people who identify as male. In a 40-year longitudinal study, Sax et al found that "[a]lthough women's representation among computer science bachelor's degree recipients [in the US] has fluctuated during the past four decades from a low of 13.6% (in 1971) to a high of 37.1% (in 1984), women presently comprise only 18.0% of computer science graduates."[182] They attribute this gap to a variety of social factors, including self-rated math ability, commitment to science from an early age, valuation of social activism, and orientation towards the arts. Many of these metrics, Sax et al admit, are socially prescribed, citing that "in the mid-1980s, the narrative around computing became gendered, such that tech companies and the media portrayed computing as a predominantly male enterprise."[183] Steve Henn, author of "When Women Stopped Coding," argues that

> ...[t]he share of women in computer science started falling at roughly the same moment when personal computers started showing up in U.S. homes in significant numbers…These early personal computers weren't much more than toys…And these toys were marketed almost entirely to men and boys.[184]

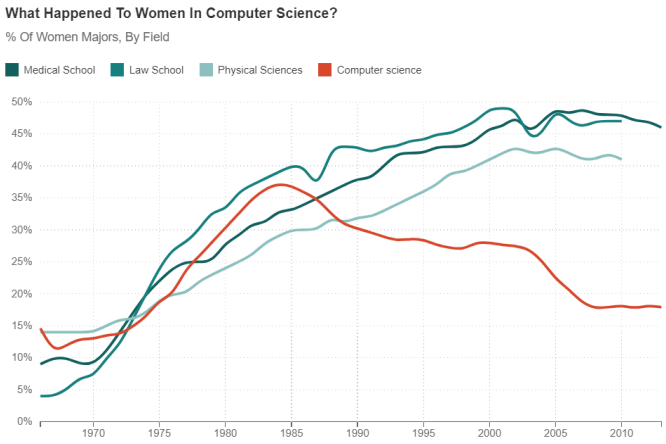

Figure 40: "What Happened to Women in Computer Science," a graph describing % of Women Majors by Field. Source: National Science Foundation, American Bar Association, American Association of Medical Colleges; Credit: Quoctrung Bui/NPR.

This dearth in female programmers in fields related to the production of digital virtual spaces has allowed for vast tracts of contemporary virtual space to become warped and hostile along gendered lines. And while the same has been true in prior ages—that is, to suggest "the photographic age" and "the age of cinema" were any more balanced in terms of access to technology and education would be to woefully misrepresent the West's relentless history of misogyny—the digital age expands exponentially on the replicative possibilities of the image in prior eras. Immersion is not unique to the digital, as this document has endeavored to show, but the *studioli* that took Federico da Montefeltro's artisan team decades to complete might be

[181] Thompson, "The Secret History of Women in Coding."
[182] Sax et al., "Anatomy of an Enduring Gender Gap."
[183] Ibid.
[184] "When Women Stopped Coding."

replicated today using contemporary digital fabrication techniques in a matter of days—or, what's more, virtually, by a small team, in a matter of hours. The resulting virtual spaces are encoded with the implicit substrata of biases and values of their makers, and so have of course developed to offer more comfort—a greater sense of belonging—to men.

For Haraway, the body itself becomes a discursive battleground. In the renegotiation of the properties of what it means to inhabit a body inscribed as female, she confronts the very language employed by many 80s-era feminist discourses that unself-consciously espouse the vocabulary of naturalism. In doing so, Haraway seeks to unite all such discourses under a banner of the cybernetic body as it exists within what she calls the "integrated circuit" (or what we might expressively call transnational techno-networks of capitalist industry). For her, the metaphor of cybernetics gains an advantage insofar as it confuses "who makes and who is made in the relation between human and machine." She continues, suggesting that "[i]t is not clear what is mind and what body in machines that resolve into coding practices." It is through the ambiguity of formal, scientific discourses that we invariably "find ourselves to be cyborgs, hybrids, mosaics, chimeras."[185]

Bodies for Haraway, we might say, are discursively constituted but technologically realized. Under narratives that structure humans according to ossified mytho-religious binaries—"self/other, mind/body, culture/nature, male/female, civilized/primitive, reality/appearance, whole/part, agent/resource, maker/made, active/passive, right/wrong, truth/illusion, total/partial, God/man,"[186] we tend to define bodies we determine as "other" in the language of subordinated terms: the "other" is also the bodily; the body natural; the natural female; the female primitive; and onwards in analogical interminability. Yet if we come to view bodies as themselves mechanical substrates of information—like other reading/writing technologies beginning with the phonograph—then the "human" (since the terms "male" and "female" at some point break down in the language of cybernetics) can free itself of the limitations placed on both the white patriarchal coding class and those that class excludes. Haraway thinks of this liberation in terms found in Foucault's *The History of Sexuality*: "The cyborg is not subject to Foucault's biopolitics," she writes. "The cyborg simulates politics, a much more potent field of operations."[187]

Yet how is it possible to escape the push and pull of biopolitics? "Cyborg politics," Haraway's solution, like that of Luce Irigaray's 1977 book *The Sex Which Is Not One*, attempts to escape interpellation by engaging in the fight over bodies at the level of language:

> Cyborg politics is the struggle for language and the struggle against perfect communication, against the one code that translates all meaning perfectly, the central dogma of phallogocentrism. That is why cyborg politics insist on noise and advocates pollution, rejoicing in the illegitimate fusions of animal and machine. These are the couplings which make Man and Woman so problematic, subverting the structure of desire, the force imagined to generate language and gender, and so subverting the structure and modes of reproduction of 'Western'

[185] Haraway, *Simians, Cyborgs, and Women*, 177.
[186] Ibid., 178.
[187] Ibid., 164.

> identity, of nature and culture, of mirror and eye, slave and master, body and mind.[188]

The lexical economy of cyborg politics, as Haraway describes it above, trades in complexity, "noise," and "illegitimate fusions": the cyborg, contrary to the implications of an intense emphasis on "code" (which we read as itself lacking physicality) is not disembodied. Rather, cyborg politics remains intensely embodied. It is "lexical," because Haraway's destabilization of gender binaries keeps with Derridean deconstructions of textuality, while yet remaining hyper-material: the cyborg, an assemblage of many kinds of matter and many kinds of code, resists legibility as a means of upsetting the normative, yet unquestionably has a body that transgresses against hegemonic ideas of wholeness and the natural.

And so the cyborg *must* have a body, and indeed does have a body, though somewhat less than concretely described. Yet the popular discourse of the 1960s, 70s, and 80s, to which Haraway is responding, did have a specific "cyborg imaginary." What, if any, physical attributes pertained to the cyborg body during the years preceding Haraway's intervention?

An example: when we meet Molly Millions from William Gibson's 1981 short story *Johnny Mnemonic*—and one of the first female characters explicitly described as a cyborg in contemporary fiction—in she is written as follows:

> "… She was wearing leather jeans the colour of dried blood.
>
> "And I saw for the first time that the mirrored lenses were surgical inlays, the silver rising smoothly from her high cheekbones, sealing her eyes in their sockets, I saw my new face twinned there."[189]

Perhaps Molly Millions' most iconic "upgrade," and a detail to which Gibson returns again and again in his vivid descriptions of her look, are her glasses—which, as Johnny here notices for the first time, are in fact visual prostheses: "bionic eyes."

Molly Millions isn't the first cyborg in popular culture to employ the trope: Colonel Steve Austin, another early bionic character from the 1972 novel *Cyborg* and 1973 made-for-TV movie *The Six Million Dollar Man*, was endowed with an eye that

> ...features a telescopic zoom lens (the ratio is cited as 20.2:1) that allows him to see things far away. It also has a microscopic lens in which he can magnify his vision to see smaller objects. Additionally, the eye is equipped with an infrared function that allows him to see in the dark and the ability to detect heat…[190]

The list continues: "Cyclops," a superhero who debuted in *DC Comics Presents #26* in 1980, and whose powers included the ability to interface remotely with all available technology and to download upgrades to his own mind and body, also featured an infrared and telescopic eye.

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[188] Ibid., 176.
[189] "William Gibson: Johnny Mnemonic."
[190] "Steve Austin."

Figure 41: Cyclops, a DC Universe superhero introduced in 1980, has one bionic eye.

The Borg collective, too, first introduced in May of 1989, and a recurrent antagonist in the Star Trek universe, is characterized by this same feature:

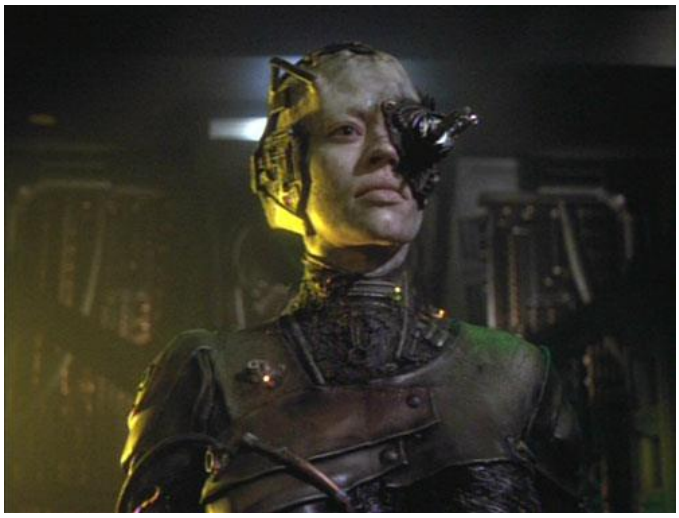

Figure 42: The Borg Collective, a hive-mind race of "cyborg organisms," are introduced in 1987's Star Trek: Next Generation. The above still is taken from a later episode of Star Trek: Voyager, Season 4, Episode 1*: "Scorpion, Part II"* (1997).

The point will probably by now be obvious: the figure of the cyborg in public discourse at the time of Haraway's 1991 publication of *The Cyborg Manifesto* was not, strictly speaking, a matter of pure assemblage, but included a very *specific* argument about vision itself: that the cyborg doesn't only have access to the power of mechanical computation, but also the ability to "see more" than is offered by our own limited range of perception. The cyborg, by virtue of its advanced ocular prostheses, has access to an ever-expanding array of possible spaces. Crary's chapter "Visionary Abstraction" in *Techniques of the Observer* naturally comes to mind: what kind of subject position is instantiated by the advanced monocular prostheses pictured above? Or in the language of Martin Jay: what speculative scopic regime can we anticipate from the trope of the bionic eye? Enlightenment thinking—i.e. modern thought—has prepared us for a world in which the human is made extant by its relation to that which it perceives: we experience the actual through our sensorium, and are made manifest by that experience. The figure of the

cyborg, depicted as often as not as a villain in popular fictions, makes us afraid that the converse must also be true: that to bear witness to and become immersed in virtual spaces necessarily makes us less human.

In addition to bionic vision, the cyborg as a figure in popular fictions also possesses an affinity for rapid and dramatic change: upgrades to the mind and body can be self-directed, in the case of Cyborg and Molly Millions, or externally induced, as with the Borg Collective and Colonel Steve Austin. We can understand this affinity in terms of "mutability" in relation to social space—a topic which gets taken up at length in Jack Halberstam's *In a Queer Time and Place*. Halberstam uses a variety of examples of the human's dramatic mutability in order to advance their theory of "technotopia." In technotopia, "… the transgender body has emerged as futurity itself, a kind of heroic fulfillment of postmodern promises of gender flexibility."[191] Still, Halberstam realizes that this transgender aesthetic can be and has been coopted by capitalist enterprises, like those proffering new ad campaigns that monetize "individualism" and "flexibility." Still, we might find in this form of postmodernity—which "can be read as the cultural logic of anticapitalist, subcultural queer politics"[192]—a measure of embodiment in the post-Jamesonian present.

But what does this embodiment *look like*? Halberstam examines the presence of a "transgender aesthetic" in postmodern art: in, for example, the large oil paintings of Jenny Saville of liminal bodies, the photography of Del LaGrace Volcano of "what [Volcano] calls 'sublime mutation'," [193] and in the sculptural work of Eva Hesse and Linda Besemer on contingency and detachability. On this curation of work Halberstam writes:

> Technotopic inventions of the body [found in this work] resist idealizations of bodily integrity, on the one hand, and rationalizations of its disintegration, on the other; instead, they represent identity through decay, detachability, and subjectivity in terms of what Hesse referred to as 'the non-logical self.' The transgender form becomes the most clear and compelling representation of our contemporary state of permanent dislocation.[194]

We might note here Halberstam's word choice: decay, detachability, subjectivity, and dislocation mirror, to some extent, the language of Haraway's "cyborgs, hybrids, mosaics, chimeras," while the phrase "non-logical self" positions Halberstam's bodies against the implicit procedurality of Hayles' Robo sapiens. Rather than seeing bodies as mechanical substrates for the human, Halberstam sees them as mutable while remaining organic, and as signifying life lived in preferred alterity.

Haraway and Halberstam therefore share an interest in the materiality of cybernetic or technotopic bodies. How are these conceptions at odds with Hayles' theory of the posthuman? Hayles begins her *How We Became Posthuman* by thinking about the implications of Turing's "Computing Machinery and Intelligence." If, since Descartes, bodies have been ontologically readable as the effects of minds ("*cogito ergo sum*"), then Turing's 1950 argument that mimicry

[191] Halberstam, *In a Queer Time and Place*, 18.
[192] Ibid., 105.
[193] Ibid., 114.
[194] Ibid., 124.

is intelligence finally divorces that which is human from that which is embodied—or, as Katherine Hayles puts it: "the erasure of embodiment is performed so that 'intelligence' becomes a property of the formal manipulation of symbols rather than enaction in the human life-world."[195] The meaning of "being human," if we find "being human" synonymous with "being intelligent," has in fact therefore suffered over sixty years of philosophical erosion. In its place emerges the posthuman, which presents us with, according to Hayles, a number of important distinctions, beginning with:

> First, the posthuman view privileges informational pattern over material instantiation, so that embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life… [the posthuman view] configures human being so that it can be seamlessly articulated with intelligent machines.[196]

Embodiment, for Hayles, is therefore less about Haraway's transition from white capitalist patriarchy into a radical but expectant "Informatics of Domination"—wherein we yet remain thoroughly embodied—and more about reconceptualizing "the human" as a certain kind and quantity of information, which just so happens to have a prosthesis it calls a body. This is not to say Hayles doesn't think carefully about materiality—both her 2002 book *Writing Machines* and the remainder of *How We Became Posthuman* speak to the import of the material—but rather that her theory of postmodernity decentralizes materiality in human subjects. If this is the case, an entity is "human" if it comprises and processes information in a manner familiar to other humans as "human information processing." Of what relevance is gender if anthropology is to be replaced by informatics?

Disembodiment of the human, to be sure, does little to prohibit prescriptive gender binaries. We understand gender is performative, after all, and so at least in part a result of pure discourse: "men do this, women do that." We moreover remember that information still instantiates itself through the disciplining of behaviors that only happen to be rendered most visible in bodies. On this Hayles provides the example of "posture," reinforced differently for boys and girls through "incorporative practices" (modeling) and "inscribing practices" (verbal lessons). Because information reifies itself in human bodies as its first and most convenient substrates, we still negotiate gender in its performative aspects constantly. And though Hayles seems to argue for the displacement of materiality in the digital age, and though Haraway longs for the unification of feminisms under the auspices of assembled bodies, we yet confront the most immediate problems associated with the appearance of bodies as impermeable, exclusive, and always present to us in our daily lives.

This immediacy of the body despite changing conceptions of the human compels us to see clearly some challenges that accompany the rise of posthumanism. One problematic of Hayles' theory is that it only starts insisting on the disembodiment of the human via the homogeneity of information precisely at a moment when tireless decades of effort by non-white non-male bodies have finally begun rewarding those subjects with a voice against their own oppression. Hayles' theory of posthumanism may, then, for some, cast a frustratingly Liberal pall over the conversation, something akin to a declaration that one "doesn't see race." The contrary view, that embodiment is constitutive of the human, also has its supporters: bell hooks' *Outlaw*

[195] Hayles, *How We Became Posthuman*, xi.
[196] Ibid., 3.

Culture, for example, positions the body as a site of deep social and political contestation, evidenced by near constant public inquisitions about reproductive rights, politics of pleasure, and carceral sovereignty—to name only a few discourses of oppression of the gendered and racialized body. To suggest that bodies no longer matter is to dismiss hundreds of years in which the "superficial" qualities of bodies alone provided pretext for corporeal subjugation.

This same subordination of the racialized body, far from being "resolved" by the body's migration into virtual space, has in many ways been exacerbated by way of a lack of representation. Following the 1995 dissemination of the Netscape Navigator, Lisa Nakamura puts it in her 2008 book *Digitizing Race: Visual Cultures of the Internet*, "… the Internet has continued to gain uses and users who unevenly visualize race and gender in online environments."[197] The neoliberal tenant of colorblindness positions the white body as the de-facto Online avatar. Ideology, as this document has tried to demonstrate throughout, isn't "lost" in virtual space—it is merely transcribed. Some minor controversy, for example, followed bell hooks' 2014 characterization of Beyoncé as "anti-feminist" (and, more jarringly, "a terrorist") following a *Time Magazine* portrait in which she was depicted, to bell hooks' mind, as the very image of black collusion with imperialist white supremacist capitalist patriarchy.[198]

Figure 43: Time Magazine's "100 Most Influential People" issue, April 2014, featured Beyoncé Knowles-Carter on the cover.

In an illuminating conversation with director Shola Lynch, writer Marci Blackman, and writer and activist Janet Mock, hooks close-reads Beyoncé's "look" as unwitting and powerless, with a sexualized yet childish outfit and affect, and insinuates that if indeed Beyoncé had creative agency over the image's publication, then she did a disservice to her fans as a role model by allowing herself to be portrayed in this way. "I actually feel like the major assault on feminism has come from visual media, and television, and videos…" she argues, "the tirades

[197] Nakamura, *Digitizing Race*, 5.
[198] The New School, *Bell Hooks - Are You Still a Slave?*

against feminism occur so much in the image-making business." Instead, she invites us to ask, "what am I looking like when I am free?" In hooks' theorization of the human, the body and self-governance are closely intertwined.

Even though the body itself becomes the locus of freedom and agency for hooks, she also implicitly suggests that one's responsibility for one's body extends equally to one's virtual bodies, including all of the body's many tireless reproductions. She frames her analysis in terms of the requisite properties of the black female role model, and that role model's responsibility to help empower young people of color to reject the imperatives of the white supremacist capitalist order and project images of empowerment, not docility: "…we have to be about that work of creating the counter-hegemonic image in order for that transformation to take place," she says. Janet Mock, however, takes an opportunity to disagree with hooks, arguing that she has long appreciated Beyoncé as a public figure who enacts the process of "owning her body and claiming that space." Whichever of these arguments one accepts—whether "owning" one's body is more or less important than the strategic deployment of one's image—the intact, unary body becomes a space in which freedom is either enacted or restricted.

Looking Forward: the Head-Mounted Display

Donna Haraway, Katherine Hayles, bell hooks, and J. Jack Halberstam all help develop a characterization of the human body in our contemporary moment: it is cyborg; it is informatic; it is corporeal; and it is mutable. And yet the materiality of the body is further complicated by the latest instantiation of the screenic interface to meet the mass market: the head-mounted display.

Figure 44: An advertisement for HTC's first commercial VR Headset, the "Vive."

The head-mounted display (hereafter HMD) is not, strictly speaking, a new technology: the first experiment using such a device was led by Ivan Sutherland and Bob Sproull and published in 1968. They called their creation "The Sword of Damocles," a reference to its massive overhead vertical structure, and to the relationship between power and fear accompanying the creation of new technological paradigms.

Figure 45: "The Sword of Damocles," the first Augmented Reality Head-Mounted Display.

In their introduction to the publication, they write:

> The fundamental idea behind the three-dimensional display is to present the user with a perspective image which changes as he moves. The retinal image of the real objects which we see is, after all, only two-dimensional. Thus if we can place suitable two-dimensional images on the observer's retinas, we can create the illusion that he is seeing a three-dimensional object.[199]

The difference between Sutherland's intervention and, say, the *studioli*, or any other static perspectival media, for that matter, is that the HMD positions the virtual object in relation to the eye of the viewing subject, as opposed to the inverse: perspectival illusions prior to the HMD have depended almost entirely on the positioning of the user in relation to the technology. Anamorphosis in painting, for example, following from the rediscovery of linear perspective, compels certain viewing angles and heights in order to perceive the painting's three-dimensional effect. One can't help but think of Holbein's *The Ambassadors* (1533), which demands an especially sharp viewing angle from below and to the left of the painting to bring the elongated skull into proportion. Forced perspective, used often in theme park rides, magic acts, and county fairs, initiates a virtual space preconditioned upon the viewer's proper alignment with the space itself. Even the photograph requires a particular physical orientation to the medium: one must be facing the picture. To escape the photograph and return to the actual, then, one can turn it over in one's hand. Walking around or leaving the *studiolo*, similarly, will help one recollect oneself into actual space. This document has heretofore argued that entering into virtual spaces is *involuntary* insofar as we are intractably drawn into images, images being the exclusive currency of perception, experience, and thought. And yet our engagement with images has always been qualified by the ease of self-extraction: one can always "pinch oneself awake," so to speak, from the viewing of most specific images—excepting, maybe, the intolerable image—even if images categorically speaking cannot be reasonably avoided. That is, we might become "lost" in virtual spaces, and their memories might linger, but to refocus one's attention on one's own body is nearly always to snap oneself back firmly into the actual, reaffirming the distinction between the two realities (virtual and actual) in practice.

In contrast, the HMD *depends* on the viewer's movement—bodily movement, or at minimum the converging and diverging of the viewer's lines of sight—to construct an operative virtual object. Such an object cannot be avoided or dispelled through movement, unlike all prior

[199] Sutherland, "A Head-Mounted Three Dimensional Display," 1.

virtual space-generating technologies. By creating an object that is *existentially stable*, independent of the movements of the viewer, a VR system can concretize the abstract image in virtual space, allowing the illusion to evolve in relation to the viewer's dynamism and the virtual space to be reified as external once again to subjective experience. Sutherland refers to the believability induced through the updating of an image to correspond with a viewer's expectations as the "kinetic depth effect." Much like the motion parallax effect, the kinetic depth effect describes a way in which the brain "settles" on the concrete extra-dimensionality of a two-dimensional image, giving the viewer the sense of having encountered an object of greater-than-nominal proportions.

The Sword of Damocles, Sutherland acknowledges, had several serious limitations: though it allowed a user to turn completely around, it only permitted about three feet of continuous movement in any given direction—enough to lean around an object to see it from another perspective, and that's about all. It also only allowed a user to tilt their head "thirty or forty degrees" up and down, being constrained by its mechanical distance-sensing arm. Objects could, however, be placed behind a user, becoming visible only when a user turned to look at them, and then be "clipped" out of existence when the user turned away once more. Sutherland also points out that, in order to advance the project further, the "hidden line problem" must be solved. The hidden line problem, he elaborates, refers to the difficulty of computing and rendering objects partially obscured by each other. As such, the device displayed "translucent" line drawings—necker cubes, more specifically—and only "operated well enough to measure the head position for a few minutes before cumulative errors were objectionable."

"Even with this relatively crude system," Sutherland continues, "the three dimensional illusion was real," managing to convince its users that the phantom object "existed," at least insofar as it accorded with their sense of vision. But for Sutherland, the Sword of Damocles was just the beginning. In remarks made at the IFIP Congress in 1965, he argues:

> The ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal. With appropriate programming such a display could literally be the Wonderland into which Alice walked.[200]

For Sutherland, the promise of the virtual is intensely material, and not "merely" visual. Little could he have known, however, how very material the next six decades of head-mounted displays would actually be.

Kinetosis: The Unsettling Effects of Virtual Space

We feel the body's materiality most intensely during moments of discomfort: physical pain, for example, brings the individual's physiological qualities into stark relief. Because virtual spaces do not often explicitly interface with the body's sense of touch, we tend to expect the feeling of "being" in virtual space to lack tactility. Indeed, historically this obviation of the tactile world has been an advantage to the habitation of virtual space—think, for example, of the

[200] Sutherland, "The Ultimate Display."

studioli, whose walls helped insulate the room against thermal extremes, or the Link Trainer, a WWII-era flight simulator which allowed Air Force pilots to practice flying without the risk of bodily harm in the event of a crash. Cinema and digital games, too, have both since their inception endured criticism that they service escapism, providing their users "risk-free" worlds into which they might withdraw. Indeed such criticism is often "correct," albeit unproductive, insofar as one might label any leisure-time activity as escapist—an indication that escapism isn't so much a medium-specific phenomenon as a human-specific phenomenon made manifest through media.

And yet to suggest the virtual and the concrete are mutually exclusive would be antithetical to this analysis. Sutherland's HMD arrives in the late 1960s as an extraordinary assemblage of computational and ocular technologies, weighing more than a person can comfortably lift. The apparatus, and therefore also the user's body, is tethered to the ceiling by a mechanical sensing arm, while the user's vision is partially obscured by miniature CRT screens. The use of such a device must have been taxing on the body, to say the least. Steve F. Anderson makes a related point in his book *Technologies of Vision*, arguing that "[w]hile head-mounted display manufacturers aspire to minimize the physical size and weight of the display apparatus, it is in fact precisely its awkward artificiality that currently preserves the medium's embodied sense of spatial otherness."[201] Though the physical reminders of our embodied existence—the feeling of straps on the head, or the weight of the display on the face—are gradually being iterated into imperceptibility, they are still in the late 2010s a central part of the hybrid experience of exploring virtual environments through VR hardware. Will the near-term invisibility of the HMD, combined with the diminution of latency, improvement of screen resolution, and development of novel hands-free systems of control, finally suspend the human in virtual spaces indistinguishable from the actual?

There are other impediments along this same inexorable march towards body-integrated computing. Yes, HMDs naturally possess tactility as body-worn objects, but the field of VR has also been heavily impacted by the ways in which the human body reacts to the challenges HMDs make against the human's evolved sense of space. Proprioception, or "the perception of the position and movements of the body," expects user sense data from the limbs, the eyes, and the vestibular system to collude in the production a perceptual whole. When the eyes receive images in conflict with the other sensory organs, terrible motion sickness and feelings of unwellness can ensue. The precise causes behind motion sickness are still of considerable debate,[202] but that motion sickness often follows use of HMDs is not.

VR-induced motion sickness, sometimes called "cybersickness," is related to, but distinct from its more thoroughly-researched cousin, "simulator sickness." Because simulators often involve bodily motion, sickness can be provoked by disagreements between the visual and vestibular systems, whereas for most VR experiences bodily movement is voluntary, and so proprioception remains in alignment. As such, sickness endured during VR experiences is thought to result primarily from vection, or the visually-induced perception of bodily motion.

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[201] Anderson, *Technologies of Vision*, 171.

[202] Two theoretical models explaining motion sickness predominate: the evolutionary "toxin detector" model, which understands motion sickness as an autoimmune response to the ingestion of toxins, and the "vestibular-cardiovacular reflex" model, which understands nausea and disorientation to be the result of the brain's receipt of conflicting perceptual information. (Golding, "Motion Sickness Susceptibility.")

The symptoms of cybersickness, according to one study, were found to be up to three times more severe[203] than simulator sickness and resulted in greater levels of disorientation following the user's exposure to the virtual environment. These symptoms, another study reports, "can continue to persist for hours after being exposed to VR"[204]; yet another, that the aftereffects of using HMDs "can be strong and long lasting." "When study subjects returned to the real world," the New York Times reported in 2015, "they had trouble with visual focusing, tracking images and hand-eye coordination."[205] Finally and most dramatically, a 1999 paper about the aftereffects of exposure to VR environments remarks that "…the consistency of the post- effects on felt limb position changes in the two VE implies that these recalibrations may linger once interaction with the VE has concluded, rendering users potentially physiologically maladapted for the real world when they return."

It's no great surprise that our habitation of virtual spaces should prove disorienting. Duration of time spent in virtual spaces seems, at first, to increase the negative effects proportionally, prolong the recovery time, and increase the "maladaptation" users experience once returning to the actual.[206]

Curiously, however, recent studies have also shown that short, repeated excursions to virtual environments actually prepare the body for progressively longer future excursions[207]: that is, provided some threshold of accordance between the senses can be entertained by the technology, *the human adapts*. We become better over time at simply being in virtual space—as we have, this dissertation has argued, for centuries.

Did the human body, in addition to the human psyche, also have to endure a period of adaptation to the first stereoscopes? Or to the photograph? To the panorama? It is difficult to say. But we might find a viable parallel in another sort of "perceptual technology" of the nineteenth century that also produced discord between the senses: the steam engine. The reception of trains and automobiles into the public sphere was accompanied by no end of concern for its effects on the body. Wolfgang Schivelbusch describes the public response to the first railroads at length in *The Railway Journey: The Industrialization of Time and Space in the Nineteenth Century,* beginning with the broad notion that they "annihilated space and time." Following their introduction into civic life in the 1800s, railroad systems were perceived as "shrinking" the amount of space between destinations by a factor of three, while also making new areas more accessible to more people, creating a world that was simultaneously smaller and bigger.

This metamorphosis, Schivelbusch argues, did not arrive without mass anxiety. He cites the "disorientation" described by Heinrich Heine in 1843, who wrote of the "tremendous foreboding such as we always feel when there comes and enormous, an unheard-of event whose

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[203] Stanney, Kennedy, and Drexler write: "We have found, after examination of eight experiments using different VE [Virtual Environment] systems, that the profile of cybersickness is sufficiently different from simulator sickness — with Disorientation being the predominant symptom and Oculomotor the least. The total severity of cybersickness was also found to be approximately three times greater than that of simulator sickness. Perhaps these different *strains* of motion sickness may provide insight into the different causes of the two maladies" (Stanney, Kennedy, and Drexler, "Cybersickness Is Not Simulator Sickness.")

[204] "Intel Gifts UTSA $200k to Support Deep Learning Research to Reduce Cybersickness in Virtual Reality | Department of Computer Science."

[205] Murphy, "Feeling Woozy?"

[206] Stanney et al., "Motion Sickness and Proprioceptive Aftereffects Following Virtual Environment Exposure."

[207] Kennedy, Stanney, and Dunlap, "Duration and Exposure to Virtual Environments."

consequences are imponderable and incalculable," which "changes the color and shape of life."[208] Some of the "symptoms of disease" Schivelbusch documents as being reported in the 1830s and 40s, compiled under the name *maladie des mecaniciens*, or "engineer's malady," included "pseudo-rheumatic pains that resulted from the drivers' and firemen's exposed working position on the locomotive… [and] the consequences of the specific mechanical vibration peculiar to the motion of the locomotive and the train,"[209] causing the muscles to fatigue over time. This same fatigue translated to "...the individual sense organs. The rapidity with which the train's speed caused optical impressions to change taxed the eyes to a much greater degree than did pre-industrial travel, and the sense of hearing had to cope with a deafening noise throughout the trip"[210] Passengers, while somewhat protected from the conditions of physical "shock" experienced by the train's operators, were nevertheless also preoccupied by the altered state of the world that resulted from the train's speed. "...[T]he travelers had a very limited chance to look ahead," Schivelbusch writes. "[T]hus all they saw was an evanescent landscape. All early descriptions of railroad travel testify to the difficulty of recognizing any but the broadest outlines of the traversed landscape." He offers as further evidence Victor Hugo's report that flowers, viewed from the window of a moving train, become "...flecks, or rather streaks, of red or white; there are no longer any points, everything becomes a streak."[211]

Schivelbusch's main point is, at last, that the modern subject had to *learn* new perceptual techniques as a result of the innovation of railway travel. He calls this "industrial consciousness," and clearly outlines the extent to which it is an acquired behavior. The train, much like the *studioli*, the photograph, the stereoscope, digital interactive entertainment, and the HMD, not only teaches the human how to live in virtual space, but *changes* the human to make it more capable of living in virtual space. The new space, a warped version of the old, challenges and then modifies the consensual "real," such that, in the case of the steam engine, "the railroad [became] part of everyday life. By the time Western Europe had culturally and psychically assimilated the railroad," Schivelbusch concludes, anxieties about the dangers of railway travel "...had vanished, as had that turn of phrase so typical of the early period, 'the annihilation of space and time.' The expression became nonsensical because the new geography created by the railroad … had become second nature."[212]

While we of course take it as a figure of speech, the term "second nature" nevertheless stands out here, suggestive as it is of there being a "first nature" upon which the second must rest. Indeed Schivelbusch might have been more correct to refer to his new paradigm as second-hundredth or second-thousandth nature. Spatial understanding is cumulative, and every new technology—technologies of vision especially, but not exclusively—arrives with an updated paradigm of spatiality to which the human must become accustomed. Still, what seems to be most at stake *implicitly* for many of the primary sources and scholars Schivelbusch cites is the loss of visibility of the natural world itself—the "losing control of one's senses," or the inability to perceive the outside world "as it truly is." "The loss of landscape affected all the senses," he

[208] Schivelbusch, *The Railway Journey*, 37.
[209] Ibid., 114.
[210] Ibid., 117.
[211] Ibid., 55.
[212] Ibid., 130.

writes. “Smells and sounds, not to mention the synesthetic perceptions that were part of travel in Goethe’s time simply disappeared.”[213]

There seem to be two implicit fears buried in these presumptions: (1) that one’s basic humanity is achieved through one’s receipt of sensory data, and so the obfuscation of sense data equates to a kind of death of subjectivity, and (2) that “inaccurate” sense data, being “unnatural” or “unreal,” challenges the legitimacy of one’s material connection with the world. What does sense data amount to in the simulacrum? What can be called firmament in postmodernity? This feeling of looming insensibility, the impression of an ever-vanishing real, runs continuously through to the modern era, culminating in grave sentiments of loss common in the writings of theorists like Baudrillard, Debord, Marcuse, and McLuhan.

Yet close examination of the long history of the perspectival image reveals that, while tactility may have declined in the age of immersion, the materiality of the body endures, as do feelings of embodiment and propinquity—at least for a time. What this exploration has called the “virtual break” must therefore remain, as it has for hundreds of years, immanent. Fear not, however: it is quite possible that one day soon we will watch as the final screenic frame fades into oblivion, and the ocular prosthesis becomes nothing more than our face turned gleefully, and for the last time, inwards upon our own private worlds of made.

[213] Ibid., 55.

CONCLUSION: THE ENORMOUS ROOM

The introduction to this dissertation began with an impossible question: "*Where are we* when we are looking at images?"

This project, initiated as an examination of the human body's place in the production and habitation of "virtual spaces" after the *Renaissance,* quickly discovered the challenge of describing the virtual without frequent and explicit recourse to the actual. Indeed, one tenant of the above argument has been that the virtual emerges from the actual, and so naturally to discuss the former is to describe the latter. Still, it would be impossible to ignore the predominance of two very specific "figures" from the actual at work in this exploration: the figures of *the room* and *the frame*.

The Introduction, for example, begins by discussing a mobile game eponymously called *The Room*. Chapter 1 then picks up with the *studioli*, two small, isolated rooms built in Italy in the late 1400s, before extending its discussion to include other rooms that challenge normative spatiality: the *camera obscura*, the *panorama,* and the holodeck, to name just a few. Chapter 2, not to be outdone, begins in a single room within the *Windows 95 Maze*, before proceeding to describe the expansion of virtual space in excess of the rooms in which it often begins. Chapter 3, turning towards the image, instead makes recourse to the frame—which, like the figure of the room, is constituted only by its limits. Finally, following the room paradigm that began nearly six-hundred years prior with Federico da Montefeltro's *studioli*, chapter 4's Ivan Sutherland confines us to a final room in many respects very much like the first. "In one test," he writes,

> … a 'room' surrounding the user is displayed… The room has four walls marked N, S, E, and W, a ceiling marked C and a floor marked F. An observer fairly quickly accommodates to the idea of being inside the displayed room and can view whatever portion of the room he wishes by turning his head.[214]

In nearly six hundred years, what has changed? The *studioli* and the HMD both depend on perspectivalism to produce spaces larger than their nominal dimensions; both privilege vision among the senses; and both seek to condition the viewer to new paradigms of spatial interpretation.

The persistence of the room metaphor may initially remind us of the totalizing influence of Foucauldian disciplinary power: the confinement of the subject, and careful structuring of their environment, conditions their behavior in space. The very title of the Sword of Damocles calls attention to its profound focus on the administration of the body, with the HMD seeming to behave as equal parts room and frame. And yet both of these scenarios *also* demonstrate the extent to which we receive reality mediated through regimes of vision dominated by regional and temporal technosocial arrangements, which confront us as a hybrid layering of images, as if through palimpsest. If we read these disorienting images as windows, not onto our own world but onto the rest of all possible worlds, then we begin to see that access to a more comprehensive real is not a distant memory, but an emerging future.

In his prescient 1950 short story "The World the Children Made," later republished as "The Veldt," Ray Bradbury imagines a room just larger than two racquetball courts side-by-side,

[214] Sutherland, "A Head-Mounted Three Dimensional Display," 301.

whose walls "were blank and two-dimensional." The two adults in the story, sensing something amiss, enter the room to have a look. "As George and Lydia Hadley stood in the center of the room," Bradbury writes,

> "the walls began to purr and recede into crystalline distance, it seemed, and presently an African veldt appeared, in three dimensions, on all sides, in color reproduced to the final pebble and bit of straw. The ceiling above them became a deep sky with a hot yellow sun.
>
> "George Hadley felt the perspiration start on his brow. 'Let's get out of this sun,' he said. 'This is a little too real. But I don't see anything wrong.'"[215]

Bradbury's "The World the Children Made" confronts this theme directly: what begins as a room, delimited and defined, changes in an instant as the story's adults observe its walls "recede" into "crystalline distance." The narrative, with its intense focus on the digital divide that now separates parents from their children, admittedly does not appear to favor the adults: by the end, it is implied that digital lions have pulled the adults into the virtual space and eaten them, leaving the story's children living in chilling harmony enclosed by the space's four walls.

It is easy to read Bradbury's story as a sharp critique of screen culture, and a harbinger of the death of the human in light of the production of virtual space. But we must also appreciate the richness we discover only by virtue of the room's transformation, whereby "blank and two-dimensional walls" evolve into a quite "too real" landscape. All of the most material details of the story—the blood-soaked handkerchief; the pebbles and straw of the terrain; the sweat on George's brow; and indeed all of the drama and feeling of the story—occur as a function of the reification of the virtual space, and the most predominant physiological responses the Hadleys experience result directly from being in that space. In fact, it is only when confronted by the immanence of the virtual that the Hadleys encounter the actual most acutely. And so while explicitly "The World the Children Made" seems anxious about the virtualization of life, it implicitly reinforces the extent to which the virtual has always drawn power from its discursive relationship with the actual. By concluding by leaving the children alone in a now-activated virtual space, the narrative anticipates, but does not describe, a future in which the seams between now-discrete spaces finally become of such high resolution as to disappear entirely.

This document maintains that the image's expansion of the real is not merely a postmodern phenomenon, nor even a modern phenomenon. To suggest there was a time before virtuality, where the tactile predominated and our relationship with nature remained wholesome and intact, seems to depend on there having been a time before technology. But if we have learned anything from Stiegler, it is that both history *and* the human begin with technics. Ocular prostheses, by emphasizing the extent to which we inhabit a neatly folded near-infinity of virtual spaces, reinforce a new understanding of history that, far from witnessing the end of the real, observes an *expansion* of access to the real.

This dissertation has thus hoped to show that, far from obviating the actual, the virtual has always depended on, and reinforced, human embodiment, even while gesturing towards worlds whose richness we have only begun to imagine. From the viscerality of Federico da Montefeltro's *studioli*, to our topographic understandings of virtual spaces, to the physical confrontationality of portraiture, and to the profound bodily effects of HMDs, embodiment has

[215] Bradbury, "The World the Children Made."

not yet been “lost,” but only selectively exchanged for a new type of “virtual embodiment.” The movement of the screen onto the human form seems, at first, to bypass physical experience in favor of the visual, and yet more than ever the body is exercised and involved in activities that take place in virtual space. The actual has not only become virtual, but the virtual has also become actual in a new age of digital embodiment.

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