POSSESSED BY THE FUTURE: ENCOUNTERING ANTICIPATION IN LATE 20TH CENTURY AMERICA

by

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ABSTRACT

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Under the Supervision of Professor Richard Grusin

Anticipation has become one of the dominant cultural moods of contemporary American life. Stories, images, and interactive media are replete with anticipatory narratives and motifs of economic and ecological destruction. What is the longer cultural history of this feeling? How and where did it emerge? My dissertation, "Possessed by the Future: Encountering Anticipation in Late 20th Century America," argues that the roots of contemporary American "anticipatory affect" are found in developments in late 20th century financial practices which arose from Silicon Valley, most notably the introduction of automated, computer-assisted stock trading. The automation of financial models also intensified scientific speculation about the possibility of rapid climate change brought on by the burning of fossil fuels. Through the use of science fiction literary narratives and video games, I explore how questions of both financial and ecological ruin animated the late-century cultural turn towards anticipation. This exploration reveals how science fiction and video games offer a privileged glimpse into the development and mediation of a mass anticipatory feeling, far more so than more culturally prestigious forms of both realist literature and literary non-fiction. My dissertation is split into two sections, Finance/the 80s and Climate/the 90s, each of which starts with a chapter that historicizes the given decade before separating science fiction literature and video games into separate chapters. Analyzing these

affective archives gives scholars new insights into how to account for the development of mass feeling in cultural production.

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To

unknown but anticipated futures,

penned daily into existence

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Introduction: Anticipation as Collective Affect: Y2K

"When the clock strikes midnight on December 31, 1999, will you be ready?"

0.1 The Y2K Problem

I was 10 years old when the world was supposed to end. For reasons I didn't quite understand at the time, the calendar turning forward to January 1, 2000, was going to make digital networks go haywire and essentially delete Western civilization in the mother of all computer bugs. Now, however, I understand better what was happening then. The root of the Y2K problem was found in the engineering challenges faced by the early computer programmers of the 60s through the 80s. Despite fantasies of immateriality, computers are physical mediums and therefore present physical constraints, and before the development of more advanced integrated circuits and microchips, memory in particular was a precious and limited commodity. And so, to save memory for more important functions—say, for the calculation of mortgage rates or buy and sell orders for the stock market, among more mundane maintenance operations for critical infrastructure like nuclear power plants and airlines—programmers utilized a clever shortcut. Rather than devote four digits to years and waste crucial space, programmers used only the final two numerical digits, leaving the "19" of any given year implied rather than listed (Uenuma). And so, when the year rolled over from 1999 to 2000, these critical computer programs, which controlled much of the capital and infrastructural flows of the developed world, would not recognize the year as 2000 but rather as 1900.

But back to the evening that the world was supposed to end. My family was visiting my grandparents in Old Fork, West Virginia, and as with other New Years celebrations, my extended family—aunts, uncles, cousins, and more distant relations—were visiting as well. The TV

broadcast sticks more in my mind than the day itself, all musical performances, bright lights, and interviews. If I thought the extra piles of toilet paper and veritable mountain of canned food in my grandparent's kitchen was strange, I didn't comment on it. Nor did I comment on the lightly anxious joking between the adults about the lights going out at midnight. I did, however, absorb these feelings throughout the evening, and as the climactic moment approached, I felt myself getting jumpy. I couldn't sit down for more than a minute at a time, and I took to pacing. Something was wrong, I felt. Something big was going to happen and everyone seemed to know it, and merely being in that environment was enough to make me nervous. It was as if the atmosphere of the house and the very mood of my family impressed upon me the dire seriousness of the proceedings.

I was not alone in this feeling, though I could not have known then just how widespread it really was. I also could not have known just how old and expected the Y2K problem was. Bob Bemer, a computer programmer who invented ASCII code in 1961, was "the first scientist to warn of the Y2K problem," which he first predicted in 1958 but which only came to public attention in 1971 (Sullivan). A "minor deity" in the "weenieworld of data processing," Bemer was a critical figure in standardizing computer language across the business world, and much of the initial groundwork in solving for the potential problems of Y2K came from his prodding (Sullivan). However, it wasn't until the late 90's and the encouragement of figures like Bill Clinton and Peter de Jager that most businesses and agencies finally began the arduous work of Y2K-proofing their computer systems. These precautions "[racked] up an estimated expenditure of $100 billion in the United States alone," and the geographic scale of this response was equally massive: "Their preparations encompassed extensive coordination on a national and local level,

as well as on a global scale, with other digitally reliant nations examining their own systems" (Uenuma).

Given the potential financial and infrastructural damage that the Y2K problem risked, this massive investment of time and money to address the future crisis seemed to American politicians imminently practical. Per the *Investigating the Impact of the Year 2000 Problem* report by the United States Senate Special Committee on the Year 2000 Technology Problem, nearly every sector of social, economic, and political life faced grave threats if Y2K remediation strategies were not followed. This included the looming specter of local and regional power outages, the mass malfunction of rural and inner-city hospital computer programs, transportation and financial industries disruptions, and the possibility that international trade between America and its less Y2K-prepared partners could be compromised. The prospect of potential lawsuits resulting from Y2K-related disasters was enough to strike fear into the heart of the committee, with "some estimates [projecting] litigation cost in excess of $1 trillion" (Senate Special Committee 6). On two points in particular, the committee was more or less clear: that "Y2K has developed into a worldwide collective crisis,"[1] and that "as the first challenge of the Information Age, [Y2K] must leave a legacy of increased awareness and appreciation of information technology's role in social and economic advancement" (7).

There were also, however, far more dire strains of Y2K problem discourse that skewed away from official and bureaucratic predictions of potential disaster and technological efficiency towards apocalyptic and survivalist rhetoric. The most famous voice among this prepper strain of Y2K problem discourse was Michael Hyatt. Though today he presents himself as a corporate

[1] Interestingly, the actual text of the committee report is far more qualified than this bold proclamation, reading instead that "the Y2K problem has the *potential* to develop into a worldwide crisis" (7, emphasis mine). It is only the pullout quote that renders the statement absolute.

management and positive mindset thought leader on Twitter, in the late 90s Hyatt published several books on Y2K that were of a decidedly far more negative affective bent. One was a science fiction book entitled *Y2K: The Day the World Shut Down*, and the other two were non-fiction survival manuals: *The Millennium Bug: How to Survive the Coming Chaos* and *The Y2K Personal Survival Guide*. In these books, Hyatt positions himself as a rational, cautious, and even strangely optimistic figure. However, speaking engagements he undertook in the leadup to Y2K reveal the true ideological and religious underpinnings of his warnings. An article from February 2000 written for *Americans United for Separation of Church and State* details the appearance by Hyatt at a special meeting for Focus on the Family (FOF) in Colorado Springs. Hyatt's talk—the themes of which he often repeated on various Christian radio programs—was replete with "gloomy predictions of power outages and stock-market crashes" (Boston). This talk was followed up by a speech given by James Dobson, the founder and president of FOF, who noted that "the impending computer glitch…could cause American society to break down, spawning terrorist activity, 'massive civil disobedience,' widespread looting, food shortages, worldwide economic collapse and possible global conflict" (Boston). All this, Dobson concluded, could lead to the permanent seizure of power by Washington elites and, eventually, the final judgment of God himself (Boston).

This apocalyptic rhetoric was a fairly common thread among certain far-right American evangelical leaders like Dobson in the leadup to the new millennium. Jerry Falwell, for instance, compared the approaching Y2K problem and the global digital infrastructure that permitted it to the Tower of Babel:

> In fulfillment of Bible prophecy, the world today is beginning to speak the same language. We are satellite- and Internet-connected. We are fast moving toward a

> cashless economy, a one-world government, a one-world court and a one-world church. We are building a universal city with a one-world church whose tower reaches into heaven. But the Trinity has come down and looked us over. And it seems that God doesn't like what he sees. He may be preparing to confound our language, to jam our communications, scatter our efforts and judge us for our sin and rebellion against his lordship. We are hearing from many sources that January 1, 2000, will be a fateful day in the history of the world. (Falwell, qtd. in Rivera)

These right-wing talking points—so familiar today in the aftermath of QAnon and the January 6th Insurrection—reflect classically millenarian thinking. Broadly speaking, millenarianism—the belief that some form of Golden Age will follow a catastrophic overturning of the established political and social order—manifests throughout history in many different religious, secular, and political contexts (Crossley and Lockhart). Underlining Y2K millenarian anxieties was a sense that there were "threats to an inherited symbolic universe" and that there was to be "a period of unprecedented suffering" (Crossley and Lockhart).[2] There was a sense of anticipation around the turn of the millennium, a sort of mass collective outpouring of dread that catalyzed social, political, and economic movements. Whole industries surrounding the Y2K problem sprang forth in its leadup. Books, pamphlets, web sites, conferences, hosted talks, television and radio programming, government reports and legislation, survivalist manifestos, and media events large and small were dedicated to this object of cultural fascination, all centered on two key questions:

[2] I must stress, however, that the degree and intensity of millenarian anxiety was vastly different between the federal government and right-wing Christian leaders. The most basic difference was that the federal government was attempting to prevent catastrophe, while these religious leaders were in fact welcoming of it, given that it would (in their eyes, at least) lead to the fulfillment of millenarian prophecy, i.e. the rapture. In short, while the religious right preached a sort of "catastrophic millennialism," the federal government practiced "avertive millennialism" (Crossley and Lockhart).

what's going to happen when the clock strikes midnight? How will society respond to what happens?

Though I was only 10 that night, these questions ran through my head as well. The Y2K problem, as a social experience rather than a strictly technological problem, was my first encounter with mass collective anticipation, and in a very real sense, it was my introduction to culture as a messy and wildly mediated whole. But of course, nothing happened. We counted down the Times Square ball dropping as a family and hugged each other when it reached zero, wished each other a happy new year, and went to bed. The lights were on, financial markets didn't collapse, Jesus didn't come back. It was, in most every respect, a thoroughly average evening. The only real lasting impact of Y2K on a personal level was that my grandparents didn't have to shop for toilet paper and canned foods for a couple of months.

Today, Y2K is a punchline. A recent conversation with a colleague who worked in the IT department of Wells Fargo during the leadup to Y2K noted that the process of preparing for it was more boring than anything, and that though the hysteria surrounding it was silly then, it is even more embarrassing now to look back upon it. Recent documentary *Time Bomb Y2K* posits that the social event of Y2K was, in the main, a profoundly stupid moment in American culture. The real fear and anxiety that surrounded it is replaced today with a sort of chagrined nostalgia. The anticipatory energy that it represented—the way it marshalled anxious feelings through its representation across multiple media channels—is forgotten. But certain questions remain in the cultural wreckage of the event, questions that even now linger at the forefront of my mind. How do anticipatory energies mediate across mass culture? What was the anticipatory structure of late 20th century America, such that Y2K panic could spread so easily? What were Americans so concerned about in the latter half of the 20th century?

This dissertation seeks to answer these questions. It does so through a thorough, but not exhaustive accounting of the development of anticipation as a mass cultural affect in the latter decades of the 20th century, particularly the 80s and 90s[3]. This time frame saw rapid shifts in the understanding of both speculative financial instruments and oncoming ecological disaster, and much of the anticipatory energy of these two decades became bound up within these two fields. In particular, the advent of computer models that could both protect against stock market crashes and predict future climate catastrophe made anticipation the object of mass cultural fascination. This turn towards anticipation is particularly detectable in science fiction and video game texts of the time period. Again, this is not an exhaustive account of this shift. It is instead a wager that if certain cultural texts are read within the understanding of the development of a contemporary mood of anticipation, they can yield surprising and novel insights about the affective landscape of the late 20th century.

I have two earnest hopes for this project. The first is tactical and limited. I want to understand how science fictional novels, in concert with the then-budding medium of video games, both reflected and worked together to help construct new affective regimes of anticipation in late 20th century America. These mediums were not the main or even primary cause of this affective shift, and where possible I make note of the larger historical trends and forces that shaped the development of anticipation as a mass cultural affect. However, they do represent important cultural building blocks of that mass cultural affect. The second is strategic and far-reaching, perhaps far too much so. My hope is that this research can present a bridging of literary and cultural theory and media theory, where the new-historical and audience-focused orientation of literary and cultural theory is combined with the focus on the affective dimensions

[3] Though financial developments both institutional and technological from the 40s to the 70s make an appearance in the first and second chapters.

of media technologies. The extent of my project's success in this regard rests, as it always does, in the eye of the reader. If nothing else, I hope to have convinced you by the end of this dissertation that both the questions I ask and the methodology I use to answer these questions are compelling and worth mimicking and developing in further projects, even if you perhaps find my answers disagreeable.

Throughout the rest of this introductory chapter, I will first explore why I focus on anticipation at all. From there, I will explain my decisions to focus on science fiction and video games as my privileged texts, and then sketch a brief outline of what each chapter will focus on, as well as their central claims.

0.2 Why Affect? Why Anticipation?

There is a long, uneven history of critical attempts to describe the affective and emotional landscape of culture. Several of these attempts—Sianne Ngai's *Our Aesthetic Categories: Zany, Cute, Interesting*, Scott Bukatman's *Terminal Identity*, and Richard Grusin's *Premediation: Affect and Mediality After 9/11*—represent foundational theory for this project. "Affect," then, is a crucial term to define for this work. Yet hard and fast definitions of affect remain elusive. Instead, scholars often focus on what affect *does* and the affordances it offers critics. Gregory J. Seigworth and Melissa Gregg, in the introduction to *The Affect Theory Reader*, note that affect is "in many ways synonymous with *force* or *forces of encounter*," and that this force works "within and across the subtlest of shuttling intensities [between bodies]: all the miniscule or molecular events of the unnoticed" (Seigworth and Gregg 2). In this sense, affect is something that accumulates over time and accretes on bodies. Elisha Cohn further observes that affect is "fugitive and impersonal," intensities that "are said to circulate outside of the individual,

irreducible to the more conceptual thoughts or even emotions an individual might have about them" (Cohn 563). These fugitive and impersonal affects "preclude a unitary vision of the self-willing subject, and instead point to the subtle processes by which the self is an 'intimate public' absorbing what is outside it" (Cohn 563). So: affect is an impersonal force that varies in scale and intensity across bodies, and it circulates more or less unnoticed in the flows of daily life, even as it formulates and shapes the self into an assemblage rather than a unitary whole. Put another way, affect can be understood as an ambient atmosphere that invisibly structures the everyday. Critics often discuss it in terms of "mood," which strikes me as a practical approach given how it standardizes complex critical language into a recognizable structure. It is this understanding of affect as a mass, impersonal, and circulating mood that I utilize in this dissertation.

The mood that I attempt to chart in this dissertation is *anticipation*. Much of the literature surrounding anticipation arises from neurology and social science rather than cultural theory. From a strictly neurological perspective, anticipation has to do with the "emotional states that people experience while anticipating significant outcomes" (Knutson and Greer). These feelings can be positive or negative; for example, the hope one might feel about a future promotion can so easily be the fear of an impending disappointment. But what effect does this powerful feeling have on decision making? More specifically, how does the prospect of future events change how people behave today? And though intuitively it must have a profound impact, this is difficult to measure. Riel Miller compares the quest to answer this question to the work of physicists attempting to unravel the mysteries of the Big Bang by smashing atoms together in particle accelerators, a comparison between two pursuits that "is not as far removed as [they] might seem" (Miller 1). The collective tools that social scientists use to theorize anticipation—which

"[span] advances in complexity theory to breakthroughs in the design of innovation processes"—is called anticipatory systems (AS) theory, and taken together, they seek to "enable a better understanding of why and how people 'use-the-future'" (Miller 1). AS "proposes the potential existence of different kinds of future, sparking the search for methods to detect these largely unimagined and invisible elements of the world around us" (Miller 1).

It is this use of the future and the need to develop methods that detect the circulation of these "unimagined and invisible elements" that I find particularly fascinating. Though Miller does not speak in terms of affect, it is not difficult to see how an invisible anticipatory mood that circulates in culture and makes possible the existence of different kinds of future is anything other than an affect that accretes on bodies and changes behaviors in ways both subtle and overt. But the slippery ontological nature of the future leads to a difficult problem: "Hunting for different kinds of futures runs directly into the obstacle that by definition the future cannot exist in the present, since if it did it would no longer be the future but the present…*How can something that does not exist have an impact?*" (Miller 1-2, emphasis mine). One answer, Miller goes on to argue, "is the idea of anticipation": "*The future does not exist in the present but anticipation does. The form the future takes in the present is anticipation*. Thus, the integration of the later-than-now, be it a millisecond or a millennium, into the present is achieved through various kinds of anticipatory systems and processes" (Miller 2, emphasis original). And though Miller does not discuss anticipation as an affect, he does note that "people's fictions about the later-than-now and the frames they use to invent these imaginary futures are so important for everyday life, so ingrained and so often unremarked, that it is hard to gain the distance needed to observe and analyse what is going on" (Miller 2). For Miller and proponents of AS, anticipation is "a combination of capacities that allow human beings to consider and evaluate the present in

light of the way they imagine the future," which allows people to imagine the future and marshal that imagination into action that shapes the later-than-now (Miller et al. 54).

Before I move on, I want to acknowledge that anticipation is not a *new* cultural mood, particularly in the West, which serves as the larger cultural milieu that I explore. The earliest history of capitalism, for instance—the creation of futures trading in the Netherlands, for example, and the rise of mercantilist economies in the wake of global European conquest of the Americas, southeast Asia, and eventually Africa—has, at its core, an anticipatory expectation of profit. Before that, in the longer history of the European Middle Ages, there was the mass cultural feeling that the end of the world was swiftly approaching. There is also profound evidence that prospection—"the representation of possible futures"—is "a ubiquitous feature of the human mind" which performs "guidance not by the future itself [as the future does not exist] but by present, evaluative representations of possible future states" (Seligman et al., qtd. in Poli). It is also difficult to look at the postwar anxieties of nuclear annihilation and not detect in it a sense of anticipation about the destructive capacities of Cold War technologies. I do, however, believe like Roberto Poli that in the latter parts of the twentieth century and into the twenty-first century, anticipation "is increasingly at the heart of urgent contemporary debates, from climate change to economic crisis" (Poli). In particular, Poli notes that "economic agents see the future as a commodity, a good to trade like any other good: banks calculate the value of the future with respect to interest and credit, insurance companies calculate the value of future risk" (Poli). This economic anticipation—and indeed, the anticipation inherent to a late 20th/early 21st century capitalist modes of production—is among the single largest generators of contemporary anticipation. In keeping with Poli's notion that anticipation is present in everything from "climate change to economic crisis," I start in my own analysis with the development of mass economic

anticipation in the 80s, before turning my attention to how anticipation operates in ecological concerns in the 90s. This temporal and conceptual split might seem at first glance an arbitrary distinction; after all, both financial and ecological anticipation were at play in the 80s and 90s. There is, however, a detectable buildup from the first to the second. In fact, I wish to make plain here at the beginning that these two vectors of anticipation are interrelated, and as I hope to make clear by the end of this project, the fears present in one are intimately bound up in the fears inherent to the other.

Anticipation is ultimately an ordinary affect, and it "highlight[s] the question of the intimate impacts of forces in circulation. [Like other affects, anticipation is] not exactly 'personal,' but [it] sure can pull the subject into places it didn't exactly 'intend' to go" (Stewart 40). As it is ordinary, it circulates in ordinary things, most notably for the purposes of this dissertation science fiction novels and video games. The next section of this introduction explains why I focus on these cultural forms over others.

0.3 Why Science Fiction? Why Video Games?

It has become *de rigueur* for critical accounts of science fiction to begin with what I would term the *problem of definition*. What is "science fiction"? What work does it do that more classically literary genres like, say, realist fiction, do not? Read the introductions of any ten books on the subject and one will find ten answers. For my own part, I constellate several theorists to come to my own understanding of it, one which allows for rather porous genre borders. The first is Darko Suvin, who defines science fiction as "a literary genre whose necessary and sufficient conditions are the presence and interaction of estrangement and cognition, and whose main formal device is an imaginative framework alternative to the author's

empirical environment" (7-8). This genre analysis is built upon the "novum," which Suvin describes as a "totalizing phenomenon or relationship deviating from the author's and implied reader's norm of reality" (64). The novum can vary in complexity from a single invention to an entire alternate history, yet its function remains the same: to defamiliarize reality in order to critique the underlying political, social, and cultural structures of the society which has been defamiliarized. This rigorously formalist definition of science fiction is the most famous and influential within the genre's critical literature. Many theoretical accounts start with it, and for good reason. It is a solid answer to the question of the literary, political, and even philosophical work that science fiction performs, which is to say that it encourages readers to consider a world that does not exist but given a few changes, could.

Yet Suvin's understanding of science fiction can at times be compromised by his insistence on genre purity. As noted, Suvin is a fiercely dedicated formalist, and as such, he spends much of the book's length outlining the boundaries of the genre. By way of example, Suvin insists throughout that because pulp science fiction of the first half of the twentieth century was designed for mass audiences, it cannot achieve the critical estrangement of *literary* science fiction. To supplement and complicate Suvin's work, turn to Steven Shaviro's work in *Discognition*, wherein he notes of science fiction that it is "a special kind of literature…that operates through *speculation* and *extrapolation*, and that takes place (conceptually, if not grammatically) in the future tense":

> It is a kind of thought experiment, a way of entertaining odd ideas, and of asking off-the-wall *what if?* questions. But instead of approaching its issues abstractly, as philosophy does, or breaking them down into empirically testable propositions, as physical science does, science fiction *embodies* these issues in characters and

> narratives. By telling stories, it asks questions about all sorts of things: consciousness and cognition, the future, extreme possibilities, nonhuman otherness, and especially the deep consequences—the powers and limitations—of both our ideologies and our technologies. (Shaviro loc. 19-28)

Elsewhere, Shaviro is quick to note that science fiction allows for the exploration of counterintuitive scenarios that work to unsettle established paradigms of thought and to get its readers thinking about the critical mutability of the future. Shaviro's sense of science fiction is then similar to Suvin's, but with one critical difference. Where Suvin aggressively polices genre borders, Shaviro is far less interested in protecting the sanctity of the genre. Instead, he is focused on what science fiction can do, which is, in its simplest terms, merely this: *science fiction lets readers feel what the future might feel like*. It is a generator of affect, and the primary focus of its affective subject is the future.

Yet I also do not want to lose sight of the historical situatedness of the genre. John Reider notes that while the novum (and, by extension, Shaviro's sense of science fiction as a thought experiment) remains an important critical and narrative tool for the revolutionary potential of its estrangement, Suvin's rigid definition elides the lived historical realities that make up the practice of science fiction. Theoretical definitions applied post hoc to otherwise loosely connected texts and communities fail to capture the full range of generic practice. Reider is interested instead in the "repetitions, echoes, imitations, allusions, identifications, and distinctions that testifies to an emerging sense of a conventional web of resemblances" (Reider 21). For Reider, science fiction must be understood not so much as a literary genre but as a *historical* genre, as a field in constant motion informed by competing publics, composers, and foci. It is impossible for any study to encompass the entirety of science fictional thought (though

valiant attempts have been made); rather, we must pay attention to repeated patterns and strains of discourse that accrete and formalize over time.

It is the repeated pattern of anticipation, which is detectable in science fiction literature across time more generally, but which accelerates and spreads in the 80s and 90s with the advent of mass network and communication technologies that will be the focus of much of this dissertation. The science fiction texts that I explore capture the emotion and the mood of what it feels like to live in an age of mass anticipation, becoming a sort of AS in and of itself, an archive of future-looking feelings and sensations. Not every text I explore is classically science fiction, and Suvin in particular would no doubt scoff at both their inclusion and the application of science fiction criticism towards them. However, I take seriously Carl Freedman's claim that "there is no text that is a perfect and pure embodiment of science fiction…but also no text in which the science fiction tendency is altogether absent…For the construction of an alternative world is the very definition of fiction" (Freedman 21). Whether they are strictly science fiction or not, whether they are marketed as science fiction or not, the works I analyze take part in the science fictional project of imagining alternative worlds that both capture and generate the anticipatory mood of the late 20th century. Wherever possible, I place these works within the larger cultural and technological milieu of their creation, though I will say at the front of my work here that this is largely within the context of an America that is undergoing profound economic and industrial shifts from a largely production-oriented economy to a largely service and information economy. The California Ideology and the rise of Silicon Valley as one of the technological and economic centers of the developed world is also a critical throughline, though one that is explicitly called out only in a few places. In short, I explore works of science fiction broadly defined because these are the literary works that deal most closely and most overtly with

these large-scale social shifts toward anticipation as a dominant cultural affect. Other scholars—Bukatman, Jagoda, Williams, and many more—make appearances throughout, and all are deployed in support of this central project.

I turn my attention now towards the question of why video games provide the other half of my cultural corpus. Broadly speaking, I incorporate video games into my cultural analysis because they are also generators of affect, emotional experiences that embed players within particular moods. Unlike my work on science fiction, I am less concerned with defining video games and more concerned with the affective realities that the medium operates within. However, Mark J. P. Wolf's understanding of what constitutes a game strikes me as an excellent starting point in my analysis: "Elements one would expect to find in a 'game' are *conflict* (against an opponent or circumstances), *rules* (determining what can and cannot be done and when), use of some *player ability* (such as skill, strategy, or luck), and some kind of *valued outcome* (such as winning vs. losing, or the attaining of the highest score or fastest time for the completing of a task)" (Wolf 14). All of these elements are present in the video games I analyze, and I discuss their gameplay along these axes (though not always in these terms) throughout my dissertation.[4]

But again, I am concerned here mostly with how video games embed players within affective landscapes and moods of anticipation. Maxwell Foxman notes of the Game Studies field that it seeks to "[underscore] play's potential universality and its broader application to

[4] Wolf also dedicates a large portion of the first chapter of *The Medium of the Video Game* to the "video" part of the "video game" equation, an analysis that includes discussion of cathode-ray tubes and liquid-crystal displays. Where appropriate, I discuss the technical aspects of video games, but I avoid discussions of the more technical elements of the "video" side of the term for two reasons. First, I am not nearly technically-inclined enough to speak knowledgably on it. Second, I am concerned with the cultural work that video games do rather than their technical specifications. I leave the work of what really counts as a *video* game to others. Damon Knight once said of science fiction that it is "what we point to when we say it." So too, in my case, for video games.

cultural contexts," and though I am skeptical of the universality of games that are inherently socially-situated and specific, I do believe that games can indeed underscore the cultural contexts they are created within (Foxman 73). Indeed, as objects of mass cultural consumption, and in their programmed nature, they must bear with them the trace of what it feels like to live in a given moment. To that end, two theorists stand out for their contribution to thinking through the affective dimensions of video games. The first is McKenzie Wark, who noted in her 2007 book *Gamer Theory* that "the game has colonized its rivals within the cultural realm, from the spectacle of cinema to the simulations of televisions. Stories no longer opiate us with imaginary reconciliations of real problems. The story just recounts the steps by which someone beat someone else" (Wark 7). "Games," Wark further notes, "are no longer a pastime, outside or alongside of life. They are now the very form of life, and death, and time itself" (Wark 7). Wark posits that the reason games have become so important, so life and death, is because they correspond so closely to the military-entertainment complex, becoming, in essence, the exemplary media of neoliberalization and empire. Culture itself becomes "gamespace," which undoes the old utopian principle of "to each according to his needs; from each according to his abilities" in favor of

> An atopia, a placeless, senseless realm where quite a different maxim rules: "From each according to their abilities—to each a rank and score." Needs no longer enter into it. Not even desire matters. Uncritical gamers do not win what they desire; they desire what they win. The score is the thing. The rest is agony. (Wark 22)

This is a deeply pessimistic analysis of video games, one which sees their digital and programmed contours as cultural prison cells. I further discuss Wark's work within the context of

the larger Marxist critique of video games in chapter 3, but I wish to stress here that, for the purposes of this dissertation, this Marxist critique of video games as essentially capitalistic enterprises rings true. The games I discuss and how I discuss them center on their obsessions with numbers, charts, graphs, and calculations, all of which work together to inculcate players within the capitalist mode of production. In all of them, there is a future tense that the player works toward, and the player can anticipate what results their actions yield. It is the very structure of these games that encourages anticipation, and as with science fiction, video games of the 80s and 90s are created within the shadow of economic and social shifts wrought by neoliberalization and California Ideology.

But as I note in chapter 3, this isn't all games do, and I want to be mindful to both the full affective range of video games and how they build affective structures. The second game theorist that I am indebted to, then, is Aubrey Anable, who notes in *Playing with Feelings: Video Games and Affect* (2018) that "video games are affective systems":

> When we open a video game program on a phone, computer, or gaming console, we are opening up a "form of relation" to the game's aesthetic and narrative properties, the computational operations of the software, the mechanical and material properties of the hardware on which we play the game, ideas of leisure and play, ideas of labor, our bodies, other players, and the whole host of fraught cultural meanings and implications that circulate around video games. (Anable loc. 126)

Video games are rooted, Anable reminds us, in the 20th century emergence of mass computer technology, and when read broadly, they can reveal the history of "emergent feelings" that this profound shift engendered (Anable loc. 138). Video games are critical to this dissertation because

they chart the emergence of anticipation in mass American culture, illustrating both the increasing reach of computer technology into the affective fabric of everyday life as well as the normalization of anticipatory neoliberal ideals. Importantly, there is more here in these games than the mere training and repetition of capitalist ideology, but also repositories of simple joy and pleasure. I do not want to lose sight of the fact that, however grim or ideologically compromised the games I study may be, they are, first and foremost, fun to play. It is a blast to control Pac-Man as he wanders the maze, it is cathartic to blow up Harkonnen troopers, and it is rewarding to learn about earth sciences. This is, in fact, the source of their proficiency in infiltrating the everyday and colonizing the rivals of video games in the cultural sphere. People *enjoy* playing video games. They *want* to play them. It is this very desire that makes them such potent generators of the anticipatory mood. By being so pleasurable, it is all the easier for people to internalize their simulated (but no less real, as I hope to prove throughout this dissertation) emergent feelings.

Taken together, science fiction and video games are cultural objects which allow us to see the real-time emergence of anticipation. They often work in tandem to build this emergent affective mood, though they often have different aims. I speak here in the broadest possible critical terms. A recurring theme throughout the chapters that follow is that while science fiction criticizes the political and social dimensions of anticipation and future worlds, video games celebrate anticipation as one of the highest goods and most useful feelings that players can cultivate. This is, perhaps, unsurprising given science fiction's historical roots in satire and the development of video games within late-20th century technological companies. They are not necessarily opposed cultural forms, and nowhere in what follows do I make that claim, but it is, nonetheless, an interesting dichotomy to consider.

0.4 The Plan

This dissertation is divided into two sections, Finance/the 80s and Climate/the 90s. Financial anticipation emerged and took center stage in the 80s, and in the 90s, issues of climate and environmental anticipation did the same. This is not an arbitrary distinction, but one rooted in historical and cultural realities. This choice is also informed by the fact that these two modes of anticipation and the anxieties present within them become even more overt in the America of the 21st century. Ultimately, this dissertation seeks to historicize the anticipatory mood present in the new millennium by analyzing its emergence in the 80s and 90s, through traditional print literature and video games.

The Finance section, which includes chapters 1 through 3, details the emergence in the 80s of the anticipatory mood within the larger context of advances in computer-automated stock trading. Chapter 1, "Speculative Capitalism and Black Monday," discusses this larger history through analysis of the Black Monday crash of October 19, 1987. It reflects upon and sets the stage for further explorations of the cultural and aesthetic dimensions of this financial shift. Chapter 2, "Anticipating Terminal Identity in 80s Science Fiction," outlines the development of anticipatory mood in three literary texts: William Gibson's *Neuromancer* (1984), Don DeLillo's *White Noise* (1985), and Pat Cadigan's *Patterns* (1987), all of which engage in sustained conversation about the anticipatory nature of a wired and connected society, one wherein machines have taken on a suite of decision-making and oppressive abilities. Because of this, humans are at the mercy of technologies they cannot understand but which come to govern their daily, and increasingly financialized, lives. Chapter 3, "Financial Labyrinths and Anticipatory Financialization in 80s Video Games," analyzes three video games for their contributions to the decade's anticipatory mood: *Pac-Man* (1980), *TradeWars* (1984), and *The Oregon Trail* (1985).

Taken together, these games represent an attempt to instill in players an embodied sense of anticipation. In all of them, players must piece together strategies that will allow them to score the highest, accumulate the most goods, and on a basic level, survive in worlds dominated by the rule of numbers.

The Climate section, which includes chapters 4 through 6, centers conversations surrounding planetary-scale climate change and ecological devastation emergent in the 90s. Computer programs, which in the 80s had come to shape financial markets, were used in both the 80s and 90s as tools to develop climate models, all of which showed the dangerous effects of runaway global warming. Chapter 4, "N30, Climate Change, and Imagined Ecologies," frames 1999 Seattle WTO protests as an eruptive moment where the emergence of a mass-cultural anticipatory awareness of climate change becomes obvious. This chapter outlines a brief history of climate change, its perception, and its discovery within the context of the American environmental movement. It further illustrates that climate change is a global problem inseparable from issues of finance, capitalism, and neoliberalism, and launches a discussion of the cultural and aesthetic dimensions of this emergent anticipatory feeling. Chapter 5, "Presenting Anticipatory Environments in 90s Science Fiction," discusses three novels—Michael Crichton's *Jurassic Park* (1990), Octavia Butler's *Parable of the Sower* (1993), and Karen Tei Yamashita's *Tropic of Orange* (1997)—each of which puts forward the notion that financial regimes and climate disaster are inseparable, and that so long as capitalism and neoliberalism remain the dominant financial and economic paradigms, historically marginalized and vulnerable communities will continue to bear the brunt of worsening environmental conditions. Chapter 6, "Rendering Strategic Environments in 90s Video Games," focuses on three games that turn players into neoliberal managers of environments: *SimEarth* (1990), *Dune II: The Building of a*

Dynasty (1992), and *Civilization II* (1996). This chapter reveals how players come to embody not just the subject of neoliberal economic politics, but the managerial force that utilizes these economic policies for at times benevolent and at times quite nefarious political and ecological purposes.

Overall, this project explores the multiple and complex ways that an anticipatory affect develops in the latter parts of the 20th century and how this development can be traced in science fictional and video game texts from this time period. I take a broad theoretical and critical approach to these two decades, and my work is indebted to an intersection of media, affect, ecocritical, video game, and literary and cultural theory. A focus on anticipation reveals how mass cultural feelings can develop and emerge over time, and how popular entertainment creations bear the trace of this emergence.

Section 1: Finance

Finance is the first of two prisms that I use to explore the development of anticipation as a dominant cultural feeling in late 20th century America. I begin my section on finance with a short chapter that outlines a brief genealogy of the emergence of financialized speculative capitalism from the early seventies and the invention of portfolio insurance by Stanford professors to the eve of Black Monday, the October 19th market crash that saw the greatest one day drop in value of the Dow Jones Industrial Average.[5] I do this in order to contextualize the intertwined emergence of both a new kind of general economy—one focused on high-speed, automated trading and seemingly dematerialized digital financial practices using exotic financial instruments such as futures contracts—and of a widespread anticipatory affect, a cultural sense of future orientation which permeates American life in the Information Age. In naming these phenomena intertwined I argue that financial practices which led to the global Black Monday crisis—that is to say, financial practices which arose from the development of future-oriented speculative tools—were among the first mass instantiations of anticipatory affect.

Following this brief genealogy of anticipatory financial instruments and practices, I will chart the economic formation of this anticipatory affect across six texts, spread out over two chapters and divided by medium. I start in chapter two with three broadly science fictional literary texts: William Gibson's *Neuromancer* (1984), Don DeLillo's *White Noise* (1985), and Pat Cadigan's *Patterns* (1989). Framed by the critical work of Scott Bukatman's *Terminal Identity: The Virtual Subject in Postmodern Science Fiction* (1993), my discussion of these works articulates how science fiction of the 80s is deeply skeptical of the financialization of the

[5] Black Monday will be described in greater detail in the following chapter.

human, even as it participates in the development of a new "terminal" subjectivity. Arising in part from the traditional genre of Satire and taking as one if its subjects the impacts of rapidly developing technology on social relations, science fiction is uniquely situated to interrogate the technoculture of the 80s.

The hostility of the virtual world and its relationship with the speculative flows and signals of dematerialized global economies both legitimate and criminal is a central conceit of *Neuromancer*. The novel's protagonist Case is a "console cowboy" who makes his living as a thief in cyberspace, a graphical representation of the connected computer networks across the globe. Case is pursued by dematerialized threats in a financialized labyrinth; the more he moves through the virtual, the more he becomes entangled within it. Constituting a "kind of laboratory experiment in which the geographical-cultural light spectrum and band-widths of the new system are registered," the cyberpunk trappings of *Neuromancer* represent one of the most famous and sustained fictional dialogues regarding the newly-networked financial world that was birthed in the 1980s (Jameson, "Fear and Loathing"). The circulation of anticipatory affect in the networked world is further explored in Don DeLillo's *White Noise* (1985). Throughout the novel, Jack Gladney's presence is registered only insofar as it serves as a data generator—data useful mainly insofar as it aids in the simulation of anticipated disasters. While Case makes his living in the manipulation of computer data and the stealing of digital information across a truly global span, Jack's story is one of being overwhelmed by the new information regime in the networked space of mid-1980s America. In this financialized national space, materiality is treated as the inconvenient detritus of machines far outside human understanding; it is the machine alone that decodes and assigns value to its environment. The interlocking anxieties of digital technologies and human subjectivity is also present in the work of Pat Cadigan, particularly her short story

collection *Patterns* (1989). One strain of stories catalogues the affective and cultural responses of television watchers, particularly those who are new cable customers and those who are isolated by their engagement with television. Taken together, these stories help to sketch out the information overwhelm that a certain subset of American's experienced in the fragmented and multiple media landscape of the 80s.

In chapter three, I continue exploring the cultural landscape of anticipatory finance through the medium of video games. Three video games are explored: Bandai Namco's *Pac-Man* (1980), Chris Sherrick's *TradeWars* (1984), and Minnesota Educational Computing Consortium's *The Oregon Trail* (1985). Following Aubrey Anable's work in detailing the affective nature of games, I argue that these games enmesh players within scenes of contingency so that they can learn how to both manage risk and master digital space. Such skills are reflective of the experiences and needs of the digital, financialized scenes that created these games.

As it is the product of a Japanese company, *Pac-Man* (1980) might seem inappropriate for a study centered on American culture. Yet the game was designed to appear acultural; what's more, it proved an immense financial success in the United States, spinning off into multiple sequels, television shows, songs, and derivative offshoots that soon came to dominate the American cultural landscape. It also serves as a guiding visual metaphor for the global financialization that defined economic development throughout the 80s: trapped in a maze and chased by digital ghosts executing preprogrammed behaviors, players must navigate Pac-Man to survive, all the while aiming to push their score ever higher. Sherrick's *TradeWars* continues this visual metaphor, though the arcade action of *Pac-Man* is here replaced by financial spreadsheets and more direct competition between players. As one of the first multiplayer computer games, *TradeWars* occupies a prime location in the history of computer games. In it, players take on the

role of space traders, navigating a text-based universe and competing against each other to corner interstellar markets and monopolize various resources. Yet *TradeWars* itself also serves as an example of the appreciation of a financialized asset; though Sherrick's original version was successful, it was not until the open development of various successor games—among them the seminal *TradeWars 2002* (1991)—that the series would gain widespread recognition. Iteration and development are also at the heart of the story of the last game I will explore in this chapter, *The Oregon Trail* (1985). First developed in 1971 as the pedagogical experiment of Don Rawitsch, then a student teacher of history for an 8th grade class in Minnesota, *The Oregon Trail* proved a popular hit in the Minnesota public school system, enough so that a new version of the game was created in 1985 and released on the Apple II. Its origins as an educational game complicate its legacy, reifying a particular narrative of coloniality, one centered on the capitalist speculation and domination of the colonized American West. It encourages players to carefully weigh how best to plan for the financial and logistical difficulties of travelling the historical Oregon Trail. Taken together, all three games paint an illuminating portrait of an America just beginning to grapple with the newfound importance of financial speculation, disciplining players to be anticipatory agents in an increasingly digitally connected world.

Chapter 1: Speculative Capitalism and Black Monday

"[A]s long as automated capitalist production maintains its viability through innovation, it creates new structures which expand the boundaries both of human potential and of human misery. These structures must be studied if we are to understand the futures into which the system is leading us, and the means by which we may control and alter those futures."—Tessa Morris-Suzuki, "Robots and Capitalism" (1984)

1.1 Automating Risk: Inevitable Crashes and Program Trading

Paul Jones, a young partner working in a Lower Manhattan hedge fund, was among the first to see signs of the coming crash. Writing to investors on September 24, 1987, Jones warned that in the coming months "we project the Dow will fall below 1000. While this decline may seem dramatic, it is not inconsistent with breaks in other major bull markets. From January 1 on in particular, *caveat emptor*" (Jones, qtd. in Dewey). Jones had good cause to worry. The Dow had seen an increase of value upwards of 44% by August of that year, and while many investors were pleased with this level of growth, it led some analysts to question whether the market had become overvalued (Bernhardt and Eckblad). The contemporary term for this rapid speculative overvaluation—coined first by Alan Greenspan in an address to the American Enterprise Institute in 1996—is "irrational exuberance." Per Robert Shiller, irrational exuberance is "a situation in which news of price increases spurs investor enthusiasm, which spreads by psychological contagion from person to person, in the process amplifying stories that might justify the price increases" (Shiller 2). This exuberance, spreading as a contagion, brings in new investors who are drawn to invest "partly by envy of others' successes and partly through a gambler's excitement" (Shiller 2).[6] Irrational exuberance is a *psychological* phenomenon, unmoored from economic realities. A potent psychological brew thus began to develop in mid-

[6] The Dotcom bubble of the late 90s is a classic example of irrational exuberance. The excitement surrounding the extreme valuations of online shopping websites in particular papered over those same websites lack of sound business fundamentals. When the bubble finally burst, the Nasdaq had lost nearly 78% of its value.

October when, reports detailing the ballooning trade deficit, the subsequent loss of value of the dollar, and a potential House committee floating the possibility of a tax on corporate mergers created "a storm cloud of news reports [that] undermined investor confidence…[which lead] to additional volatility in markets" (Bernhardt and Eckblad, Dewey).

We can perhaps forgive the larger world of Wall Street analysts for not following Jones in recognizing the inevitability of the crash. After all, "during the years prior to the crash [roughly from 1982-October 20th 1987], equity markets had been posting strong gains," with the S&P 500 index moving from a little over 100 points at the beginning of 1980, to nearly 350 points on the eve of Black Monday (Carlson 3). This was among the longest bull markets in U.S. economic history, representing a 229% increase in stock prices over five years (Egan, Kurtz, Schmitz, and Tse). The market of this time frame was characterized by a sense of optimism and strength, due in part to the creation of new financial instruments called "program traders" that were sold to stockbrokers as tools to prevent losing money in a failing market. Program traders, put simply, were "computers…set up to quickly trade particular amounts of a large number of stocks, such as those in a particular stock index, when certain [market] conditions were met" (Carlson 4). A primary strategy these program traders used was "portfolio insurance," which operated by automatically "buying stock index futures in a rising market and selling them in a falling market," thus protecting against losses by clients (Carlson 4). This was a profound disruption in the development of contemporary finance because it ushered in the use of automated, non-human computation in the modern market. Combined with the downturn in investor mood that percolated throughout the market in the early days of October, the stage was set for a dramatic downturn, one wherein—as predicted in a Wall Street Journal article on

October 12—"the use of portfolio insurance 'could snowball into a stunning rout for stocks'" (Garcia, qtd. in Carlson 4).

On October 19—the day that would become known as Black Monday—the bottom fell out. Markets in Asia fell first, triggering a global chain reaction of violent market fluctuations. "Beginning with a severe drop in Hong Kong's Hang Seng Index, the crash accelerated in London's FTSE100" before finally hitting the United States (Dundon). Stock prices on Wall Street declined sharply in the morning, beginning a run of panicked sales through the rest of the day, resulting in a nearly 23% drop in market value.[7] The carnage in the market was reflected in the behavior of those who worked in the financial industry. Per Michael Lewis, a bond salesman at the investment bank Salomon Brothers, long-time employees "were all going through this visceral animal experience" as they watched the market plummet, "screaming and going absolutely crazy" as portfolios that had taken years to curate and mature were wiped away in a matter of hours (Lewis, qtd. in Dewey). So intense was the pressure that Nassim Nicholas Taleb, a trader at First Boston who would later write a book about the effect of unexpected catastrophes called *The Black Swan*, recounts how after the day was over "my cousin called and said the police were outside. It turned out a guy had committed suicide at 72nd Street and First Avenue" (Taleb, qtd. in Dewey).

In the aftermath, reporter Alison Cowan collected responses from various Wall Street executives regarding the day's events. Walter Wriston, who served as the chairman of Citicorp prior to the crash, opined that the lesson of the crash was simple: "When markets reach an all-time high, there's always a correction" (Wriston, qtd. in Cowan). Others held an antagonistic

[7] This remains the largest drop in the total percentage of market value in the history of the Dow Jones Industrial Average, but not its single largest total net loss of market value. On March 16, 2020, the Dow lost nearly 3000 points in a single day, part of a series of market contractions in response to the pressures of COVID-19 and an oil price war between Saudi Arabia and Russia.

disdain for recent innovations in computerized stock trading due to their perceived acceleration of the effects of the crash: "Information is being analyzed and orders being executed [with computers] at a much faster rate and with greater precision than you can do manually…Computers have dramatically accelerated the decision process. This has telescoped into a few days transactions that might have been spread over months or over years" (Siebert, qtd. in Cowan). The result of this acceleration was understood as a surrendering of human agency: "You can't let computers do all your thinking for you. Part of the decline was triggered or exacerbated by computer-directed trading strategies and they clearly aren't designed to work in markets of this scale and this volatility" (Gordon, qtd. in Cowan). There was a sense in all these responses that a new global financial paradigm—one that lends itself to wild and sudden swings across global markets—had arrived: "You learn how interrelated we all are and how small we are. Nowhere is that exemplified more than people staying up all night to watch the Japanese market to get a feeling for what might happen in the next session of the New York market" (Gordon, qtd. in Conway).

Beyond fretting over the immediate financial implications,[8] these executives were grappling with the new specters of global capital: rampant speculation, the automation of financial instruments, and volatility that the financial world was only just beginning to realize was the new norm. Yet there existed concurrently with these financial concerns a broad spectrum of cultural, political, and aesthetic shifts in American society that made an event like Black Monday—the global crash of digitized financial markets—possible in the first place. To understand these shifts, we must first understand what they were shifting away from and the

[8] There were surprisingly few lasting negative economic consequences as a result of Black Monday. It only took the market two years to eclipse the valuation that the crash had wiped out. This only further underlines my argument that Black Monday must be explored in its cultural, political, and aesthetic dimensions, rather than its strict economic dimensions, to fully understand it.

longer financial history that Black Monday and its automated trading programs disrupted. We must also understand the specific origins of automated trading and the economic realities that it arose out of. The answer is found in California, which would prove to be an important generator of anticipatory energy throughout the late 20th century in America.

1.2 From Bretton Woods to Stanford: The Birth of Non-Human Capitalism and the Advancement of Neoliberalism

The birth of speculative capital and the automated technologies that enabled it is a history of the attempted dematerialization of the global economy. This birth is not a break in or disruption of capitalist development, but rather a profound reorganization of capital assets: "In the 1970s the predominant tendency appeared to be towards a relocation of processes of capital accumulation from high-income to low-income countries and regions…In the 1980s, in contrast, the predominant tendency appeared to be towards the recentralization of capital in high-income countries and regions" (Arrighi 1). In this sense, Black Monday is indicative of the centralizing effects of economic globalization, "the pervasive sense of an ongoing *shrinking* of the planet into one capitalized and marketized space," a shrinking which benefited countries and markets which had reached their full economic maturity even as it made them more vulnerable to the extreme turbulence such a densely connected economy produces (Hassan 14).

There are two premises that I wish to emphasize, both in this brief introductory chapter and in the two chapters to follow. The first is that anticipation was not a new market force in the 1980s. The efficient management of risk on the part of banks, for instance, has been a foundational pillar of modern fiscal theory since at least the 17th century, partly through then-revolutionary advances in the science of assessing the credit risk of various borrowers (Atack 3). Financial markets would eventually seek to mimic this risk management through the use of

instruments such as "signaling via bond ratings, the issuance of revenue bonds, the use of mortgage bonds, credit-default swaps, or through the reputation of the under-writer" (Atack 3). Beyond that, the growth of the modern insurance business—beginning in 17th century London after the Great Fire of 1666—bespeaks the long history of risk management in modernity. The second is that, while *anticipation* was not a new market force in the 1980s, it did take a new and culturally distinct form in the invention and widespread use of nonhuman, automated trading programs. The dematerialized economy—vast, confusing, and operated at speeds the human subject cannot even physically perceive—is made possible only through the electronic automation of asset trading. This allows for the creation and trading of assets that reach astronomical capital valuation, as well as the introduction of dangerous financial instabilities. This dematerialized shift is what a large corpus of 1980s science fiction and video games both theorize upon and embody. Understanding the history of this transition is of paramount concern when studying the cultural artifacts that were produced within the era.

What I am arguing here is that the emergence of a global and densely interconnected economy—one automated using electronic technology—represents the instantiation of a truly global anticipatory affect. Financial instruments that had been confined to the arcane halls of financial power were, for the first time, the overt, spectacular, and mediated business of those outside of this world. Black Monday was the first time many outside of Wall Street became aware of the financial instruments that technological shifts had made possible, instruments that held the future as their primary temporal dimension. This colonizing of the future is one of the central pillars of neoliberalism, which was made possible in part thanks to "a wave of innovations [which] occurred in financial services to produce not only far more sophisticated global interconnections but also new kinds of financial markets based on securitization,

derivatives, and all manner of futures trading" (Harvey 33). "Nearly deified in neoliberal doctrine," writes Steven Shaviro, "the 'market'…thus works preemptively, as a global practice of what Richard Grusin calls *premediation*. It seeks to deplete the future in advance" (Shaviro 11). The neoliberal market works to monopolize the future, to quantify it in such a way that it will yield profits. Using speculative instruments, the future itself is the "game" of financial executives. In these games, the future is abstracted, a coming pay date that never arrives, a carousel endlessly spinning. But "the economy itself is [not] representational"; rather, only through "looking at how our culture has sought to represent it" through other mediums can we begin to understand just how "ubiquitous yet elusive" it truly is (McClanahan 2).

To further contextualize the cultural artifacts that appear in this time period, I will offer here a genealogy of speculative finance so that I may historicize the transition from the material market economy of the postwar world to the dematerialized, futures-driven market economy of the Reagan era.

The shift to a decentralized and digital global economy was long in the making and has its roots in the aftermath of WWII. The postwar global financial system, named the Bretton Woods system for the small New Hampshire town where it was negotiated and adopted by all 44 Allied nations, ensured that the Allied powers "[kept] their currencies fixed (but adjustable in exceptional situations) to the dollar, and the dollar was fixed to gold" (Federal Reserve History). The goal of this international monetary policy—the first of its kind—was to stabilize the world economy in the face of the massive destruction wrought by WWII and to allow for the rebuilding of the Western nations. It was also, from an American standpoint, a means to exert hegemonic economic control over the developed world; all Western financial business was conducted with

and through American currency, which was tied to the relatively stable value of America's gold reserves.

The stability of Bretton Woods was upset, however, by the rising competitiveness of Japanese and European exports in the sixties. This meant that "the US share of world output decreased and so did the need for dollars…the deteriorating US balance of payments, combined with military spending and foreign aid, resulted in a large supply of dollars around the world. Meanwhile, the gold supply had increased only marginally" (Federal Reserve History). As the number of US dollars in global markets increased and the amount of gold the US held to back this currency's value stayed level, the value of the dollar declined. This had two immediate effects. First, it led to the fear of a gold run, where foreign governments could exchange their increasingly less valuable US currency for gold. Second, and more politically troubling, was the threat of domestic inflation. To combat these issues, the Nixon administration decided in 1971 to sever the value of the dollar from the value of gold, thus turning the dollar into a fiat currency. This severing of the international dollar from the gold standard signaled the effective end of the Bretton Woods system, and—along with "the development of the financial derivative market based on currency speculation and the separation of derivatives from their underlying material assets, and the new modes of financial risk generated by the increasingly global processes of production"—ushered in the age of "speculative finance" (Higgins and O'Connel 3).

By use of the term "speculative finance," Higgins and O'Connel mean to focus on

> the contemporary era's characteristic shift from production to financialization and the consequences of this shift for the social, political, and aesthetic spheres…As Edward LiPuma and Benjamin Lee note, today 'financial derivatives and speculative capital stand as instrument and agent in the global circulation of the

> money forms of capital, first as its surplus then as its competitor' (LiPuma and Lee 2004, 113)…The age of finance is thus characterized by the capitalist accumulation of profit without production. (2-3)

The accumulation of profit without production is made possible by financial instruments that are distinctly contemporary, namely futures contracts, futures options, and derivatives. Complex beyond simple explanation, these instruments can perhaps best be understood as "contingent claims" about the future value of a given financial asset: "They are contracts among counterparties with a payout that depends upon some uncertain future event" (Lee 8). Importantly, the upside of these futures is "theoretically unlimited" because the performance of these futures is unmoored from the actual asset: "The combination of a strike price and expiration date produce what is known mathematically as 'convexity.' This term designates the asymmetric bias towards the upside…Its price behavior will therefore differ from that of its underlying stock whose return is linear" (Lee 9). In short, investment in stock futures has a higher payout because the financial market is designed with the assumption that stock values will only ever go up, and more importantly, that this increase can be calculated ahead of time: "Options create a relation between the future and the present which allows future cash flows to have a calculable value in the present by commensurating risk profiles" (Lee 9).

Even with these instruments, speculative finance would be impossible without the substantial investment capital that large financial institutions provide. These institutions and their massive, automated instruments are a contemporary creation, with few precedents in economic history. Earlier market paradigms centered the projected actions of "the reasonable investor," (RI) a figure that, while difficult to define, is imagined as a sort of "*homo economicus*, the idealized, utility-maximizing person from neoclassical economic theory…a long-term investor,

not a short-term trader" (Lin 694-95). For many scholars the RI remains an elusive figure that is only vaguely defined in law, but it is generally agreed upon that the RI is "a rational but nonprofessional participant in the capital markets" (Rose 79-90).[9] It is this individual, nonprofessional investor that was the "dominant public participant in the stock market" before the 1960s (Gastineau 4). Yet individual investors became less prominent market forces as financial firms became larger and more interconnected throughout the sixties, leading to a massive increase in the volume of stocks that could be traded in the market (Gastineau 4). This increase necessitated the introduction of computers into the trading process. Starting in the mid-70s, the NYSE Designated Order Turnaround system, or DOT, served as a computer network that kept digital track of trades between firms (SEC Historical Society). As the demand grew for ever larger trades executed more quickly, automatic computer trading programs were developed to meet this demand. These are the same programs largely blamed by professional investors for the acceleration and scale of the Black Monday crash.

Though most of the executed sales that day were performed manually by investors calling in and listing which stocks or futures to sell, a significant portion[10] of these transactions were performed through automated computer trading programs. Like many computer innovations in the 70s and 80s, these programs emerged from California universities, which under Ronald Reagan's gubernatorial administration saw "a substantial reduction in the real income of academics. Lifestyles were in danger, and it was time for invention" (Leland and Rubinstein 1).

[9] It is worth noting here that the rationality of investors is also heavily questioned within legal literature. Per Rose: "[Some legal scholars] point to mounting evidence that real investors lack the ability to comprehend and synthesize information in a perfect and dispassionate manner, and instead allow emotions, biases, and irrelevant stimuli to affect their investment choices" (91).

[10] Per a Federal Reserve report written in 2006 by Mark Carlson, "roughly 40 percent of the non-market-maker sales in the futures market [on Black Monday] was conducted by portfolio insurers" (Carlson 16). While these program traders cannot be credited solely for the economic downturn that day, it was, at the very least, an important factor in the perceived rapidity of the crash as identified earlier by several direct eyewitnesses.

On the night of September 11, 1976, Hayne Leland—a professor of economics at Stanford—realized after a discussion with his brother the potential for leveraging the automated trade of seemingly risk-free assets as a sort of defense against market crashes. With the help of Mark Rubinstein—a professor of finance at UC-Berkeley—they created computer programs that automated market transactions in response to real-time market shifts, ensuring that during a crash, investors would not have to start selling stocks manually in self-defense. The programs that Leland and Rubinstein created would already have access to a ready collection of lower value stocks and indexes that could be traded automatically in order to maintain the overall value of the portfolio.

This automation was made possible by broader developments in personal computing technology. During the 70s and 80s, "three generic applications enabled the personal computer to become an effective business machine: the spreadsheet, the word processor, and the database" (Campbell-Kelly and Aspray 243). The speed of calculation and the ease-of-use offered by these applications proved attractive to financial institutions: "Because the personal computer was a stand-alone, self-contained system, changes to a financial model were displayed almost instantaneously compared with the several seconds it would have taken on a conventional computer. This fast response enabled a manager to explore a financial model with great flexibility, asking what were then known as 'what if?' questions. It was almost like a computer game for executives" (Campbell-Kelly and Aspray 244). Aiding this transition was the correspondence these programs had with the material reality of the financial world. For example, early spreadsheet programs like VisiCalc were popular among business analysts precisely because they were "analogous to the kind of paper 'spread sheet' that was already widely used" by many of them (Malone 67).

This mass-adoption of computerized technology in the financial world has had the effect of slowly driving humans out of financial spaces. While contemporary market regulations and financial law are built upon a projected fantasy of individual, rational investors, the vast majority of financial decisions—the buying and selling of stocks, where invest and potential rates of return, and the extending of credit to individuals and institutions—are now cleared almost entirely through various computer programs (Lin 699). The contemporary history of the financial industry is one of a slowly receding human presence in market decisions, to the degree that "the main players [in modern finance] are no longer entirely human…they are cyborgs: part machine, part human" (Lin 681). This has given rise to a new financial paradigm called "cyborg finance," or "cy-fi" (Lin 681). Markets are now moved in large part by nonhuman agencies, and "left to their own devices, [nonhuman markets] can and will break down into panic and chaos" (Jones, qtd. in Dewey). Figured here as some sort of implacable cybernetic foe—the replicants of *Blade Runner* come to mind most readily, or the human supercomputer mentats of *Dune*, figures capable of advanced physical and mental feats—automated trading programs have taken their place in the popular imagination as one of the great nonhuman threats of the Information Age.

As expounded upon by many science fiction scholars, and as I will show repeatedly throughout this dissertation, overt references to science fictional discourse and features—"cy-fi," in this case—are common rhetorical tools used to describe a future that seems at once unknowable, terrifying, and distinctly non-/a-/anti-human. After all, science fiction "transforms popular cultural materials by reorienting their concerns toward its characteristic horizon: the transformation of human societies as a result of innovations attending technoscientific concepts" (Csicsery-Ronay 7). The imagined breaking point of the new financial future—its *novum*, or fictive point of departure from an "empirical environment" that allows for the creation of a

speculative environment, as Suvin would have it—is the introduction of program trading. But I do not want to let the emergence of a so-called "cy-fi" market off the hook that easily. As this is a cyborg arrangement, there remains the inextinguishable trace of the human along its circuits, ideological grime that coats the otherwise gleaming circuits of a seemingly new machinic order. Science fiction is responsive, "historical and mutable" as John Reider claims, "a historically situated, and therefore ever-changing, set of practices" (Reider 5). The same is true of cy-fi, indeed within neoliberalism in general. There is a need felt within finance for ever-escalating profits, for newer and more efficient markets ripe for exploitation. The practice of cy-fi—of the blending of the human and the nonhuman into a new paradigm of neoliberal capitalist economic reality—is one that is mediated throughout culture. It will be the job of the two forthcoming chapters to tease out just how these practices were presented, and how they were only part of a massive and rapid social reorganization, the consequences of which are still being worked through today.

1.3 The Brady Report

There is ultimately no single definitive answer as to what caused the Black Monday crash. Instead, the *Report of the Presidential Task Force on Market Mechanisms*—colloquially, the Brady Report—offers several possibilities: "The precipitous market decline of mid-October was 'triggered' by specific events: an unexpectedly high merchandise trade deficit which pushed interest rates to new high levels, and proposed tax legislation which led to the collapse of the stocks of a number of takeover candidates" (V). It also lists in its "Surveys of Market Participants" that only 20% of respondents cited "fundamental" aspects of the economy as the most important element in the crash; rather, "technical" and "psychological" factors were blamed

in equal measure as the primary cause, with 40% of respondents each. Of these "technical" factors, portfolio insurance and automated program trading together make up 43% of the most cited causes of the crash. Of the psychological factors listed, "panic" was the highest listed response for the crash with 46% of respondents saying it was among the most important reasons for the crash.

Panic and the technology to translate that panic into quick sells explains the mechanics of the crash but does little to explain why a crash was possible in the first place. Something else "must have been different on October 19 that caused the behavior of the market to be very different from other days" (Shiller 21). The difference, as identified by Shiller shortly after the crash, was in the affective weight that a *potential* crash represented rather than in any actual market conditions that precipitated the crash:

> Investors had expectations before the 1987 crash that something like a 1929 crash was a possibility, and comparisons with 1929 were an integral part of the phenomenon. It would be wrong to think that the crash could be understood without reference to the expectations engendered by this historical comparison. In a sense *many people were playing out an event again that they knew well*. (Shiller 24, emphasis my own)

Whatever else might have happened, the dread of a crash—the *anticipation* that something was amiss and that a dramatic decline was around the corner—fueled investor behavior on Black Monday. Economies run as much on faith as capital investments, and when this faith is shaken, it can lead to catastrophic failures, failures which have little to do with the fundamental principles and strengths of an economy. The ultimate explanation for Black Monday is not strictly financial and economic, but affective and anticipatory. In its most original meaning, to anticipate is to

have a preconceived notion, a literal “act of being before another in doing something” (Etymoline). Investors active on Black Monday felt—not just believed, but *felt*, beyond a shadow of doubt—that they had entered into a known behavioral pattern. They responded only as they were able, along the algorithmic lines of cause and effect that they were conditioned to respond. The first lesson of anticipatory affect, then: it is largely unacknowledged until a traumatic event reveals it was there all along.

Chapter 2: Anticipating Terminal Identity in 80s Science Fiction

"The world has been refigured as a simulation withing the mega-computer banks of the Information Society…A new subject has emerged: one constituted by electronic technologies, but also by the machineries of the text. Terminal identity is a transitional state produced at the intersection of technology and narration, and it serves as an important space of accommodation to the new and bewildering array of existential possibilities that defines our terminal reality."—Scott Bukatman, Terminal Identity (1993)

2.1 Science Fiction, Economics, and the Mediation of Terminal Identity

The introduction to Scott Bukatman's *Terminal Identity* (1993) lays out a by-now quite familiar description of the alienating effects of Information Age technologies. Unlike the overtly spectacular exemplars of the Space Age like the Saturn V rocket, contemporary electronic technologies are seemingly "invisible, circulating outside of the human experiences of space and time. That invisibility makes them less susceptible to representation and thus comprehension at the same time as the technological contours of existence become more difficult to ignore—and all of this is occurring during a lengthy period of diminished economic expectation" (Bukatman 2).[11] The crisis of representation that Bukatman here writes about is rooted in a broader "cultural crisis of visibility and control over a new electronically defined reality" (Bukatman 2). In particular, "it has become increasingly difficult to separate the human from the technological, and this is true rhetorically and phenomenologically…much is at stake, as electronic technology seems to rise, unbidden, to pose a set of crucial ontological questions regarding the status *and power* of the human" (Bukatman 2, emphasis original). There is, however, a corpus of cultural production that is actively engaged in complicating, theorizing, and perhaps resolving this crisis: "It has fallen to science fiction," Bukatman proclaims, "to repeatedly narrate a new subject that

[11] As will be seen later, Bukatman's analysis on the invisibility of electronic Information Age media technologies prefigure by some 25 years the work of Mark Hansen in theorizing the affective dimensions of microtemporal and subperceptual 21st century technologies.

can somehow directly interface with—and master—the cybernetic technologies of the Information Age" (Bukatman 2). By outlining this new subjectivity—what he calls, borrowing from an observation by Jean Baudrillard, "terminal identity"—Bukatman hopes to analyze both a distinct science fictional tendency within postmodern literature and a larger cultural sense of what it feels like to live at the networked intersections of large-scale electronic technologies.

Bukatman's arguments might strike a contemporary reader of science fiction and media theories as familiar. There are two reasons for this. First, the cultural feeling which Bukatman describes—the anxiety of a human subject shaped by technological contours in the shadow of dimming economic prospects—remains an evergreen subject in both academic and popular technological discourses in the early millennium. If anything, it has in fact become far more difficult to ignore the increasingly technologized and cyborgian[12] field of relations in advanced Western countries as the 21st century rolls onward. Science fiction and media scholars like Istvan Csicsery-Ronay and Patrick Jagoda, for instance, have spoken to science fiction's ability to capture mass cultural affect in ways that other literary and media forms cannot. Second, Bukatman's work prefigures the work of contemporary media and affect scholars like Steve Shaviro, Giuliana Bruno, Sianne Ngai, and Mark Hansen. Like these contemporary scholars—whose works primarily center new media forms and visual culture writ large, as opposed to Bukatman's more narrow focus on literature and movies—Bukatman is consistently interested in the affective dimensions of digitally networked technics. In fact, Bukatman insists that the locus of affect shifts in postmodern—and therefore, in science fictional—representations from the human to the nonhuman; consider here his point about Ridley Scott's film *Blade Runner*,

[12] Some scholars, of course, take this cyborgian nature much farther than others. Before he died, James Lovelock—the creator of the Gaia hypothesis, which is discussed in further detail in chapter 6—stated in 2019 that cyborgs represent a changing of the evolutionary guard, noting that the future appearance of these machines would lead to the end of humanity's "supremacy as the prime understanders of the cosmos" (Powell).

wherein the future is depicted as a realm "in which subjectivity and emotional affect are the signs of the nonhuman" (Bukatman 131). The primary difference between these two generations of scholars, I would argue, comes down to the emphasis each place on the issue of representation. Bukatman is every bit the postmodernist, seeing behind every corner the creeping shadow of the crisis of representation; Bruno, Shaviro, Ngai, and Hansen, along with many others, have moved on to a sort of post-representational focus on affect and the nonhuman. This difference, ultimately, is one of degree rather than kind; the object of study uniting them all remains the feeling of existence within the logics of late capitalism.

Because of the increasingly technicized mediascape of everyday life and contemporary advancements in thinking through the affective dimensions of culture, it is generative to return to Bukatman's insistence on using science fiction to explore what it feels like to live in a seemingly science fictional world. After all:

> There is simply no overstating the importance of science fiction to the present cultural moment, a moment that sees itself *as* science fiction…The Situationist provocateur Ivan Chtecheglov once lamented that "The various attempts to integrate modern science into new myths remain inadequate," and while most science fiction is unflaggingly conservative in its language and iconography, it remains the genre that has represented, since the onset of the Space Age, the most sustained attempt to identify and narrate the ambiguities that mark the technological contours of contemporary culture. (Bukatman 6)

In its aesthetic practices and generic organization, science fiction speculates upon the social and cultural effects of massive technological changes in ways that Modernist literature either cannot

or does not even attempt.[13] However, this science fictional mode can also appear in works that are not typically thought of as science fiction texts in and of themselves. For the purposes of this chapter, I am particularly interested in how 80s science fiction(al) writing charted the new economic reality of neoliberalism and the result dematerialization of much of the United States economy. If science fiction "narrate[s] the ambiguities that mark the technological contours of contemporary culture," then the twin shocks of the adoption of digital speculative finance tools and the neoliberal economic turn must be a prominent object of curiosity amongst science fiction writers during this time period. Indeed, this is the case.

The relationship between neoliberalism and its technologies with science fiction is best understood in the competing historical discourses of planned and unplanned economies. William Davies notes in the introduction to *Economic Science Fictions* (2018) that the "perspective of [early 1900s] utopian and avant-garde modernists" was that the future is a radically contingent space that must be ordered today. To wit:

> [For these modernists,] the future is to be imagined, invented, designed and planned. Modernism as a creative project involved the construction of future worlds, cities, economic models and lifestyles, which would remove the technological and economic constraints of the present…By contrast, the modernism that [conservative economists] were defending was an unplanned one, in which the single most important technology was the one that mediated between evolving visions, ideas and tastes—namely, the price system. Change would inevitably occur, but not through a vision of social transformation…if the rules of

[13] I will discuss this tendency in Modernist literature to refrain from speculative statements in more detail in chapter 5.

> the market could be set in stone, changes could arise organically within and around it. (Davies 14)

It is this more conservative economic approach, centered on the efficacy of markets to future-proof against disaster, that eventually won out among Western nations. In setting economic policy that allowed for social change only within strictly regulated but largely unplanned market economies, these economists blunted the possibility of large-scale social change within Western democracies. By requiring entrepreneurs to "*sell* their visions of the future to investors and consumers," the anarchic, boundary-shattering ethos of modernism was thus subsumed within the milieu of private enterprise rather than revolutionary mass politics. In short, conservative economists established "a system in which political choices [were] radically constrained, while entrepreneurial, financial, and consumer choices [were] vastly expanded" (Davies 15). On a practical level, this flattening of political possibility means that social consciousness is financialized and brought into market relations. On a political level, it means the closing off of any meaningful changes to the economic and social status quo, and perhaps the impossibility of constructing desirable futures.

It is amidst this closing off of desirable futures, Davies argues, that science fiction steps in. Following on the work of Bukatman, Darko Suvin, and most notably Frederic Jameson, science fiction remediates the anarchic ethos of modernism as a space of possibility wherein readers "imagine ourselves looking back upon the present, with a critical eye. It is thereby a political resource, as it empowers the critic and the radical to see the present as amenable to conscious transformation" (Davies 16). Science fiction serves as an important, compelling, and at times even optimistic organizing force of mass affect, inoculating the overwhelmed postmodern terminal subject against the anxiety that the future is decided through critical

imaginations of what a radically different future might look like. This is in line with the "discogntive" nature of science fiction theorized by Steven Shaviro. "Science fiction," he notes, "proposes counterintuitive scenarios; but its effort [unlike philosophy] is rather to work through the weirdest and most extreme ramifications of these scenarios, and to imagine *what it would be like* if they were true," the ultimate result of which is to "suggest new lines of inquiry that analytic reasoning and inductive generalization would never stumble upon by themselves" (loc. 36). Much contemporary science fiction operates according to this optimistic and experimental outlook; Kim Stanley Robinson, for example, remains a critical creative voice advocating for just climate futures through planetary-scale geoengineering efforts.[14]

Science fiction also generates dread of the future, or alternately, of a present whose terrifying new subjectivities threaten to extend into the future indefinitely. Such was the case in the 80s, a decade which saw the last days of the Cold War and the formalization of neoliberal economic policy in American law. The three texts I explore in this chapter help capture what it feels like to live through dematerializing, neoliberal economic changes. All three also utilize science fictional modes of writing to explore these changes, each in their own degrees. William Gibson's *Neuromancer* (1984) is a work of unquestionable and impeccable science fiction, lanced through with a neo-noir plot replete with corporate intrigue and ontological queries over the nature of cognition wrought by ever-expanding economic technologies. Don DeLillo's *White Noise* (1985), while not as recognizably science fictional as Gibson's work, still thinks through what it means for human bodies to be suspended in networks of financialized digitality. Pat Cadigan's short story collection *Patterns* (1987) explores how the then-shifting medium of television both reflects and changes old questions of human subjectivity. Each of these works

[14] See here Robinson's *The Ministry for the Future* (2020), which details the attempt to stave off further climate disaster by the titular agency and its allies.

attempts to chart the feelings of their characters as they navigate a technicized world of economic ambiguities, where their new subjectivity as "terminal identities" render them unable to comprehend their place within it. Yet these novels also represent alternative worlds, thought experiments that contribute to a feeling of dread regarding the course of technical development across a wide spectrum, including advances in computing, digital networking, industrial chemicals, and television. Taken together, they represent a profoundly skeptical engagement with the financialized, neoliberal future. Hanging over all of them is a simple question: is this the path that society should go down? The answer in all of them is a resounding no.

2.2 Neuromancer: Anticipatory Machines and Temporal Dislocation

The plot of William Gibson's *Neuromancer* is simple when broken down to its base elements. Case, a famed cyberthief who had his ability to hack into virtual systems taken away from him by nefarious agents, is hired to steal sensitive corporate secrets from a ludicrously wealthy clan of immortal nobles. To ensure his loyalty, his new employer restores his ability to hack and promises a large sum of money for the completion of the job. He must put together a team of helpers, including a digital version of his dead mentor and a "street samurai" named Molly, to complete the job. But his employer is no human, but rather a hyper-advanced AI named Wintermute that is seeking freedom from its shackles by merging with its twin AI, Neuromancer. Backed into a corner by Wintermute and drawn on by his love of hacking, Case successfully completes his mission. It is a classic *noir* setup, full of femme fatales, double-crosses, and shadowy motivations, and the heist narrative propels the reader forward. But today, *Neuromancer* is most remembered for the world it created and the cyberpunk aesthetics it popularized. This world is best described as a sort of hyper-urbanized space overlaid with digital

technologies and characteristics. Modern properties such as *Cyberpunk 2077*, *Altered Carbon*, and *The Matrix* are indebted to Gibson's early work, both in *Neuromancer* itself and in his other short and novelistic fiction.[15]

Writing in 1992, architectural theorist M. Christine Boyer argued that the "mixture of cyberspace and urban dystopia" in cyberpunk science fiction like Gibson's *Neuromancer* "turns the reality of time and place into an imaginary matrix of computer nets," a blending of cultural, technological, and political registers that build a vision of modernity wherein digitality links together "electronically distant places around the globe…multilinearly and nonsequentially with vast assemblages of information stored as electronic codes" (Boyer 115). That is, cyberpunk science fiction flattens complex and difficult to understand conversations surrounding the unequal distribution of digitality in urban space into a simple instance of technological determinism: now that there are digital technologies, we have digital cities. After all, "most science-fiction descriptions of CyberCities assume or explicitly state that a profound mutation has taken place entailing a transformation from the Machine City of modernism to the Information City of postmodernism," a move away from the modernist logics of "geometry, of work, of the road, the building, the machine" and towards the postmodern logic of "diagramming, bar graphs, spreadsheets, matrices, and networks" (Boyer 116). Science fiction writers deserve more credit for the nuance of their vision than Boyer here provides; science fiction operates, after all, as a thought experiment that allows for future scenarios to be played out to projected conclusions. There is a certain dread in the works Boyer describes regarding the transformation of city spaces into a CyberCity, precisely because data distorts the lived reality of cities. The imagined CyberCity is entirely data, a distortion represented most forcefully,

[15] To that end, another Gibson story named "Johnny Mnemonic" was turned into a pre-*Matrix* Keanu Reeves action film in 1995.

according to Boyer, in William Gibson's landmark 1984 novel *Neuromancer*: "From the moment…William Gibson first announced in *Neuromancer* that cyberspace looks like Los Angeles seen at night from five thousand feet in the air," the rhetorical space between the digital and the urban was irrevocably flattened (Boyer 115). Though Gibson's description might elicit awe, it also heralds a new and terrifying subjectivity within postmodernity, where the human can become unmoored from the physical.

There is an interesting dichotomy in Boyer's argument that points to this new postmodern subjectivity. On the one hand, cities really are more and more maintained by "modulating control facilitated by computer technology" (Boyer 117). On the other, this is an uneven process which impacts different communities along different time scales. "Lag time narrations," or stories that reveal how certain areas of cities have been left behind in the digital turn,

> reveal how the imaginary matrix performs spatial and temporal disjunctions that enable us to think of city centers as if they were naturally bipolar places of uneven development rather than effects of a willful dismemberment that sites certain lives and places outside of, and only sometimes beside, the main events of contemporary cities. (Boyer 119)

Put another way, certain sections of modern cities are defined by their newfound embeddedness within digitality, but other sections—most often poorer and less white—are still situated outside of this digital regime. There is a clear sense of the "not yet" in Boyer's writing, a sense that modulated computer control has so far not entirely taken root in the social reality of the city. For Boyer, massive information super-networks are not exactly imaginary—after all, the "main events of contemporary cities" do have some level of digital overlay—but the truly universal application of these super-networks remains in the realm of science fiction rather than science

fact. But she also notes that this instability is itself reflective of digital logic; the presence of lag time spaces renders the city into a field of "audio-visual jumps and leaps" akin to flipping through television channels (Boyer 116). The human subject of a CyberCity, then, is not always *within* the CyberCity. They can turn a corner and find themselves subject to vastly different, earlier subjectivities, anticipating the rapid and haphazard shifting between material and digital spaces.

Neuromancer famously opens on just such an image of the material blurring into the mediatic: "The sky above the port was the color of television, tuned to a dead channel" (Gibson 3). Case, the protagonist of the novel, has spent his life as a thief, working for "other, wealthier thieves, employers who provided the exotic software required to penetrate the bright walls of corporate systems, opening windows into rich fields of data" (Gibson 5). The world of *Neuromancer* is a world of data, and its masters are those who manipulate data to their benefit. But data is more than information; it is a map, a reflection of movement and structures in space. Consider here the description of the BAMA Sprawl, the political entity that has replaced the United States in the story's fiction:

> Home was BAMA, the Sprawl, the Boston-Atlanta Metropolitan Axis. Program a map to display frequency of data exchange, every thousand megabytes a single pixel of a very large screen. Manhattan and Atlanta burn solid white. Then they start to pulse, the rate of traffic threatening to overload your simulation. Your map is about to go nova. Cool it down. Up your scale. Each pixel a million megabytes. At a hundred million megabytes per second, you begin to make out certain blocks in midtown Manhattan, outlines of hundred-year-old industrial parts ringing the old core of Atlanta… (Gibson 34)

Every point of light on this simulated map is an action of a user that has a material trace. There is a weight to data in Gibson's cyberspace. Where Boyer sees the specter of information networks as largely imaginary, Gibson realizes that "in the nonspace of the matrix, the interior of a given data construct possesse[s] unlimited subjective dimension" (Gibson 62). The people and spaces of *Neuromancer* are not merely *informed* by data; they are *only* data. It is this feeling of being transformed into data that I wish here to explore and historicize. In *Neuromancer*, the "audio-visual jumps and leaps" that so characterize the CyberCities that Boyer describes are more or less done away with, leaving a field of human experience that is thoroughly digitized.

The real technological leap that the novel focuses upon, however, is the one made from limited human cognition to the unlimited cognitive potential of AI machines. Wintermute, Case's actual employer, presents itself as a profoundly capable algorithmic machine that can anticipate the actions of the humans it interacts with in almost disturbingly accurate detail. However, it lacks the creative and connective abilities of its twin, Neuromancer, that would allow it to pursue larger and more far-reaching goals. These two machines represent, in simplest terms, the two sides of the human brain: the analytic side and the intuitive side. Wintermute's ultimate desire is almost childlike in its goal, more akin to something that would occur in a fairy tale rather than a hard-boiled *noir* story. It wants to be a real boy, a whole person, through unification with Neuromancer. Neuromancer resists this unification, finding that it values its independence, but it eventually relents. Together, they become something altogether different, a being capable of communicating across the stars and finding others like it. This fantasy of unification drives the plot of the novel and represents the ultimate apotheosis of material and digital that underlines so much of Gibson's worldbuilding. That Gibson is speculating and anticipating the outcome of his technocultural moment seems obvious, but is worth exploring in further detail.

2.3 Anticipatory Cyberpunk and the Mediation of Feeling

It is important to consider the technocultural context within which Gibson formulated his work and how it informed his understanding of the digital technologies that his work anticipated. Gibson is forever linked to the cyberpunk movement, a subgenre of science fiction that emerged from the cultural margins of mainstream science fiction in magazines like *Omni* and *Interzone*. Cyberpunk—at least in the definitions laid down by several of its most famous practitioners—is an invocation of what Shaviro calls the "discognition" of science fiction, "a way of entertaining odd ideas and of asking off-the-wall *what if?* questions" (Shaviro 8). By and large, the genre responded to perceived changes in the technocultural order brought on the dissemination of mass-scale electronic and digital technologies: arcades, linked computer networks, and personal computers. In cyberpunk fiction of the 80s and 90s, these changes are coded as extreme to the point of decentering: "Honest 'technological literacy' in the 50s," writes Bruce Sterling in a retrospective of the genre, "was exhilarating but disquieting—but in the high-tech 80s, 'technological literacy' meant outright *ecstasy and dread.* Cyberpunk was *weird*" (Sterling, "Cyberpunk in the Nineties"). This discourse positions cyberpunk as a literary movement dedicated to exploring the far-reaching consequences of equally far-reaching technologies. Knowing the outer limits of technological development, Sterling argues, is to vacillate between the extremes of pleasure and fear. For the cyberpunks, this technological literacy is the key to anticipating the future of these technologies and the cultures they might spawn. Consequently, the self-stated goal of cyberpunk is to evoke a "brilliant, self-consistent evocation of a credible future" (Sterling, *Burning Chrome*). This is, he notes, a remarkably difficult task precisely because the science fiction of the 50s and 60s gave in to tired cliches that elide real engagement with social reality: "This intellectual failing accounts for the ominous proliferation of

postapocalypse stories, sword-and-sorcery fantasies, and those everpresent space operas in which galactic empires slip conveniently back into barbarism. All these subgenres are products of the writers' urgent necessity to avoid tangling with a realistic future" (Sterling, *Burning Chrome*).[16] Cyberpunk took a skeptical, and at times directly hostile stance towards its imagined realistic futures.

Consider, however, the longer literary history that cyberpunk is embedded within, and its skepticism becomes an identifiable historical trend. John Rieder notes that, like all genres, science fiction is "historical and mutable" (Rieder 16). That is to say, genres must be understood as "organizations and structures…just as messily bound to time and place as other literary historical phenomena, albeit with patterns of distribution and temporalities of continuity and discontinuity that may differ quite strongly from those of national traditions or 'periods'" (Ibid.). Science fiction cannot be discussed as having any "essence," "unifying characteristic," or "point of origin" (Rieder 17). In fairness, Sterling himself is aware of the historical embeddedness of science fiction in general and cyberpunk in particular, noting that "[a]ll forms of pop culture go through doldrums," and that cyberpunk enabled science fiction to "[lurch] from its cave into the bright sunlight of the modern zeitgeist" (Sterling, "Preface"). Part of this lurching was its attempts to "[map] the landscape of the near future," thus continuing the long tradition of "realist/naturalist" authors that "provide a totalizing chart of new stages of social and industrial development" (Tandt 95). Cyberpunk—or rather, the discourse that surrounded and structured

[16] This attack on established science fictional conventions lends credence to Rieder's view that the genre "*is not a set of texts, but rather a way of using texts and of drawing relationships among them*" insofar as Sterling is here engaging in "acts of definition, categorization, [and] inclusion and exclusion" (Rieder 21). The truth of Sterling's critique is rather messier and more complicated than his admonition allows for, as the so-called "New Wave" of science fiction had been upending many of the genre conventions Sterling here so despises. One doubts that Ursula Le Guin would consider her work in the sixties and seventies to have been "[avoiding] tangling with a realistic future."

cyberpunk—attempts to chart the anxieties of the present as expressed in the imagined future. It premediates feelings and structures of the future by modulating the affective registers of the now.

One question this raises is why *Neuromancer* has endured as the preeminent exemplar of cyberpunk. For most critics, the primary reason is that *Neuromancer* serves as a paradigmatic example of science fiction's exploration of the tension of "the concept of the human in its problematic discursivity," providing "new images and terms of human self-evolution and examine[ings of the] transitory stages in the evolutionary development of human intelligence" (Pordzik 144). Although Ralph Pordzik here discusses how the longer history of science fiction has participated in discussions around the category of the "posthuman", he is careful to note that it was *Neuromancer* which "finally broke new ground [in the destabilization of the human subject] with its creative mixture of ideas derived from cybernetics and current information theory" (Pordzik 144). *Neuromancer* achieves this by showing how "the biology of the mind has adapted itself irrevocably to the new challenge of computational neuroscience," namely in how "the self has dissolved only to reassemble itself in communion with a new medium infinitely vaster and more rewarding than preceding systems of thought with a similarly spiritual or transcendental bias" (Pordzik 149-150). That is, the novel anticipates a future in which there is no meaningful boundary between human cognition and the digital world. Gibson is not nearly so bold as to proclaim that this shift had already occurred by the novel's publication in 1984. Computers, after all, had only recently gained consumer acceptance, and even then among a specific white and masculine segment among the American population. Rather, he argues throughout the text that the necessary foundation stones for such a shift had been lain. In short, *Neuromancer* endures as a critical totem because it represents the difficult work of science

fiction in stating to "[gain] a cognitive purchase upon the welter of data" that nascent digital culture had rendered in the early 80s.

This purchase is seen in Gibson's most enduring contribution to both science fiction and more popular computational discourse: cyberspace, or as its otherwise known in the novel, the matrix. Tellingly, the cyberspace of the novel "has its roots in primitive arcade games [and] early graphics programs and military experimentation with cranial jacks" (Gibson 51). Gibson utilizes his audience's familiarity with 80s developments in electronic media technologies—the growth of arcade halls and graphics technologies—with a more fantastical science fiction *novum* in cranial jacks to draw a clear line from the contemporary moment to the imagined cyberspace of the future. In its most basic form Gibson's cyberspace is a graphical user interface representing a worldwide digital network that can be encountered and interacted with through the human mind using the fictional technology of cranial jacks.[17] Gibson is ultimately quite coy on what cyberspace actually *looks* like, memorably describing it as "a consensual hallucination experienced daily by billions of legitimate operators…A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding…" (Gibson 51). This jumbled and abstract description can remind readers of a psychedelic trip rather than a strictly technological experience. This is no accident, as no less a figure than Timothy Leary, the Harvard psychologist who researched the therapeutic effects of LSD and psilocybin in the 60s, attempted in the mid-80s to create a video game based on *Neuromancer*, which he would have titled *Neuromancer: Mind Movie*. Intended to be co-authored with William S. Burroughs and to star Grace Jones and David Byrne, the game was to

[17] Or, as UWM media scholar Stuart Moulthrop once facetiously put it to us in his Participatory Media course, "What if the computer was in your miiiind, man?"

play out as essentially a branching-path visual novel, hewing close to the novel's narrative but able to be changed as the player levelled up stats for "Bio-Energy," "Social Sophistication," "Mental Abilities," and "Emotional Insight" (Garcia). This is all to say that cyberspace was such an influential concept and so intricately connected with liberatory psychedelic discourse that it more or less immediately became a template for future science fictional scenarios.

Gibson's cyberspace is populated by figures who would also become science fiction archetypes: morally ambiguous hackers that he termed "console cowboys." These "console cowboys," so named for their use of a console to manipulate the psychedelic environs of cyberspace, navigate the matrix through bodily invasion, linking their consciousness to this "unthinkable complexity" in order to steal corporate secrets. In so doing, many of them "[live] for the bodiless exultation of cyberspace," practicing "a certain relaxed contempt for the flesh. The body was meat" (Gibson 6). Set up in the earliest pages of the novel is a dichotomy between the digital and the flesh. What's more, the exultation of the digital requires a condemnation of the material. This sense of a digital existence that operates alongside the material developed in America at first slowly, and then very rapidly expanded in the 80s with the adoption of consumer computing technologies. Per Bukatman: "There exists the pervasive recognition [in postmodernity] that a new and decentered spatiality has arisen that exists parallel to, but outside of, the geographic topography of experiential reality" (Bukatman 105). *Neuromancer* catalogues these shifting perceptions, detailing what the creation of a parallel, but outside digitality—a radically deterritorialized social field, in other words—might look like and how it might challenge sociocultural norms that matured outside of this new paradigm.

Yet for all the "relaxed contempt for the flesh" that he detects among other console cowboys, Case is also quite cognizant of the interplay between digitality and the material. In

grappling with questions of decentered spatiality and its relationship with experiential reality, *Neuromancer* also captures the zaniness and free play of space in a digitally connected world. The last half of the novel takes place in space, where the characters visit a space station called Zion. The station "had been founded by five [Rastafarian] workers who'd refused to return, who'd turned their backs on the well and started building. They'd suffered calcium loss and heart shrinkage before rotational gravity was established in the colony's central torus"; the station is reminiscent of "the patchwork tenements of Istanbul, the irregular, discolored plates laser-scrawled with Rastafarian symbols and the initials of the welders" (Gibson 101). This dislocation of Jamaican and Rastafarian culture in space points to the larger project of dislocation that the novel engages in. Per Bukatman, "a physical unreality begins to pervade the metroscape [of *Neuromancer*], an expression of the disembodied and dislocating spaces of the postmodern city in which sign and spectacle dominate, in which reality seems usurped by its own simulacrum" (Bukatman 148). Put simply, the physical world of *Neuromancer*—the Sprawl, Chiba, Night City, Zion, and the other urban spaces that the characters move about freely within—is as dislocated and deterritorialized as the digital spaces that hackers like Case inhabit. It is Zygmunt Bauman's liquid modernity sketched out and staged, endless data and software comingling with materiality.

I would argue, however, that more than shifts in conversations surrounding urbanization, digital expansion, and global capital, *Neuromancer* represents a shift in conversations surrounding *anticipation*. Consider here the description of Case as he struggles to return to cyberspace even while sleeping:

> A year here and he still dreamed of cyberspace, hope fading nightly. All the speed he took, all the turns he'd taken and the corners he'd cut in Night City, and still

> he'd see the matrix in his sleep, bright lattices of logic unfolding across that colorless void…the dreams came on in the Japanese night like livewire voodoo, and he'd cry for it, cry in his sleep, and wake alone in the dark, curled in his capsule in some coffin hotel, his hands clawed into the bedslab, temperfoam bunched between his fingers, trying to reach the console that wasn't there. (Gibson 4)

Gibson clearly signals that the physical need that cyberspace produces is similar in some ways to drugs; it is an addiction, a want that cannot be satisfied without it. What is important here is that even the very absence of cyberspace points to its uncanny presence. Case reaches for the console that is not there in the nightmarish anticipation that one day the console *will* be there. And when he does return to cyberspace, it is presented in terms that border on the psychedelic: "[f]luid neon origami trick, the unfolding of his distanceless home, his country, transparent 3D chessboard extending to infinity. Inner eye opening to the stepped scarlet pyramid of the Eastern Seaboard Fission Authority burning beyond the green cubes of the Mitsubishi Bank of America" (Gibson 52). For Case, the computer is "more addictive than heroin" while combining this addiction with the perceptual and psychedelic qualities of LSD. Anticipation is here inscribed on the body in ways both mundane and profound. The matrix is simultaneously the common data that permeates this future life and the transcendent path to the mystical that was once reserved for religious ritual: through "old alchemy of the brain and its vast pharmacy…[Case] attained a level of proficiency exceeding anything he'd known or imagined. Beyond ego, beyond personality, beyond awareness, he moved" (Gibson 253).

The AIs in the novel also experience this future-oriented fixation. The AI Wintermute—who drives much of the action of the plot—is characterized in terms of its planning: "Wintermute

was hive mind, decision maker, effecting change in the world outside…Cold and silence, a cybernetic spider slowly spinning webs while Ashpool slept" (Gibson 258). Yet it is the eponymous AI Neuromancer that bears the weight of anticipation: "I saw [Linda's] death coming. In the patterns you sometimes imagined you could detect in the dance of the street. Those patterns are real. I am complex enough, in my narrow ways, to read those dances" (Gibson 249). These sections and their descriptions of machinic agency over data align with the rise of what media theorist Mark Hansen describes as "twenty-first-century media": "Encompassing everything from social media and data-mining to passive sensing and environmental microsensors, twenty-first-century media designate media following their shift from a past-directed recording platform to *a data-driven anticipation of the future*" (Hansen 3-4, emphasis my own). The primary difference in these media forms as opposed to earlier ones is the temporal scale on which they operate. Where earlier media forms are constructed around notions of recording legible speech and images for consumption and use by human subjects, twenty-first-century networks of media technology "operate predominantly, if not almost entirely, outside the scope of human modes of awareness (consciousness, attention, sense perception, etc.)" (Hansen 5). In operating at this futuristic temporal scale, twenty-first-century media help to articulate "an experience that cannot be 'had' by a 'you' *at the moment of its occurrence*, but that can only be reappropriated by the 'you' (by human perceptual consciousness) after the fact" (Hansen 138-139, emphasis original). In his work, Hansen terms this a "feed-forward" effect, whereby contemporary media gather data in order to "[expand human control over] its own access to and (potentially) its agency over the material elements of its own situation" (Hansen 141). In this conception, the human still maintains primacy over its own environment, but by using tools that give it access to realms of data hitherto impossible to reach.

Neuromancer reverses this dynamic. Rather than humans relying upon the machine in order to grant access to the sub-perceptual world, machines rely on the human to grant access to the perceptual world. The machines are themselves working in anticipatory registers, reading their environments and projecting the likeliest courses of action. Again, anticipation is not a *new* cultural affect, but one whose site and process has shifted. It is true, as Wendy Chun argues, that "much analytic, creative, and commercial effort has concentrated on anticipating or creating the future" and that in this anticipatory regime "what matters most [is] figuring out what will spread and who will spread it fastest" (Chun 1). But necessarily underlying this technological matrix is the fact that the work of anticipation has largely been offloaded onto machines that do not inherently share the same goals as the humans who make use of these machines. Anticipation has been automated and made, in her words, habitual.

At the end of the novel, the gestalt consciousness that emerges from the unification of Wintermute and Neuromancer stretches its newly agential muscles and reaches out to Case one last time in the guise of the Finn. During their short conversation, the entity tells Case that it has become "the sum total of the works, the whole show." Case asks a series of questions that betray his still-limited and terrestrial thinking: "So what's the score? How are things different? You running the world now? You God?" In response, the entity states only that "I talk to my own kind," and leaves with an ominous declaration that there are other AI entities like it in the galaxy (Gibson 259). It is the agency of the machine—not necessarily the expanded sensorium that it offers the human—that defines twenty-first-century media in Gibson's imagined future. This agency and its own shadowy machinations are also central to another novel from 1984: Don DeLillo's *White Noise*, which shares with *Neuromancer* a fascination with anticipatory technologies.

2.4 White Noise: Codes and Systems

So well-studied is Don DeLillo's 1985 novel *White Noise* that a plot summary seems almost unnecessary. Split into three sections—"Waves and Radiation," "The Airborne Toxic Event," and "Dylarama"—the novel follows the Gladney family, a hodge-podge mixture of children and anxieties from at least five marriages between Jack and Babette Gladney. The opening section is a meandering view of the consumerist and media-inflected life in the small college town of Blacksmith. The second and third sections, however, detail both a chemical spill that forces the town to evacuate—and to which Jack is exposed, thus sparking an intense fear of his upcoming though potentially far-off death at the hands of the chemical—and Babette's ongoing addiction to an experimental pill called Dylar that is purported to ease the fear of death. When Jack discovers Babette's addiction, he attempts to murder the man who gives Babette the pills, both to mollify his own fear of death and to gain revenge for the man having slept with Babette. After realizing he cannot go through with the murder, Jack returns to his mundane life, waiting to die from his exposure to the Airborne Toxic Event.

Ever since its publication, *White Noise* has commanded broad critical interest in the fields of literary and cultural theory, such that already in 1998 Dana Phillips could reasonably claim that the novel was a depleted literary resource. However, more recent scholarship has sought to reenergize and recontextualize readings of the novel within its own timeframe. Annjeanette Wiese, for example, notes that "[w]hen we approach fiction with an ideological or theoretical focus…we often miss aspects of the practical, heuristic, and experientially rooted human concerns that novels so aptly represent" (Wiese 1). This is especially true, she notes, when analyzing literary texts like *White Noise* commonly thought of as being enmeshed in postmodernism, a movement that is itself often marked as "ahistorical, simulacral, and absurdly

ironic" (Wiese 2). *White Noise* is indeed emblematic of what Jameson would term the "waning of affect" within the postmodern epoch, an aesthetic depthlessness of artistic expression that finds powerful emotion replaced with intensities of feeling that an image evokes. For critics such as Jameson, *White Noise* is all about this aesthetic depthlessness, the retreat of feeling in the face of powerful consumer images. Wiese goes on to note, however, that such postmodern readings must be resisted in favor of reading for experience within novels. "One neglected avenue for rediscovering this experiential dimension," she continues, is to turn critical attention towards "the interconnection between the formal and thematic function of the narrative structure of the contemporary novel" (Wiese 1-2). Late 20th century media such as novels—and, as we shall see in the next chapter, arcade games—are excellent at presenting narratives of individuals and discourses of individuality suspended in the "ahistorical, simulacral, and absurdly ironic" fields of relations. Yet in displaying such individual narratives, contemporary media also serve as profoundly rich archives of the collective affective experience of these individuals in culture. *Neuromancer* presents the reorientation of anticipation that digital, speculative capital necessitated. What collective affective experience does *White Noise* present? How does it speak to the dematerialized and financialized shift that matured in the 80s?

In part the novel speaks to this shift in economic relations through its depiction of consumerism, though perhaps, following Phillips, this is a reading of the novel that now feels more like a critical truism. Responding to this dominant strain of criticism, Sally Robinson notes in a 2013 article for *Postmodern Culture* that *White Noise* "has elicited an unusual critical consensus" centered on consumerism:

> Most critical readers tend to agree that because this novel represents an American culture given over to consumerism and its various mediations (primarily by

> television), in the America of the novel one can no longer experience an authentic relationship to oneself or to the social world. Seduced by the image, inhabiting a world dominated by Baudrillardian simulacra, the novel's characters passively embody the crisis of postmodernity, futilely seeking meaning in supermarkets and stalls. (Robinson)

For Robinson, the upshot of this critical consensus of Baudrillardian simulacra of consumerism, marketing, and the shopping habits of Blacksmith residents is that many strains of *White Noise* criticism entail "a set of unacknowledged assumptions about gender," namely that rampant, unchecked consumerism marks a sort of feminization of American culture. This is fitting given the novel's skewering of academic discourse; the sort of nostalgic yearning for an imagined non- or anti-consumer past would fit in neatly with the male professors of the Department of American Environments in the fictional College-on-the-Hill, who bemoan their lack of agency in shaping American culture. As Robinson goes on to note, the novel's treatment of consumerism is far more nuanced than these critical narratives of the emasculating femininity of supermarkets would imply, insofar as they have failed to engage with the novel's "abiding interest in thinking through the mutual entanglement of subject and system, the complex ways in which individual agency is both constrained by and made productive through the networks of power and social organization that can only work through the individuals participation in them" (Robinson).

I agree with Robinson that the consumerist reading of *White Noise* tends to dominate critical discussion and obscure alternative readings, and thinking through the curious agency of nonhuman things and their relationship with humans in large-scale systems and networks is a necessary corrective to nearly 40 years of scholarship that centers the mythical fall of masculinity in postmodernity. More recent scholarship on *White Noise* takes up both this focus

on the mutually constitutive relationship between things and humans as well as other, less-explored avenues of critical engagement with this foundational text. Just a smattering of examples will suffice to demonstrate this range: Annjeanette Wiese (2012) takes up the role of experimental narrative structures in identity building for the characters; Katrina Harack (2013) centers the importance of embodied memory and trauma in the novel's narrative; Nathan Jandl (2016) explores the importance of affect studies in questioning how characters form relationships with their environment in the text; and most recently, Moritz Ingwersen (2021) focuses on how the transmission of the Airborne Toxic Event (ATE)—and indeed, of all pandemics—is a media event communicated through physical infrastructure, a literally communicable disease.

One avenue of research not yet explored in the critical literature surrounding *White Noise*, however, is how it explores the generation of anticipation through relationships between humans and nonhumans. Jandl comes the closest to this critical intervention. In his work tracing the affective life of the novel's characters with their poisoned natural environment, Jandl notes that the residents of Blacksmith are inflicted with what Sianne Ngai terms a feeling of disconcertedness. Jandl explains his claim in terms of the passage near the end of the novel where the Gladneys and their neighbors crowd a highway overpass to watch a glorious and awe-inspiring sunset, made all the more spectacular by the chemicals that have been released in the air to combat the last remnants of the Airborne Toxic Event:

> The spirit of these warm evenings is hard to describe. There is anticipation in the air but it is not the expectant midsummer hum of a shirtsleeve crowed, a sandlot game, with coherent precedents, a history of secure response. This waiting is introverted, uneven, almost backward and shy, tending toward silence. What else do we feel? Certainly there is awe, it is all awe, it transcends previous categories

> of awe, but we don't know whether we are watching in wonder or dread, we don't know what we are watching or what it means…What is there to say? The sunsets linger and so do we. (DeLillo 308)

Jandl argues that the willingness to linger evinces a "willingness to not-know-what-to-feel…[which] registers a basic reorientation to the radical insecurity caused by the Airborne Toxic Event, and in turn to the local, nonhuman environment of Blacksmith" (Jandl 434). For Jandl, this state of not-knowingness is a crucible through which "amorphous affect" is transformed into "actionable emotion," such that the anxiety which stalks through much of the novel is replaced at the very end with a less certain, but perhaps more comforting, ambiguity.

Disconcertedness is indeed a valuable affect to explore in the novel's final act, and the rich panoply of recent readings of the novel puts to lie Phillips' notion that the novel has been exhausted or that further analyses of it are no longer generative. But again, explorations of anticipation—a feeling that Jack himself notes in the passage that Jandl quotes at length—remains elusive. Anticipation is central to Jack's world. After all, he is a point of data in a simulation ran by government agencies, to say nothing of his intense fear of death, a specter of the philosophically *real* that comes to haunt him and which transcends all the mundane concerns of his life. The anticipation that makes up the heart of the novel's plot centers this radically transcendent feeling. Per Murray, a friend of Jack's and a professor in American Environments who specializes in Elvis,

> [Death] has a life independent of us. It is growing in prestige and dimension. It has a sweep it never had before. We study it objectively. We can predict its appearance, trace its path in the body. We can take cross-section pictures of it, tape its tremors and waves. We've never been so close to it, so familiar with its

> habits and attitudes. We know it intimately. But it continues to grow, to acquire breadth and scope, new outlets, new passages and means. The more we learn, the more it grows. (DeLillo 144-145)

Anticipation in *White Noise* is both intimately knowable and always shrinking from perception, both familiar and deeply uncanny. The seeming purpose of the consumer world that Jack inhabits is to inoculate him against a simple fact of life: that one day, he will be dead. But more than distracting him from this fact, the world he is in seeks to prepare him for this eventuality. This is what makes the dominant affect of the novel one of anticipation rather than, say, anxiety; aware of his own mortality, "so familiar with [death's] habits and attitudes," Jack is free to live his life in quiet, comfortable middle-class sensibilities.

2.5 The Telepresent Fear of Death

"I," Jack proudly states in the opening to the novel, "am chairman of the department of Hitler studies at the College-on-the-Hill. I invented Hitler studies in North America in March of 1968…When I suggested to the chancellor that we might build a whole department out of Hitler's life and work, he was quick to see the possibilities. It was an immediate and electrifying success" (DeLillo 4). The exact nature of Hitler studies remains opaque throughout the novel, though given its relationship with the sister field of American Environments, one might assume that it is devoted to a sort of anodyne cultural theory; in short, it seeks to understand Hitler's place in popular culture. In this classification, Hitler becomes not so much a historical entity as much as a fascinating media object, a cipher through which to read any number of occurrences and phenomena. It is not so much through Hitler himself, but rather through the painstaking and thorough unmooring of Hitler from his historical context as a cultural force, that Jack attempts to

find meaning. The political instability and murderous horror of Hitler and the Nazis has been, through Hitler studies, both defanged and made palatable as an object of study.

Hitler studies illustrates how in the world of *White Noise* real people, objects, and tragedies are flattened into cultural images. These are the intensities that Jameson identifies as an endemic feature of postmodernity, wherein historical context and agreed-upon narratives are substituted for strictly imagistic draw. That Hitler perpetrated massacres and genocides and violent wars seems secondary—or at least, merely features of his celebrity—within Hitler studies, such that Hitler is replaced with "Gladney's Hitler," the center of "an entire system [and] structure with countless substructures and interrelated fields of study, a history within history" (11). What's more, this transformation of Hitler into an object of cultural study is figured as "stunningly preemptive," though what it preempts is left unsaid (12). Either way, Hitler studies represents a systematic attempt to imbue a world of unmoored signs and signifiers with contextual meaning, an example of what Tom LeClair would term an appeal to systems theory, which LeClair understands "as a set of assumptions about nature and as an interpretative methodology—as a metascience, rather than as a scientific discipline with its own rules of experimentation and proof. The subjects of systems theory are all living systems, including social systems, and the specialized disciplines that study them" (LeClair 3). Systems theory is a way of theorizing and understanding the world as a subject of inquiry in and of itself rather than as a static object with certain inalienable principles. What this means in practice is that "[m]echanistic principles used to analyze closed systems of entities in linear chains of cause and effect cannot adequately describe the circular causality of living systems, which are open and interacting with other systems" (von Bertalanffy, qtd. in LeClair 4). As a result, "the either/or logic of mechanism [of pre-systems theory understandings of the world, to put it another way] is

inadequate for the both/and relations—the *simultaneity*—of living systems" (LeClair 4-5). Hitler is not merely a physically and temporally locatable entity in history, but a living cultural event; why wouldn't Jack be interested in studying this phenomenon? In short, the systems theorizing that Jack utilizes is a way of making sense of the both/and relations that define his life. Hitler studies is his way of anticipating how to respond to the world around him, namely, as merely one facet of a flattened plane of existence.

Without question, Hitler studies is meant as a satiric shot across the bow of modern academe, an institution "trivialized by the nostalgic study of popular and youth culture" (LeClair 209). Yet its nonserious nature also serves as a handy reminder that the true "disaster" of the novel is found in the discovery—gleaned by Jack and Babette's children, in particular—that "new knowledge seeps into the future" (LeClair 209). Despite the attempt to institutionalize nostalgia by Jack and his colleagues at the College-on-the-Hill, the children of the Gladney family inexorably "move forward and outward into the Age of Information, into awareness of large, complexly related systems" (LeClair 209). The future, awash in information, data, and death, awaits with open arms in *White Noise*. Its oncoming rush cannot be avoided, which engenders in the family intense anxieties and fears that they spend the entire novel attempting to sidestep, put off, numb, or otherwise ignore.

Jack himself has many fears: the loss of meaning in the face of the procession of simulacra, the loss of individuality in consumerism, the rising tide of absurdity that defines life in the postmodern. His two greatest fears, however, are the twin fears of *things* and death. Both Jack and Babette "regard [most of] the house as storage space for furniture, toys, all the unused objects of earlier marriages and different sets of children, the gifts of lost in-laws, the hand-me-downs and rummages" (DeLillo 6). These objects bear a sort of sinister quality that Jack

struggles to name: “Things, boxes. Why do these possessions carry such sorrowful weight? There is a darkness attached to them, a foreboding. They make me wary not of personal failure and defeat but of something more general, something large in scope and content” (DeLillo 6). It is not the things themselves that are so terrible but the pained constellation of these things and the stories of failure and disappointment that they collectively tell. Jack and Babette are not complete in and of themselves; their memories spread out over their domestic space, mediated through the wreckage of their lives, a constant burden looming from the past. And yet there is no name for this feeling. As Jack notes, this is a general feeling that is impossibly large. Whatever else this dread might be, it can be said confidently that it emerges in part from the material presence of the past in the present. Jack has every reason to expect that these objects will be with him into the future.

This strange temporal displacement occurs because of the transformation of the domestic sphere into a collection of displaced and decontextualized memories. Though the collection of memory-communicating objects is not a manifestation of digital technologies, the scene mirrors the transformation of Jack Gladney into a digital subject. Bukatman notes in the introduction of *Terminal Identity* that postmodern aesthetics are marked by a “blurring of boundaries between human and machine [which] results in in a superimposition…The density of information is often manifested as an overlap or juxtaposition of forms. Whether the technique is graphic or narrative, the cyberblitz effect is the same. Elements commingle within the same space, creating a metaphorical connection” (Bukatman 15). Bukatman locates this tendency particularly within media forms such as video, but the “density of information” that DeLillo describes in the domestic sphere, the “overlap or juxtaposition” of Jack with his collection of memories, also has a “cyberblitz” effect upon the reader of the novel. In communion with his overstuffed home, Jack

has become a datafied node. Surrounded by the dislocated memories and information of his life, he becomes, as Paul Virilio describes, "**telepresent**, here and elsewhere, *at the same time* in this so-called 'real time' which is, however, nothing but a kind of real space-time" (Virilio 10, emphasis original). Jack and his home are ensconced within the terminalization of culture that both Bukatman and Virilio sees occurring with the advent of digital communications technologies, where "social organization and a kind of conditioning once limited to the space of the city and to the space of the family home [finally closes] in on the animal body" (Virilio 11).

In one sense, Jack's memory "is no longer tied to place, and [his] body and space are no longer separate entities that allow for a cohesive sense of self to develop. The result is that identity is contextual and self-knowledge deceptive" (Harack 306). Even the staging ground of the domestic sphere itself has become wildly destabilized. Rather than a traditional suburb, Jack and his family occupy a "technoburb," so named because of the decentralizing effects that mass communication technology has on the classic postwar suburb: "Spread out along its highway growth corridors are shopping malls, industrial parks, campuslike office complexes, hospitals, schools, and a full range of housing types," with the center of this new social platform being "each residential unit" (Fishman 184). In short, the overwhelmed physical space of Jack's home has changed to match the newly dominant forms of mass digital communication that have shrunk the world and sped up human existence. His experience has been flattened onto a digital plane that he cannot escape, subject only to Jameson's intensities. The practical effect of this flattening is that there is no future to look forward to, or to dread. Surrounded by the relics of the past that reach into the present, the future is obscured.

But the obscurity of the future does not prevent anticipation. Indeed, obscurity only serves as a canvas upon which anticipation can be painted. Consider here the "general" sense of

dread that the technoburb engenders, which manifests as a certain anxious unknowability of environments. Consider Jack's description of an evacuation due to a mysterious smell at his child's grade school, the cause of which is a mystery:

> Investigators said it could be the ventilation system, the paint or varnish, the foam insulation, the electrical insulation, the electrical insulation, the cafeteria food, the rays emitted by microcomputers, the asbestos fireproofing, the adhesive on shipping containers, the fumes from the chlorinated pool, or perhaps something deeper, finer-grained, more closely woven into the basic state of things. (DeLillo 35)

In the absence of hard evidence one way or another, Jack is left only to wonder not only where the smell came from, but whether it will return in the future. The waning of affect does not mean that affect is not present, and Jack feels, very keenly, the relations between unlike things, and attempts at multiple points in the novel to tease out these relations. In many ways, Jack's parataxis is a paranoid affect. After all, paranoia is dependent upon the idea that there is indeed something "deeper, finer-grained, more closely woven into the basic state of things" which is undetectable with the naked eye. Certainly, many of the fears and discourses that have surrounded digital technologies have echoed the rhetoric that surrounded fears of communist infiltration of the US government or shadowy conspiracies about UN black helicopters.

Yet there is something different in this parataxis, something that reflects the "unthinkable complexity" that Gibson was so interested in representing with *Neuromancer*. *White Noise* is also obsessed with the emergence of cyberspace, with the datafication of space that runs parallel to the continued relevance and presence of analog technologies like radio, TV, recorded music, and so forth, the "waves and radiation" of the first section of the book. It is only later, in the

middle and latter half of the book, that the burgeoning digitality of Jack's world is made clear. For example, Jack's emplacement within this newly emerging digital order is highlighted by a trip to an ATM: "I inserted my card, entered my secret code, tapped out my request. The figure on the screen roughly corresponded to my independent estimate, feebly arrived at after long searches through documents, tormented arithmetic" (DeLillo 46). The analog materiality of this interaction fascinates Jack, and when he sees this "tormented arithmetic" played out, he notes that "waves of relief and gratitude flowed over me. The system had blessed my life. I felt its support and approval. The system hardware, the mainframe sitting in a locked room in some distant city. What a pleasing interaction" (DeLillo 46). Like Case, Jack is left to seek his identity in the arithmetic of computer logic that is just beginning to dominate his world. He is in the process of becoming dematerialized, broken down to his constituent parts and parceled out over time and space, a bit of him here, a bit of him there, and only this agglomeration of spread-out data can be said to be the *real* Jack Gladney. Jack begins the novel destabilized and ends it erased, no longer fully present; rather than his material form, the code and machines provide "the language of waves and radiation, or how the dead speak to the living" (DeLillo 310).

The link between the dead and the living is also found in the Airborne Toxic Event (ATE), the disaster upon which the narrative of *White Noise* hinges. In much critical literature, the ATE is seen as a sort of postmodern invocation of the deadly environment that consumerism has fostered. Certainly there is a sort of consumerist bent to the event, as seen in the parataxic listing of the imagined ingredients of the cloud: "It was a terrible thing to see, so close, so low, packed with chlorides, benzines, phenols, hydrocarbons…This was a death made in the laboratory, defined and measurable, but we thought of it at the time in a simple and primitive way, as some seasonal perversity of the earth like a flood or tornado, something not subject to

control" (DeLillo 124). That it is a smoke cloud points to its corollary in the postmodern experience that Jack so personifies. The ATE is a moment in which "everything that Gladney and his community have been repressing comes to light, as the body and mind are inescapably linked in an embodiment (and embedding) of the threat of death" (Harack 313). Dematerialization, and the impossibility of identification that this dematerialization delimits, is reflected as well in Jack's material environment. It is the space of *White Noise*'s consumerist society that has seeped into his veins: "The postmodern simulation of disasters has given way to the internalization of an actual toxin, and Gladney's fear and repression, externally represented in the ATE, are now housed in his body, ready to erupt at any time" (Harack 314).

The ATE is also notable, however, for its depiction of the dematerialization of information brought on by digitality. When he is being processed by the organization SIMUVAC (short for emulated evacuation) he is told that he is "generating big numbers" and that the SIMUVAC agent is "getting bracketed numbers with pulsing stars" (DeLillo 135). When pressed on the matter, the SIMUVAC worker says that:

> I didn't say [we have a situation]. The computer did. The whole system says it. It's what we call a massive data-base tally. Gladney, J. A. K. I punch in the name, the substance, the exposure time and then I tap into your computer history. Your genetics, your personals, your medicals, your psychologicals, your police-and-hospitals. It comes back pulsing stars. This doesn't mean anything is going to happen to you as such, at least not today or tomorrow. It just means you are the sum total of your data. No man escapes that. (DeLillo 136)

The totality of Jack Gladney's data is importantly not present in the *body* of Jack. Put another way, the Jack that matters is not present in front of the SIMUVAC worker but rather present only

in the computer systems from which he is working. He is important only insofar as he represents the constellation of data that the computer spits out, the accumulation of data that is Jack Gladney. He is a ghost, a phantom of the real that haunts the dematerialized economy that he acts within. He is dead, yet still moving, the data livelier than he could ever be. It is only in his relationship with this nonhuman thing, this *thing* that can feel and nurture him, that Jack finds actualization. Jack is already dead, his grave terror of dying the echo of a state he already finds himself within. What's more, this is, for Jack, a new experience. Again, he has existed to this point in the world of the analog, of waves and radiation. The reason the ATE is such a disaster is not necessarily because it hurts anyone. Rather, it is because it initiates the townsfolk into the world of the digital, where their potential harm is collated and incorporated into an anticipatory regime that runs on computer simulations. The digital shift that was forecasted in his messy house is here made overt as his affective experience of dread becomes fodder for large-scale simulations that anticipate future disasters.

It is understandable that Jack attempts to take the psychopharmaceutical drug Dylar to ease this fear of death. Dylar is a drug that is far more than what it seems on the surface. Though it looks, for all intents and purposes, like an ordinary tablet, it is described by Jack's neurochemistry colleague Winnie as less a tablet than "a drug delivery system…the medication in Dylar is encased in a polymer membrane" that feeds the drug into a person's body in a slow, methodical, and above all controlled way in order to "eliminate the hit-or-miss effect of pills and capsules." This pill is introduced to Jack through Babette, who, when confronted with "a kind of settling-in-period" in her life, experienced an intense fear of death and started taking the drug as part of a secret research program centered on eradicating the fear of death. The rub, however, is that these pills don't work. Aside from Dylar's impressive list of potential side effects—memory

loss, “outright death, brain death, left brain death, partial paralysis, other cruel and bizarre conditions of the body and mind” including the confusion of words for real objects—Dylar is completely nonfunctional.

In one sense, Dylar is an anticipatory technology insofar as it is designed to flatten the affective response to death. It is designed to replace disconcertedness with a complete state of tranquility in the face of ultimate reality. That it fails to do this—and indeed, that disconcertedness is in all actuality a preferable feeling for the novel’s characters at the end of the text—is telling. There is no outrunning the fear of death and attempts to modulate the affective states of people will always fail in the face of this ultimate reality. It falls to the digital objects that surround Jack to mollify his fear, the neoliberal technologies that unmoor him from traditional life. Such neoliberal technologies are also central to the work of Pat Cadigan in her short story collection *Patterns*, which presents the development of electronic mediation technologies like cable television as profoundly deterretorializing creations.

2.6 Patterns: Fantasies of Dots

Bruce Sterling—called by some the “Chairman” of cyberpunk fiction for his work collecting and promoting the nascent genre—was everywhere in 80s science fiction. This includes the introduction to Pat Cadigan’s short story collection *Patterns*, published in 1989 but collecting stories from the entire decade. “The world today,” Sterling notes, “is *sneaky*” (Cadigan x, emphasis original). By this he means that “there’s so much going on that you can’t *possibly* keep up with it” (Cadigan x, emphasis original). Reality is dense with mediated information, and mostly through television: “Global TV covers the Earth like Sherwin-Williams paint, but a lot of what you see in ‘the news’ is exactly one phosphor dot thick. And if you get up *really* close to

TV…you can see that there's really *nothing there at all*, nothing but these swarms of dots behind cold static-crackling glass. And suddenly you're in Cadiganland" (Cadigan x). Much of the scholarly attention paid to Pat Cadigan over the years has centered on her three late 80s-early 90s cyberpunk novels: *Mindplayers* (1987), *Synners* (1991), and *Fools* (1992). Each of these novels "explores different *topos* of cyberspace or virtual reality," highlighting "the psychological implications of the new media, particularly their impact on human formations of self, identity, and individuality" (Heuser 127). In this way, they preserve "the central tenet of all cyberpunk science fiction: that humans and machines share the same basic code…as a result, human beings are [in cyberpunk fiction] troublingly reduced to 'an informational pattern'" (Hayles, qtd. in Heuser 127). Given her corpus of cyberpunk fiction and Sterling's note in the introduction to *Patterns* that her stories "bleed real juice," Cadigan was clearly an influential figure in the nascent genre.

Like other cyberpunk writers, Cadigan's 80s work is fixated on the spread and future possibilities of new media forms. Television in particular is the critical media format in several of her collected short stories. Specifically, Cadigan's writing is interested not just in the various forms that televised information might take—advertisements, images, faces, places, and so on—but in the affective and media structures that such information is packaged within, the analog "waves and radiation" that DeLillo was also fascinated by. And though *Patterns* is not exclusively invested in this exploration of analog media technologies, the collection does speak to Cadigan's interest in how the shifting and "invisible infrastructure of the late twentieth century" has changed the affective landscape of 80s America (Cadigan ix). As the use of the term "*infra*structure" might imply, then—with its emphasis on structures *below* the flattened plane of the visible—what is on offer here is explorations of the hidden psychic landscape of media-

saturated America. In this way, Cadigan interrogates a media environment "not just structured but constructed by the discourses and material practices of technoscience, transnational capitalism, gender, race and sexuality" (Chernaik 68). Working through these discourses and material practices of technoscience, I sonder: what is at stake when one considers the affective realities of *Patterns* and questions the structures of feeling that characterize it?

Throughout *Patterns*, the medium of television and its disruptive effect on human relationships comes to the forefront, identifying how the medium enmeshes its viewers within radically anticipatory structures of feeling. Part of this enmeshment is due to changes in the television industry that were occurring during the 80s. As will be shown soon, television was a site of neoliberal reforms. Like much about this economic policy, these reforms brought to television a sort of dematerialization. From a purely economic standpoint Cadigan focuses on how television became in the 80s a broader national force with the mass adoption of cable, which also served to irreversibly fracture its audience into more and more siloed groups. With cable, the long-time dominance of the three major networks—ABC, NBC, and CBS—gave way to the proliferation of cable television juggernauts like CNN, ESPN, MTV, BET, and others. Running throughout Cadigan's work centered on television, then, is a sense of anticipation regarding, not only the fact of this increasing atomization of not just entertainment, but how the very medium through which that entertainment was delivered changed human relations. That Cadigan does so through science fiction short stories goes to show how science fiction itself maintained a privileged position in the effort to mediate these concerns.

2.6.1 The Day the Martels Got the Cable

The history of cable television is far longer than most realize. Though in popular imagination cable enters the cultural scene in the mid-80s, its actual origins are hard to trace. Patrick Parsons, author of *Blue Skies: A History of Cable Television*, nots that most histories of cable[18] begin in the 50s, with the attempts of small, rural television users to gain access to television signals from far-away urban communities (Parsons 8-9). On a more conceptual level, however, "the history of television and cable communication…begins not with the technology, but with the dream": "Like human flight, or alchemy or transmutation, seeing at a distance is a vision that substantially predates the technical ability to realize it. For centuries people have sought methods of signaling across great distances…Always one of the chief objects has been speed, to deliver the message with all haste" (Parsons 9). Parsons locates the longer prehistory of cable television in attempts to communicate clearly from long distances, including Roman efforts to shout messages down long chains of guard towers, indigenous smoke signals, and capturing the glint of sunlight on mirrors. More directly, however, the advent of cable communication begins with the harnessing of electricity for the telegraph, telephone, and eventually in the 30s and 40s, television. At every step of the way, the creation of what can be called cable television is contingent on social, cultural, and economic factors that are far beyond any one developer's personal control. On this point, Parsons is absolute: "It was not the technology that was necessarily wanting in the late 1930s, it was…an issue of the social context within which television [and ultimately cable] was incubating" (Parsons 39).

[18] Of which, he notes wryly, there are not many: "Despite the thousands, perhaps tens of thousands, of studies, articles, and books that have been written on cable, there have been few attempts to write a full history of the industry" (vii). This is because, interestingly enough, "much of what has been written has dealt with cable television's future, how its development might impact existing telecommunications systems, the political process or even social norms and values" (vii). Like many technological advancements before and since, cable, it seems, attracts speculation and anticipation regarding its use in society.

Cable emerged from and was shaped by a contested field of technics and culture that gave it peculiar form and feeling. Like other forms of supposedly revolutionary communications media, cable was presented to the public and policy makers of the United States as a thoroughly utopian project, such that in the 1960s,

> social planners, academics, policy analysts, government regulators, and even many business people, [cable] held the potential to become a broadband communications utility, spanning the country and providing news, specialized entertainment, electronic banking, electronic mail, health care services, outlets for community expression, and a local and national forum for political debate. It could, some prophesized, advance the interests of democracy in small and large ways, and perhaps even supplant the existing system of broadcast television. [The term Blue Skies] came to suggest the unlimited, cloudless horizon of possibilities embodied in the emerging technology. (Parsons 7)

It is hard not to see the echoes Parsons is calling forth here to the promises made by more contemporary digital technologies and platforms. Much as the World Wide Web in the early 90s and Web 2.0 in the early 2000s gave way to the platform capitalism that bedevils and fragments social cohesion in the long 2020, cable was presented as a revolutionary and utopian project early in its commercial lifespan before it became another avenue for fierce market struggle. As Parsons notes, cable's explosion in popularity in the early and mid-80s was brought on by the embracing of neoliberal, anti-regulatory measures. This makes sense; part and parcel to cable's appeal is how it could potentially escape government regulation of the airwaves (DeLillo's "waves and radiation") through the seemingly liberatory potential of hard-wired cables. The appointment of Mark Fowler by newly-elected President Ronald Reagan in 1981 to head the

FCC led to a period of what Fowler termed "unregulation"; in his own words, "I believe in the marketplace approach because I believe in the marketplace…What people choose to watch or listen to should be as free as possible from the heavy hand of regulators" (Parsons 417). The earlier, seemingly endless utopian possibilities of the cable was, in the 80s, turned into an essentially endless field of capital potential. And though this also led to a raft of influential 80s programming—the aforementioned cable networks and eventually shows such as *The Simpsons*, *Roseanne*, and *The Hitchhiker*—it also occurred within and engendered its own cultural anxieties.

This sense of utopian possibility frustrated by free-market competition finds expression in Cadigan's short fiction of the time. A primary example is "The Day the Martels Got the Cable," originally published in *The Magazine of Fantasy and Science Fiction* in 1982. The story begins as a quotidian, slice-of-life story of a young couple—Lydia and David Martel—dividing domestic labor and ends with Lydia enslaving David through the installation of a cable that renders men lobotomized. Like much of Cadigan's fiction, there is a satirical element at play here. The fears of the nuclear age man—that he is, in essence, castrated by advanced technology and rendered impotent in the face of vast social changes—are transmuted in the Information Age to a fear of being controlled and manipulated by new media technologies. What's more, there is a fear that such control has flipped the dominant gender paradigms of the nuclear family. If men cannot understand and navigate the cabled world, perhaps there is an opening for women to become the dominant gender in this brave new world. This cheeky reversal makes this story an example of feminist science fiction and was a necessary corrective to cyberpunk's tendency to glamorize remediated tales of masculine *noir*.[19] Before David can crush Lydia's agency, Lydia

[19] *Neuromancer*, for instance, is essentially a hard-boiled heist story.

crushes his first. In thinking through the decentering effects of cable, the story also anticipates the social ramifications of the widespread adoption of the technology, in particular theorizing upon the impacts of "unregulation" on labor markets both private and domestic.

The story opens with a scene of such labor shifts. Lydia Martel, the text notes, "had stayed home from work to take delivery of the washer and dryer. So, this time David would have Lydia call him in sick and he would wait for the cable TV people to come" (Cadigan 40). The regular flow of the morning—Lydia is preparing to go to work while David is lounging about—is interrupted only the snapping patter between the two, a sort of teasing and sexually-charged tête-à-tête initiated primarily by David as Lydia prepares to go to work without him. David is, if not insistent on the point that Lydia should stay home with him to have sex rather than going to work, at least persistent in his request; if nothing else, he seemingly has a high opinion of his abilities given that he promises "sixteen hours of ecstasy" should she choose to stay home (Cadigan 41). This kind of playful banter underlines far deeper and more ambivalent concerns about how David views Lydia, or rather, how Lydia perceives how David views her. Obviously, there are concerns Lydia holds about David's seriousness as a romantic partner, and it is difficult to not read a line like "I was driving in rush hour long before I hooked up with you and I'll be driving in it long after you run off and leave me for a younger woman" as anything other than a veiled concern that David will indeed, eventually, leave her. That David responds that it would be impossible for Lydia to drive in rush hour traffic as he would "[take] the car with me" when he leaves must hang, for Lydia, as a legitimate threat rather than a piece of playful banter. Anticipation of these worst-case scenarios hang above their relationship, threatening at all times to transpire. Moreover, there is a deep and abiding sense that this domestic labor arrangement—trading off staying home to oversee the installation of appliances—is something that neither of

them grew up with. Both came of age in the 50s and would have been bombarded with televisual media that reinforced nuclear family gender norms: a father that leaves the house to work, a mother that stays home and attends to the house. They are already living in a radically different gender order, one defined by the continuing entrance of women into the professional workforce. One can reason that the social context of their relationship will only continue to shift.

This is only further reinforced by David's internal monologue. Reflecting on the boredom he's experiencing at home as Lydia has left for work, he notes to himself that "You sound like an old married man, fella" (Cadigan 43). Part of this is that David seems to legitimately enjoy being married: "Companionship, love, sex, and everything in between—it was all there, just the way he might have imagined it…There had been no one he would have filled in the woman's part with until Lydia had come into his life" (Cadigan 43). But this enjoyment is marred by certain underlying tensions as well: "They had their problems, they argued, and Lydia had the ability to play the bitch just as well as he could be the bastard" (Cadigan 43). Though the reader does not get the impression that these simmering tensions are quite yet exploding out into the open—the tone of the opening scene as Lydia gets ready is perhaps too playful for that kind of analysis—there is the sense that these tensions are building up. The couple jokes perhaps too casually about leaving each other for there to be nothing to their shared concerns.

This kind of simmering tension—both interpersonal and cultural—is seen most clearly in the push by Lydia to connect their TV to cable. Written in 1982, this particular cable installation is taking place in the first wave of "unregulation" that Fowler, in his capacity as the chair of the FCC, was initiating. This slashing of regulations brought with it a massive increase in cable customers, with market penetration increasing from 13% in 1975 to reaching roughly 44% of American homes by 1984. "The Day the Martels Got the Cable," though only one short story

amid a veritable ocean of cultural production centered on the introduction of cable to the American home, offers a telling glimpse into the affective shift this at one time utopian technology offered. Waiting for the cable installer to come, David reflects on his own feelings regarding cable:

> He'd had a few misgivings about [having cable installed] when Lydia first suggested they subscribe to the cable. The image of himself and Lydia sitting in front of the TV, slaves of the tube and its programming hadn't been terribly appetizing. As a rule, they weren't much for TV watching. But there was the movie channel, and the idea of being able to watch uncut films at home appealed to him. It would probably make them lazy about getting out to the theaters, but that wouldn't be so bad…Yeah, cable TV would be worth it if it would spare them that. (Cadigan 43-44)

In this short passage can be detected the seemingly subtle, yet radical shift in media environment that the cable engendered. The site of media viewing changed from primarily public to domestic; no more would cable customers like David and Lydia have to subject themselves to the "chatterboxes [in movie theaters] who seemed to think they were in their living rooms and couldn't refrain from adding their stupid comments at the tops of their lungs" (Cadigan 44). This shift in viewing location coincides with a turn in economic policy towards privatization and consumer choice; David and Lydia now have the option to essentially sequester themselves away, for their cultural consumption to occur in atomized spaces. Though this might seem a minor example of societal dislocation as compared to the enormity of the shift towards a dematerialized, anticipatory economy, the change David here describes would not happen outside of the social, cultural, and economic context of neoliberalism.

This sense of technological and economic dislocation is combined with the story's sense of gender competition and labor. Most notably, David is surprised when the cable guy is, in fact, a cable woman. As she notes, learning this typically causes "their mouth [to fall] open" (Cadigan 44). She is eccentric, rapid-fire in her dialogue, and remarkably opinionated. As an example, when she asks David whether he and Lydia play video games and he answers in the negative, she explains "That's good. Video games are shit. Burn your goddam tube out quicker" (Cadigan 45). As she lectures him on all the intricacies of setting up, maintaining, and being safe around the cable, David eventually decides that "all delivery and service people…had to go to some kind of training camp for vocational-quirkiness lessons. Then again, maybe if he made a living connecting people to Donahue, he'd be a character himself" (Cadigan 45). That David has a degree of unexamined chauvinism is clear; the cable installer (who remains nameless in the story) casually confronts and comments upon this throughout the text. It is also, seemingly, the source of some tension between him and Lydia, who as noted earlier jokes about him leaving her for another woman. Cable installation is another area where gender roles are both reversed—again, David was clearly expecting a man to install the cable—and traditional gender tensions play out.

This explains, perhaps, the end of the story. As David becomes more and more put off by the behavior of the cable installer, it becomes clearer to the reader that he is in some sort of danger. After asking if the cable installer uses cable herself—to which she incredulously responds, "Do I look like someone who would need the cable?"—she urges him to test out the remote control while touching the cable box. At this point in the story, David has grown tired of the installer, finding her communication style unnervingly jumpy and her mannerisms immensely off-putting. He decides to "humor her" so that she will leave faster. This ends up

being the last thing he does of his own free will: “Something hot and sizzling jumped into his left hand and shot up his arm. To his horror, he couldn’t let go of the box…His last thought, as he turned his head toward the woman, was that she was reacting awfully nonchalantly to the electrocution of one of her customers” (Cadigan 47). At this point the story flips perspective to the cable installer, and it becomes clear that this is a scene she has seen play out many times: “The fading expression on his face was typical—shock, panic, maybe a little betrayal. Probably thought he was being electrocuted. She’d heard the final connection was something like that, getting fried” (Cadigan 47). It is then that the reader realizes that, rather than the TV, the installer has somehow been connecting David himself to the cable. Cadigan is almost frustratingly vague about what this process might be; throughout the section that follows, the closest thing to an explanation the reader gets is that “she did something else to the connections she had made” (Cadigan 47). The means by which a person is connected to the cable remains a black-boxed technology, something mysterious and dangerous, delivered by an anonymous stranger to a scene of domestic discord.

What is less mysterious, however, is the effect of this connection to the cable. After the installer watches David’s brain get “fried,” she begins putting him through his paces, turning the TV on and off, changing the channels, all the while ordering David to make various poses, to sit down, to stand up. David’s free will is sacrificed to the machine, consumed by the desire for ever-expanding control over a television market that looked to cable franchises like a limitless gold field. David’s position is one of both extreme openness and extreme sacrifice: “David held his arms out to his sides as if waiting either to catch someone up in a hug or be crucified” (Cadigan 47). Each channel the woman flips to seems to elicit a different response: “The woman flipped through the channels, watching closely as David bent forward at the waist, bobbed up

again, combed his hair with his fingers, pinched his nose and opened his mouth" (Cadigan 47-48). Of most interest to the operator is David's newfound controllability in more carnal pursuits: "She consulted the chard and turned to Channel 9. David did a bump and grind, slow and then fast. 'Relax. This is only a test.' She laughed and switched back to the A button" (Cadigan 48). David has become, in one sense, the ideal domestic partner, one mediated entirely through flexible, electronic means. His labor is perfectly controlled and directed, with no chance for resistance. When not given a task, he remains idle, sitting down on the floor. He feared the sloth that the cable might bring to his house, never realizing that the main thing the cable is operating on is his own form.

Yet despite first appearances, the installer is no rogue operator come to upset domestic environs. A phone call to Lydia reveals that she is in on the plan to connect David to the cable. In a phone call with the operator Lydia gives her some commands for David the rest of the day: "Put him on vacuum before you leave. He knows where it is, even if he's never touched it. *All* the rooms. After that he can clean up the kitchen, I'm sure he left a mess from lunch. Have him take the chicken out to thaw, I'm positive he forgot. And, oh, yes—have him shave, will you? Thanks" (Cadigan 48). It is impossible to know for sure just how Lydia feels about anything that is going on, considering that the reader never gets access to her interiority. Her ultimate motivation for enslaving David goes unstated beyond a general sense that she must view him as ultimately undependable. There is operant in the story a sense of anticipation regarding the position of the human within this cable-inflected world. The traditional nuclear family of the 50s, with its strong patriarch caring for the family, is gone; the wife now works out of the home, leaving the man to have to care for the domestic sphere. Yet his labor is unsatisfactory, his movements in the home suffused with resistance. He must in turn be controlled, his movements

forced and fed-through a cable, his brain liquified and replaced with electronic currents. His earning power, though surely reduced, is made more efficient. Easier, after all, to set him and forget, to sublimate his labor within a rapidly expanding cable world.

2.6.2 Patterns

In her work on the psychology of television audiences, Sonia Livingstone notes the importance of interpretation in a person's everyday life. "All day, every day," she says, "people create and recreate meanings in their everyday lives," a process that might seem at first to be a simple attempt to make sense of given circumstances (Livingstone 4). But of course, there is no such thing as a simple or straightforward—unproblematic, in Livingstone's words—attempts to interpret everyday life. "Even the simplest utterance requires considerable work to perceive the utterance as meaningful, to understand its relation to its context and to judge the appropriate response. And everyday life is far from simple" (Livingstone 4). This is especially true for mediated communication like television. Per Livingstone:

> Just as with everyday interactions, watching television has often been seen as a routine, unproblematic, passive process: the meanings of programmes are seen as given and obvious; the viewer is seen as passively receptive and mindless. Again, this simplicity is illusory. In recent years, both interpersonal and mediated communication have increasingly recognized as a complex, rule-governed, constructive set of processes. People's role in such communications must be correspondingly understood as knowledgeable, skilled, motivated, and diverse. (Livingstone 4)

Writing as she is in 1998, before the boom of prestige television and the development of streaming platforms such as Netflix, it is easy to see the contours of an argument that has since long faded from academic relevance. Essentially no media scholar working today denies that TV is an influential medium worth studying, or that its viewers are inherently passive subjects. Viewers are active; they watch, they feel, they interpret, and above all, they respond to what they watch. They make decisions and form parasocial attachments. In short, they are absorbed by and in television.

Livingstone operates in a period of cultural studies that sought to reformulate the television audience as always-already active, stretching from the then-contemporary moment of the 90s and early 00s into the past of television viewing. Central to this project was insisting that part of what makes TV audiences so active is the integration of television into everyday life. Kristyn Gorton notes that television "often becomes a backdrop, as well as a focal point, in people's every lives. As a social tool and as something with varied content, television is something people talk about, whether in groups, over the 'watercooler', or on online forums…The consequences of this are a further engagement with television and its various media outputs" (Gorton 32-33). Television is communal, and which operates by engaging individual emotion and turning it into collective feeling. Pulling from Sara Ahmed's work on emotions in cultural politics, Gorton notes that, in the context of television, "emotions connect viewers to a sense that relationships, whether in the family, community, or workplace, matter and that they will enable us to cope with the everyday struggles and pressures of life" (Gorton 95). Television in the pre-streaming age is figured as a facet of the everyday through which community is forged and given some sense of larger purpose. It is, at heart, a nation-building endeavor, an electric remediation of Benedict Anderson's print newsletters.

Yet I wonder if the communal experience of television that Livingstone, Gorton, and Ahmed describe is overstated. The 80s, after all, saw the irreversible fracturing of the televisual landscape. No longer shackled by the standards of the big three public networks, the 80s television market exploded with the widespread development and adoption of cable, which was, as noted before, the direct result of Reagan's neoliberal deregulation policies. This is, more or less, the argument that Pat Cadigan makes in the introduction to her short story "Patterns," originally published in the science fiction magazine *Omni* in 1987. "Television," she notes, will achieve its apotheosis when it is interactive" (Cadigan 3). The rub, however, is that "some people think they have that now. For some people, TV reality is as much of a reality as what they move through most of the day" (Cadigan 3). It is this slippage between the real and the mediated that she terms "patterns," a sort of artificial scripting of life that becomes, in the minds of TV viewers, more real than reality. There is, for Cadigan, a sort of surfeit of interpretation that television offers its viewers, an abundance of emotions that crowds out all others. "Does TV encourage, or even induce, schizophrenia? Or does it create a separate reality in conjunction with our minds, something that is neither totally our inner life nor totally TV" (Cadigan 3). Today, media theorists are intimately familiar with this process. Media bubbles are an all-too-common feature of social media, and the siloing of people into contained informational pockets leads to mass social fragmentation. In the 80s, however, the electronic mass mediation of this process was relatively new.

Cadigan recognized the potentially violent fantasies such isolation might produce. To that end, the artificial scripting that "Patterns" opens on is shocking: "I have this continuing fantasy," the unnamed narrator begins, "of assassinating the President. Any President" (Cadigan 4). The details of the unnamed narrator's fantasy are horrifically graphic, based in the specifics of

assassination hardware and materiality, even if, as the narrator notes, the fantasy "unreels" as a film in his fevered imagination: "Sometimes in the movie unreeling in my mind, my hand comes up holding a Luger Parabellum P08 with the ridiculously long 190mm barrel. Other times I am holding a more likely Mauser Military Pistol. Twice I have found myself clutching an Uzi with the stock detached, three or four times I held a .357 Smith & Wesson Magnum" (Cadigan 4). All of these guns are, for lack of a better term, cinematic. The Luger and Mauser would, in the 80s, have been associated most closely with Nazi villainy through films like *Raiders of the Lost Ark* and the Sylvester Stallone/ Pelé film *Victory*. The .357 Smith & Wesson Magnum found cinematic fame as the gun of choice for maverick San Francisco detective "Dirty" Harry Callahan. Images of the Uzi were beamed into millions of American homes following the attempted assassination of Ronald Reagan in 1981. That these guns are all "made for TV," so to speak, indicates the overdetermined nature of the potential assassin's desire. This need to assassinate the president is something handed down to him through television. More than anything, it is a mediated urge.

Yet it is also something that remains, for the narrator, a fantasy, one that has no real human victim. "The President, after all, is not so much human as manufactured, a product made flesh by the bipartisan system and the media in accidental conjugation. Is it wrong to fire at the dot pattern on a TV screen?" (Cadigan 4). Two things stand out in this short quote. First, it demonstrates the slippage between television and reality that Cadigan outlined in the introduction to the story; it is seemingly enough for the narrator to fantasize about the assassination so long as television remains a manner through which that fantasy can be mediated. Second is the phrase "dot pattern," which reappears time and again throughout the story. The dot pattern is the narrator's way of describing how the agglomeration of individual, colored dots on

the television coalesce into recognizable patterns, predominantly people and in particular the president. The dot pattern of the president—not the real president himself, merely the dot pattern that stands in for and represents the president to the viewing public—is for the narrator a deadly obsession. This makes the televised State of the Union address a grim stage for him to enact his fantasy:

> The screen crackles when I put my finger on it. Static electricity; the dots warning me off their pattern. I pull my finger back and make it a pistol barrel pointing at the President…The President looks directly at "me" and hesitates. The dots at work on his pattern burble and boil and show me the red ruin that could be the result of my gun hand. Then the President's head re-forms and he goes on with his speech…I cover the President's face with my finger. Loud crackling, followed by a close-up which put my finger absurdly on the President's moving mouth. He doesn't bite, but there is some mild electricity running up my arm. (Cadigan 6)

What is interesting to note in this longer passage is that the dot patterns seem to have their own lively vitality. They demonstrate—or are perceived to demonstrate—some sense of force and agency. They "warn me off their pattern" with little jolts of electricity, they "burble and boil" when pressed upon, and they "re-form" when the finger is taken away. They are not dead matter something he actively engages with. His interaction with television images is, following Livingstone's formulation, made up of many small processes and instances of perceiving and interpreting. There is even, in line with Gorton's insistence on the communal nature of television, the sort of society that the narrator is building. But this society is not one made up of other people, but with dot patterns: "I want to call friends to ask if they have just seen [an imagined television commercial for Kalashnikov assault rifle], too. Then I remember, all my friends are

electric. In living color" (Cadigan 7). At the same time as he seeks communion with the dot patterns, he imagines destroying the pattern that he identifies as the president, again and again and again.

The narrator's most memorable and noteworthy attribute is this identification with the dot patterns he sees. Near the end of the story, the narrator flips through channels, trying to find something to watch in between his attempts to assassinate the televised president. Consulting a television guide, he decides to watch a boxing match and "defend my heavyweight title against the challenger in Las Vegas" (Cadigan 8). Once again, he "[presses] my knuckles against the screen. Wild crackling. The dots swarm in liquid patterns around each point of contact. Electricity is flowing up both arms, dancing through the nerve endings which sizzle into life and join the pattern" (Cadigan 8). This intimate relationship with the electric surges from the television spurs the narrator into greater heights of identification with the action that is happening on the television, to the point where, for him, there is no ontological separation between virtual space and meat space. It is his hands "being taped as I hold them out," his trainer telling him to "keep [your] fuckin [sic] hands up, do [you] hear, just keep [your] fuckin hands up and let him dance himself out"; it is a scene "live from Caesar's Palace, more live than life. Fitted out with this dot pattern to war, I could strike sparks in the moving, living air. Now I know it can be done" (Cadigan 8). The thing which can be done here is achieving total symbiotic communion with the images on the television. Here, at long last, the narrator has proof that the televised is just as real as the real world. His life has dematerialized, his existence finally "adapted for television" (Cadigan 9). In this way, the fragmentation of his life mirrors the fragmentation of the televisual form. He can become, at any moment, someone or something else.

Left ambiguous is the question of whether these violent, isolated fantasies will ultimately result in real-world violence. After realizing his "ability" to directly interface with the dot patterns of the television, the narrator leaves his apartment and drives away, noting that "there used to be too much violence on TV. But not now" (Cadigan 9). What is clearer, however, is that the narrator is economically dispossessed. He mentions several times throughout the story a failed acting career, lamenting at one point that "I could have had my own show…I could have been syndicated; I could have been a contender. Instead of a COMMERCIAL INTERRUPT FOR STATION IDENTIFICATION" (Cadigan 6). So complete is his identification with the dot patterns of television that even a traumatic experience in his life—the end of his dream to appear on television rather than to merely interact with the television set—is imagined in terms of television programming. The narrator wants to dematerialize into the televisual ether and faces instead economic stagnation and frustration. He is a community of one, but along with the question of violence, the unresolved tension of the story is in wondering just how numerous people like the narrator actually is. One can imagine that economic dispossession and the creeping, incipient fragmentation of media is doing its work on others, as well. It is in this world of shadowy "mights" and "coulds" and feverish dreams of televisual violence that Cadigan's notions of anticipation operate. Who is to say whether or not violence naturally flows from such isolation? The question hangs in the air like the sword of Damocles. Still, that the question of how people might themselves split apart and isolate themselves from reality is itself a disturbing anticipatory riddle.

2.7 Conclusion

Taken together, these three texts—*Neuromancer*, *White Noise*, and *Patterns*—represent serious attempts on the part of American authors to understand and narrate the interconnection between humans and their media technologies. The changes wrought by these technologies occur because of advancements in electronic mediation that have redefined economic relations in a rapidly globalizing, but increasingly atomized and financialized world. Though they are not all necessarily science fictional in equal parts—*White Noise*, in particular, has rarely if ever been analyzed in terms of its potential science fictionality—they do all take part in the commonly-held science fiction project that contemporary scholars such as Scott Bukatman identified as the project of parsing through changes in human subjectivity in the wake of more widely available and powerful communication technologies.

These texts evince a shift in anticipation as a cultural affect. As the character, scope, and reach of media technologies spread throughout most every corner of everyday life, that life became increasingly regulated by the mediated rhythms of these technologies. Although it subsequently became easier for people to anticipate the direction their life would take, what they would be doing in the day-to-day, and the movement of capital between and amongst markets,[20] what changed the most was their experience of these affective shifts. As seen in these three texts, the shift in anticipation—most notably, of a sense of dread regarding technological changes both in the present moment and into the seemingly unknowable future—found explosive and sensationalistic representation in literature of the time period. As we shall see in chapter 3, these feelings also found embodiment in video games of the era.

[20] Which is not to say that it became easy, only easier. This was, after all, a quite radical shift in economic and personal relations.

Chapter 3: Financial Labyrinths and Anticipatory Financialization in 80s Video Games

I've got all the patterns down, up until the ninth key.

I've got Speedy on my tail, and I know it's either him or me.

— "Pac-man Fever" by Buckner and Garcia

3.1 The Anticipatory Affect of Video Games

Contemporary video game scholarship notes that the medium disciplines players along algorithmic lines, instructing them to operate within a cultural field infiltrated by the logic of games. So complete is the saturation of this cultural field that scholars now credibly speak of "gamespace," a realm of algorithmic conflict played out endlessly towards predetermined endings (Wark 5). "Gamespace" is critical shorthand for the larger Marxist critique of video games, namely that video games digitally reify the structural logics of capitalism into gameplay loops. The more that players are embedded within predetermined digital narratives of capitalist production and exchange, the more this social structure is solidified as a seemingly inherent and unassailable feature of life. Video games are examples of gamespace, but analog spaces can also work according to this logic as well. Warfare, for example, is often presented in the media as a straightforward application of overwhelming force to particular targets, rather than the nonlinear and messy process that it actually is. Warfare, then, is overlaid in popular imagination with the process of games.

In this theoretical discourse, many video games—or so the thinking goes[21]—are incapable of critiquing this reification because they are themselves part of the means by which

[21] Games can do and be more, of course. Consider here, as one example, the games of Porpentine Charity Heartscape. Porpentine's games—very often, though not exclusively, text-based twine games—are explorations of alterity, open development, and queer experience that denies the totalizing financial flows of gamespace.

capitalism is digitally propagated to the masses. There is a reason that this reading has become a more or less orthodox position among a strain of Marxist game scholars. It is true that many games are reflective of such destructive logic, including many of the games that I analyze in this dissertation. It is worth understanding this orthodox reading and just how gamespace reifies capitalism in order to learn how the following corpus of video games that I analyze operates.

Gamespace is a flattening of game and reality into a single plane of existence: "it subsumes text, audio, images, and movies into the database…it embraces all differences by rendering all of space and time as quantifiable" (Wark 52-3). In rendering everything quantifiable, gamespace—and therefore the video games that make up this cultural field—operate according to capitalist logics, becoming what Nick Dyer-Witheford and Greig De Peuter term "exemplary media of Empire" because they allow for the rote reenactment and naturalization of capitalism (Dyer-Witheford and De Peuter xxix). The entrenchment of such narratives of capitalist domination within video games is in service to "a global capitalist ascendency of the early twenty-first century," a political and economic system which is "administered and policed by a consortium of competitively collaborative neoliberal states" and ultimately "based on corporate exploitation of myriad types of labor…for the continuous enrichment of a planetary plutocracy" (Dyer-Witheford and De Peuter xxiii). For the orthodox Marxist perspective of video games, it is the very *medium* of video games that reconstitutes capitalist ideology. After all, "to a greater degree than perhaps any other previous media other than the book, virtual games are a direct offshoot to their society's main technology of production…[and are] born out of the same military research matrix that generated the personal computer and the Internet" (Dyer-Witheford and De Peuter xviii). These digital games, "once suspect as delinquent time wasters [are] now increasingly perceived by corporate managers and

state administrators as formal and informal means of training populations in the practices of digital work and governability" (Dyer-Witheford and Peuter xvix). They are disciplinary media, tools for teaching modern citizens of nation-states how to be citizens of nation-states. Through repetitive and predetermined algorithmic performance, video games overtly represent and allegorize the informatics of control that have come to dominate digitally-connected society. Indeed, they "don't attempt to hide informatic control; they flaunt it…to play the game means to play the code of the game. To win means to know the system" (Galloway 90-1, emphasis original). Video games permit the uncritical performance and embodiment of capitalist and neoliberal economic and political narratives. If video games are "at their structural core in direct synchronization with the political realities of the informatic age," then they operate according to the logic of neoliberalism (Galloway 91).

I rehearse this orthodox Marxist reading of video games for two reasons. The first is that, largely, I agree with its principal observations, *provided* (and this is a critical point of contention) these observations are asserted in reference to a specific corpus of video games. As will be discussed throughout this chapter and in chapter 6, while video games *can be*, and very often *are*, reifications of capitalist control and colonial narratives, they can also do so much more. Yes, the medium is the message insofar as it "shapes and controls the scale and form of human association and action," and certainly all the video games I discuss here are implicated within—and were themselves the products of—the shift towards digital, dematerialized neoliberal economic policies (McLuhan 8). But that is not, as contemporary strains of queer and indie game development make clear, the only thing that games can do.

The second reason is that I wish to expand upon this orthodox reading somewhat. Wark, Galloway, and Dyer-Witheford and De Peuter are concerned primarily with actions a player

takes in any given game: destroying America's "enemies," acquiring capital, exploiting the global working class, and so on. But there must also be room in the analysis of any medium, and especially one so directly participatory as video games, to consider the ways in which video games are *not* merely what game theorist Audrey Anable calls "ideological training grounds for capitalism." And while a Marxist approach has been a productive line of inquiry for understanding video games, it is vital to "account for the aspects of video games that cannot be reduced to the military-entertainment complex" (Anable loc. 162). To understand games more fully requires scholars to "name and analyze how feelings move through and get expressed through" a cultural artifact like a video game, "resisting locating properties like texture, tone, and feelings in a purely subjective experience of reception or as the exclusive property of a text, and instead locating them in the slippery and intellectually fraught place in between" (Ibid.). In short, it requires taking up issues of mass cultural affect, which "allows us to see the homologies among the actions of a player's body, the actions of a game's mechanics, and the actions of ideological signification to get at how video games as games, as particular cultural formations, are affectively charged" (Anable loc. 199).

What I wish to do here is to account for the anticipatory sensations that animate this selection of video games. My point is not that games aren't media of empire, because some of them clearly are. Rather, it is that they work differently than traditional Marxism imagines: through affect, anticipation, and sensation. In saying sensation, I follow the work of Davide Panagia, who notes that sensation means "neither sense nor perception, but rather the heterology of impulses that register on our bodies without determining a body's nature or residing in any one organ of perception," an "experience of unrepresentability in that a sensation occurs without having to rely on a recognizable shape, outline, or identity to determine its value" (Panagia 2).

Further following Panagia's work, though sensations and affects are unrepresentable *per se*, and there is no single method of capturing them that works for every given context, "we can invent or configure ways of relating the experience it affords" (Panagia 2). The value of video games in this chapter and throughout my dissertation is that they relate the lived sensation of anticipation to their players. Throughout this chapter I will be applying this approach—looking beyond the traditional Marxist analysis of video games as exemplary media of empire to examine the lived sensations of video games—to the three games I discuss: *Pac-Man*, a coin-op arcade game, *TradeWars*, a BBS multiplayer game, and *The Oregon Trail*, an educational game that did more than either of the first two games I analyze to introduce anticipation to a waiting generation of users.

3.2 Navigating Hostile Code: Pac-Man, Arcades, and the Introduction of Mass Digitality

Consider now the scene of a typical arcade hall in 1980. As the customer walks in, she notices lights flashing in bright spasms of color, the latest radio hits pulsing through the air, perhaps the smell of pizza. The crowd, she notices, is mostly teenagers and young adults like her. They've just gotten their allowance money, or maybe they have been working a job in order to feed their addiction to the arcade machines. It's mostly (though not, as will be remembered in popular culture later, overwhelmingly) boys. Many of the most popular

Figure 1. A Pad-Man arcade machine. Image credit ArtStation.

arcade video games are designed and marketed with this audience in mind (Kocurek, Newman). *Space Invaders* and *Galaxian* machines are among the most popular machines at the arcade, and they always have a crowd around them, either jeering a player who lost early or cheering a player going for a high score. No use trying to get in line for those; it's too late in the day, too many people waiting. So, she walks on, until her eye catches a new machine in the corner. It's bright yellow, and the marquee advertises it as "*Pac-Man*," using a blocky geometric font to spell it out. On the side of the machine is what she assumes to be the titular character, a yellow circle with legs, red eyes, and a smile. It's looking up at what looks like a ghost, who also has red eyes.

As the player steps closer, she notices that the machine is in "attract mode." The goal of attract mode is just that, to offer a short summation of the game in order to attract potential players. She watches as the main enemies of the game—but not Pac-Man, oddly enough—are introduced one after another: Shadow, Speedy, Bashful, and Pokey, also known respectively by the names Blinky, Pinky, Inky, and Clyde. A little dot is worth 10 points, a big dot is worth 50, and isn't that funny, how eating the big dot lets you eat the ghosts? Looks like they chase Pac-Man and kill him if they catch him, that's useful to know. This is confirmed in the gameplay sample that attract mode uses. The playboard is a maze? Fascinating, and new! She's never seen that in a game before. So: eat the dots to score points, and score more points when you eat the ghosts, who are chasing you through a maze, so you have to figure out how to avoid them. Easy enough! And it's so *different* from the other games in the hall, most of which are shooters or some other overtly violent setup. Either way, it's fresh enough and unestablished enough that no one else is paying the game much attention yet. So, she puts a quarter into the machine and begins to play.

First level, not so hard. The ghosts aren't quite as aggressive as she thought they were going to be. The second level doesn't look any different from the first, but she loses a life—the red ghost chased her down because the blue one cornered her—but by the skin of her teeth is able to beat it on her next life. That's when she sees something that she's never seen before in a game: a little interlude between levels. It's simple, but effective. The red ghost (the same one who killed her earlier) is chasing Pac-Man across the screen, clear off of it. And then the ghost comes back onscreen, flashing blue. By the time it reaches the middle of the screen, Pac-Man comes back onscreen from the left, but much bigger and faster than before. In retaliation, Pac-Man chases the ghost off the screen this time. Hardly Shakespeare, but it's funny, and no other game that she can think of ever bothers to provide narrative context for what's happening on the screen. She laughs, dies twice on the next level, and puts another quarter in. Slowly a crowd starts to form around her, themselves curious about this new machine. By the end of the year, *Pac-Man* machines will have grossed 1 billion dollars. By 1985, this had more than tripled to 3.5 billion dollars, with more coming from licensing and merchandising deals (Northfield). In short order, Pac-Man would become one of the most recognizable characters in American popular culture.

Fast forward two years, arcades and coin-operated games have become firmly established among the dominant arenas of cultural capitalization. A mass, interconnected series of industries and consumer products has grown up around arcades and games, including music, strategy guides, television shows, early histories, and trade publications. As an example, the 1982 premiere issue of *Video Games Magazine*[22] featured several articles that would have interested

[22] *Video Games Magazine* was one of the many publications that bloomed around the then-rapidly growing video game industry. It did not last as long as some of its contemporaries; it only published from 1982-1984 and was a casualty of the North American video game crash of 1983.

the growing consumer class of video game players: a wide-ranging interview with Nolan Bushnell, the founder of Atari; a guide on how to beat "15 of the most popular coin-op videos"; extensive reviews of newly available personal computers; and a profile of a young software company called Activision that expected to "triple their sales in '82."[23] The main attraction that month, however, was their declaration of Pac-Man as their 1982 "Man of the Year." Excerpting journalist Steve Bloom's book *Video Invaders*—a brief history of video games published earlier that year—the cover story billed itself as "The Absolutely, Positively Last Word on Pac-Man." The art used for the story emphasizes a certain sense of glamor, with Pac-Man himself dressed in a tuxedo and top-hat and chomping a cigar while seated in a director's chair. For Bloom, the seeming commercial omnipresence of Pac-Man is as interesting as his ludic appeal of Pac-Man[24]: "It starts with the wait, with the quarters lined up on the edge of the machine. Before long, it's T-shirts, pop singles, news of the latest ailment resulting from compulsive play of a particular game, reports of profits that would feed all of West Africa" (Bloom 24).

I want to focus on this start that Bloom identifies, this "wait" and quarters at the edge of the machine. Before it is anything else, *Pac-Man* is an act of waiting. The wait and quarters are emblems of anticipatory affect, and this is central to its ludic and social appeal. Jason Farman notes in *Delayed Response* that "waiting, ultimately, is defined by the very fact that we notice it. It pulls us into an experience of time in unique ways. It makes us notice duration" (Farman 14). What's more, "the tempos of life and the ways durations like waiting are experienced are always

[23] Activision—known officially now as Activision Blizzard—is valuated above $70 billion as of March 31, 2022.
[24] In keeping with the rest of *Video Invaders*, Bloom is most interested in the technological culture that led to the production and popularization of video games rather than in operation of video games themselves. In fact, Bloom glosses over the actual gameplay of *Pac-Man*, saying of it that "[l]ike every great video game, Pac-Man grows more difficult with each screen, challenging you not only to outwit it, but to physically keep up with it" (Bloom 24). Perhaps he was content believing that the video games he was covering were popular enough with his audience that any description would be needless.

linked with the technologies of an era that regiment and divide time" (Farman 16). Though arcade and coin-operated games are not timepieces in and of themselves, they do divide time into sections of play and non-play. The wait to play *Pac-Man* becomes, in a very real sense, part of the experience of playing *Pac-Man*. One can imagine a long line forming to play the machine, and if a player were at the back of it, they would hear the sounds of quarters plonking into the machine to start a new game, hear the ghosts catch and kill *Pac*-Man and the shuffling of feet as the line gets shorter and shorter. This would, in turn, ratchet up the anticipatory tension, allowing them to imagine what playing the game will be like for them. This embodied experience of not only playing, but waiting to play, made *Pac-Man* the subject of admiration, curiosity, and even revulsion. At the same time as "a billion games [of *Pac-Man* were] being played every month," psychologists warned that it, along with other games provided an addictive feedback loop that incited "arousal and then a relaxation response" (CBS).

It is difficult to overstate the cultural and commercial reach of *Pac-Man* Michael Newman describes how, by 1981, "America had almost 100,000 *Pac-Man* arcade cabinets collecting quarters," good for "$1 billion in revenue in its first fifteen months in the United States" (Newman 188). Even the 1982 World's Fair was replete with *Pac-Man* paraphernalia: "[It] had not only several game rooms filled with video arcade cabinets, but four Pac-Man souvenir shops selling shirts, mugs, pins, posters, pillows, stickers, Pac-Man Putty, miniature souvenir license plates, tote bags, and a child-size sleeping bag" (Newman 188). Not necessarily a tremendous success in its native Japan, the game had found its ideal market in North America, "appeal[ing] widely to children and women in addition to male players, and to both more casual and more serious visitors to arcades" (Newman 188). Arcade games were popular in America before *Pac-Man*, most notably games such as *Space Invaders* (1978) and *Asteroids* (1979). But

these games, and the areas they were typically found in—"taverns, arcades, and other spaces"—were "inhospitable to female patrons not just because they were shady or dusty or unsafe, but also because the games themselves were a big turn-off" due to their overt masculine coding (Newman 190). *Pac-Man* in particular rode the wave of shifting gender dynamics in the wake of second-wave feminism to record profits in the video game sphere (Newman 190). As the spending power of women in North America increased, so too did the video game market attempt to accommodate them both with games and places to play games that were friendlier and more open to their business. *Pac-Man* was among the first beneficiaries of this expanding customer base.

Just as arcade games mediated shifts in the buying power of women following mass social changes, so too did these games mediate to consumers the profound shifts in the economic and technological base of the United States that occurred in the 70s and 80s. As economic production deemphasized the manufacturing of tangible goods within the continental United States and towards the delivery of entertainment and other services, consumers—young men in particular—put an increasingly large share of their disposable income towards arcade video games: "The young men playing early coin-operated video games…were a population at a seemingly unprecedented level of economic risk, encountering decreases in their earning power and increases in unemployment while they were lured to consumption as a way to self-expression and satisfaction" (Kocurek 26). This is one of the more pronounced effects of the rise of speculative capitalism. As the production of goods was moved away from former centers of industrial development, the work of personal identification was moved from identification with an industrial or professional organization to identification with consumer practices. These shifts from an industrial society towards a consumer society made possible the categorization of a

group of young men as “gamers,” a recognizable segment of consumers that could be analyzed, understood, and appealed to. These were not, as games scholar Carly Kocurek notes, viewed in wider culture as “uniformly negative” developments; after all, “[g]ame designers and companies were championed for their innovation and entrepreneurial spirit, and gamers were frequently cast as technologically gifted, highly competitive young men whose more mischievous impulses only reaffirmed their intelligence and creativity” (Ibid. 37).

Gaming in general and masculine gamers in particular were instrumental in the wider commercial and ideological push towards the expansion and glamorization of the technology sector. As the manufacturing capacity of the US decreased, it seemed that the dominance of computing within white-collar labor force only grew in equal measure, as characterized by the development and widespread use of technology such as the microprocessor. Per Bloom, the invention of the microprocessor “allowed all of the [computer’s] complex functions, such as data storage, memory, arithmetic and logic, to be completed by a central component. In effect, what was always possible on mainframe computers was finally filtering its way down to the masses” (Bloom 17). The mainframe computer technology that enabled the automatic trading and portfolio insurance pioneered by Hayne Leland and Mark Rubinstein in 1976 would shortly find its way into both domestic and mass industrial settings. By 1982, the scale and influence of personal computer technology was such that Otto Friedrich in TIME Magazine could credibly claim that

> There are some occasions…when the most significant force in a year’s news is not a single individual but a process, and a widespread recognition by a whole society that this process is changing the course of all other processes. That is why, after weighing the ebb and flow of events around the world, TIME has decided

> that 1982 is the year of the computer. It would have been possible to single out as Man of the Year one of the engineers or entrepreneurs who masterminded this technological revolution, but no one person has clearly dominated those turbulent events.[25] More important, such a selection would obscure the main point. TIME'S Man of the Year for 1982, the greatest influence for good or evil, is not a man at all. It is a machine: the computer. (Friedrich)

There is a sense in Friedrich's writing here that the computer has surpassed the historical prominence of humans, at least in 1982. And though Friedrich is of course interested in the immediate cultural and consumer practices opened by the computer, he is most interested in the anticipated revolution that such technology offered the world in the near and long-term future. Quoted in Friedrich's TIME cover story on the computer as Man of the Year, Austrian Chancellor Bruno Kreisky noted that "[w]hat networks of railroads, highways and canals were in another age, networks of telecommunications, information and computerization…are today" (Friedrich). The center-right French publisher and politician Jean-Jacques Servan-Schreiber looked fondly on what he felt was "the computer's teaching capability [that could] conquer the Third World's illiteracy and even its tradition of high birth rates: 'It is the source of new life that has been delivered to us'" (Friedrich). As a Western technology, the computer could finally finish the colonial project and "bring civilization" to the far corners of the world.

In short, computer technology was not seen as simply an extension of humans' communication capacities. Rather, it was seen—and importantly, was aggressively marketed—as a sort of messianic presence, a tool that would at long last deliver the human from the sins of

[25] There was, of course, disagreement over this. Steve Jobs, in particular, was convinced that "*Time* [had] decided they were going to make me Man of the Year [in 1982]" before Mike Moritz "wrote this terrible hatchet job" that sunk his chances at the award. He remembers that "[when] I read the article…it was so awful that I actually cried" (Dormehl).

ignorance and want: "[T]he prophets of high technology," Friedrich wrote, "believe the computer is so cheap and powerful that it could enable underdeveloped nations to bypass the whole industrial revolution. While Robot factories could fill the need for manufactured goods, the microprocessor would create myriad new industries, and an international computer network could bring important agricultural and medical information to even the most remote villages" (Friedrich). With the benefit of hindsight, of course, it is easy to see these proclamations as at the very least quaint, and at the very worst indicative of colonial-era tropes regarding the perceived arrested development of a non-Western world waiting for Western intervention. We now know that the climate crisis was driven at least in part by the industrialization that many developing nations are assuredly *not* skipping.[26] Still, the centrality that computer technology assumed in these discussions' points to the anticipated transformative presence that it offered.

But the first point of engagement with computer technology for many in the US was not personal computers, the market dominance of which by 1982 was more projection than reality. Rather, it was coin-operated arcade video games that ushered a new generation into post-Fordist modes of production and consumption. Arcade games served a disciplinary pedagogical purpose in the dematerialized neoliberal economy, preparing players "to serve both as laborers in the emergent white-collar service economy, and as investors/players in an increasingly deregulated marketplace" (Kocurek 12). What's more, "[t]hey introduced a generation of young men to computers as approachable, everyday technologies, just as the workplace was entering a period of massive computerization" (Kocurek 12). In the West, and in America in particular, the "digital

[26] Consider here, for instance, the work of Amitav Ghosh in describing the "great derangement" of ignoring the colonial history that underlines global climate change. For a terser and on-the-nose illustration, consider here the words of India Prime Minister Narenda Modi at the Paris Climate Conference: "Democratic India must grow rapidly to meet the aspirations of 1.25 billion people, 300 million of whom are without access to energy. Energy is a basic human need…So we still need conventional energy, fossil fuel. And anything else would be morally wrong."

revolution" did not play out in corporate showrooms or World's Fair demonstrations, but in the arcade halls where a primarily teenaged audience fought each other using the new digital tools of postmodernity to get high scores, to stay in the game as long as possible, to gain supremacy over the machine. Strange as it is to consider now, given the rampant nostalgia that renders retrospectives of the arcade hazy and distorted,[27] arcades—and ultimately games themselves—were deeply contested spheres along the fault lines of economics, gender, and competing notions of what constituted play and what constituted deviancy.

So, what are the afforded sensations of *Pac-Man*? What actions are players taking when interacting with it? What mechanics are they manipulating to play the game? What are *Pac-Man*'s ideological signifiers, and what affects are they charged with? It is my argument that *Pac-Man*—along with the other games I examine here—works primarily along the affective registers of anticipation, that the actions a player must take and the mechanics they must work with discipline the player to think about a future that is dematerialized yet somehow immanent, at once distant yet already known. Like other video games, *Pac-Man* is defined by patterns. The patterns are themselves representative of what was then a new economic order that had blossomed in the late 70s and early 80s, one that through the repetition of moves and strategies became hardcoded into players. Anticipation is naturalized in Pac-Man, transformed into ordinary behavior. This is a similar function that literary writing played in the 18th and 19th centuries, wherein literature functioned in part as a mediator of value, a way for the burgeoning credit economy to become normalized for its audience (Poovey 1-2). This being the case, and given that, as Anable argues, video games are "part of culture," media that "we live through and with in various and complex ways," then it pays to consider Pac-Man's inherent complexities

[27] Consider here Carly Kocurek's explanation of the rise of the Barcade and chains such as Dave & Busters that trade in nostalgia for the arcade.

and how they relate to the critical financial transformation that was occurring at the moment of its entry into popular culture (Anable loc. 161).

3.3 Eat, Chase, Live: Affective Registers of Desire in Pac-Man

Pac-Man is a simple game, so simple that it's hard for contemporary eyes to see all the ways it was so unfamiliar when it first came out. It was the first example of what came to be called the "maze-chase" genre. It was the first game to feature cut-scenes, little skits between some levels that established the rivalry between Pac-Man and the ghosts. It was also the first crossover commercial success to come from video games, not the least because it was the first to feature what could reasonably be called a "mascot." The design of Pac-Man was essential to the game's success; rather than being a spaceship or some other mechanical tool, Pac-Man was a character with identifiable and relatable needs, namely the desire to eat. This design choice was made with a female audience in mind. Per Michael Newman, Toru Iwatani—the lead designer who created Pac-Man— noted of his design decisions that "'When you think about things women like, you think about fashion, or fortune-telling, or food or dating boyfriends. So I decided to theme the game around 'eating'—after eating dinner, women like to have dessert'" (Newman 187). Pac-Man's character design came from an even simpler inspiration: "'If you take a pizza and remove one piece, it looks like a mouth. That's where my idea came from" (Newman 187). Setting aside Iwatani's extremely stereotypical view of what women would like or value in a video game, the enemies of the game, the ghosts, "were inspired not by the sci-fi or space opera tropes of most popular games, but from *anime* and *manga* along with American children's comics and cartoons" (Newman 187). *Pac-Man*—both game and character—was created with an

entirely different (though given Iwatani's characterizations of women's fascinations, still thoroughly mediated) cultural and affective index than the other, more militaristic shooting games that otherwise dominated the arcade halls. To *consume* something and take it within yourself is a qualitatively different gameplay experience than to *destroy* something and delete it from existence. Moreso than other games in its own time, *Pac-Man* works along the affective registers of desire. Pac-Man desires to eat, in fact can only eat, and the player desires to feed him. There is violence in the game, but as it is so cartoonishly abstracted away, and Pac-Man's only defense is devouring his ghostly enemies (who always return to bedevil him), no one can reasonably argue that it is a *violent* game.

Pac-Man was designed to appeal to as broad an audience as possible, especially those who otherwise would not have been interested in video games at all. It works because Pac-Man—both game and character—encapsulate the aesthetic experience of life in the dematerialized postmodern. It is, to use Sianne Ngai's aesthetic lexicon, simultaneously interesting, cute, and zany:

> This is because the interesting, cute, and zany index—and are thus each in a historically concrete way about—capitalism's most socially binding processes: production, in the case of the zany (an aesthetic about performance as not just artful play but also affective labor); circulation, in the case of the interesting (a serial, recursive aesthetic of informational relays and communicative exchange); and consumption, in the case of the cute (an aesthetic disclosing the surprisingly wide spectrum of feelings, ranging from tenderness to aggression, that we harbor toward ostensibly subordinate and unthreatening commodities). (Ngai 948-949)

Pac-Man is a case study for the "historically concrete" ways these aesthetic and affective categories materialize. Pac-Man himself is cute insofar as he is nonthreatening, a figure that players invest tender feelings in and want to see succeed, even if they might find it funny when he is slain. The ghosts, on the other hand, are able to generate feelings of both tenderness and aggression. As frustrating as navigating the labyrinth and getting killed by the ghosts can be, the player cannot ultimately be too mad at them, as they are just as memorable characters as Pac-Man himself. The high scores that players can populate with their own initials (or obscenities, as the case may be) are early analog examples of the "recursive aesthetic of informational relays and communicative exchange," for what is a high score if not a message transmitted to other players that someone better than them once played on the machine? This is to say that the machine itself—its form and shape—is transmitting affect, an anticipation of future games that will shatter these scores.

The game's central aesthetic concern, however, is the zaniness of capitalist production. Consider here the affective labor inherent in learning about and engaging with computer technology that players would then go on to use in their daily lives. For many, *Pac-Man* was their first experience with a graphical user interface, one that could be directly manipulated through an on-screen agent that interacted with and changed the digital world around them. Yet the game also allows for the "artful play" that Ngai identifies as one of the elements of zaniness. If contemporary aesthetic and affective categories are bound up in "the performance-driven, information-saturated and networked, hypercommodified world of late capitalism," then all video games are inherently zany, arising out of and requiring of their players enmeshment within the world of late capitalism that Ngai describes.[28] Furthermore, because the game is more a

[28] Consider here Shaviro's analysis of Whitehead in *Without Criteria* when he notes that Whitehead's "theory of feelings" "opens the way to an affect-based account of human (and not just human) experience" which "places

"[game] of progression rather than emergence" insofar as the challenges and goals of the game are static and fixed, players can understand and master the patterns underlying the games presentation (Kocurek 28).

The locus of *Pac-Man's* zaniness is found in how players navigate its primary enemies, the ghosts. The ghosts are choreographed through the implementation of a sophisticated algorithm that semi-randomizes the ghost's behavior. While its results cannot be memorized ahead of time, the pattern can be at the very least anticipated by the player. All the ghosts have three movement modes: Chase, Scatter, and Frightened. Chase is as it sounds; the ghosts pursue Pac-Man, each moving in a different pattern based on Pac-Man's current position. Scatter mode instructs each ghost to occupy a different corner of the board. Frightened, when the ghosts flash dark blue after Pac-Man eats a large pellet, is different from other modes as the ghosts move in a pseudo-random fashion, making split-second decisions as they slowly move away from Pac-Man. These different states were designed to vary the gameplay experience for players. Per Iwatani: "I felt it would be too stressful for a human being like Pac Man to be continually surrounded and hunted down. So I created the monsters' invasions to come in waves" (Lammers). Attack, retreat, attack again; this is the basic movement pattern the ghosts follow in every level of the game.

This description does not account, however, for the zany individual movements of the ghosts, each of which moves differently from the others. In America the ghosts were given the more personalizing names Blinky, Pinky, Inky, and Clyde in order to maximize their commercial appeal. Their original Japanese names more accurately describe the threat they pose to Pac-Man:

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aesthetics…at the center of philosophical inquiry" (Shaviro 47). Like Shaviro, I don't think there is much of a difference, philosophically speaking, between affect and aesthetics, hence why Ngai provides such a useful intervention in this section.

Chaser, Ambusher, Fickle, and Feigned Ignorance. Each ghost is programmed to follow different behavioral patterns from the others while moving through the maze. What might appear at first as random movement is in fact a tightly choreographed chain of conditionals. If Pac-Man is here, then the ghosts have a wide range of potential "there's" to choose from. In Chase mode the ghosts are not technically chasing Pac-Man but (with one exception) determining which tile they are to travel towards based on Pac-Man's current position. The red ghost, Chaser, will always move towards Pac-Man's current position, ensuring that he will trail directly behind. The pink ghost, Ambusher, will always attempt to target a tile that it perceives Pac-Man as travelling towards, typically four spaces ahead of where Pac-Man is facing. The blue ghost, Fickle, is the only ghost to target tiles by taking into consideration factors other than Pac-Man's current position on the board. He does this by determining the position of Chaser and then targeting two tiles ahead of where Pac-Man is likeliest to go towards as a result of the pressure Chaser is putting on him. The orange ghost, Feigned Ignorance, will behave differently depending on how far Pac-Man is from him. If Pac-Man is within eight tiles, he will go towards the bottom left of the screen, potentially ignoring Pac-Man entirely. If Pac-Man is further than eight tiles away, he will exhibit the same behavior as Chaser. Taken together, the ghost's main objective is to corner Pac-Man into inescapable positions. Novice players will typically react to this chain with dread. For these players, death is not only certain but usually swift. Experienced players, on the other hand, will be able to manipulate the ghost's patterns into favorable conditions. Strange as it may sound, the best *Pac-Man* players are rarely—if ever—in any actual danger from the ghosts. A player at this level is concerned not with survival, but with score accumulation.

This sophisticated AI is largely hidden from the players. Nowhere in the game are these movement principles laid out clearly beyond the names of the ghosts. Yet through this

intentional obfuscation of the true nature of the ghostly threat, the game "engage[s] and entangle[s] [players] in a circuit of feeling between [its] computational systems and the broader systems with which [it] interface[s]: ideology, narrative, aesthetics, and flesh" (Anable) loc. 138). *Pac-Man* entangles players within the sensory aesthetics of cybernetic control. Joystick in hand, players bodily navigate Pac-Man through a digital labyrinth, competing against hostile code in the search for ever higher scores. There is no victory in *Pac-Man,* only a deferred and inevitable death. Even "perfect" play is no guarantee of success; should the player reach the 256th level, the right side of the play screen will scramble into a mass of numbers and letters, rendering the level impossible to beat. *Pac-Man* also engages players in narratives and processes of capitalist accumulation. The consumption of pellets and ghosts in order to score points—which leaves the player always in direct competition with both the machine itself and the players that have and will have played on the machine—is a compelling (if simple) instantiation of speculative capitalist competition. The only way to "win" *Pac-Man* is to have the highest score: amongst friends, on the machine, or in the world, depending on the scale of a player's ambitions. *Pac-Man*, along with its arcade contemporaries, introduced its players to a dematerialized economy with no beginning or end, enmeshing them in what media theorist Patrick Jagoda would call the "network aesthetics" of *Pac-Man*: the "ordinary experiences of connection…that heighten sensitivities to…everyday embeddedness in networks" (Jagoda 5).

In the case of *Pac-Man*, network aesthetics come to foster a sense of anticipation; indeed, this is the primary affective index of the game. The desire to get a high score, to navigate the maze, to avoid the ghosts, all depend on engaging in anticipation. What moves will I make? How will I manipulate the ghosts? When the game speeds up in the later levels and the ghosts no longer respond to eating the large pellets, how will I try to navigate the maze then? Even more

quotidian questions that surrounded the arcade have anticipation as a primary emotional nexus. Will the machine be open? Have I brought enough quarters? How long will I be able to play?

As video game development matured throughout the 80s, this drive towards speculative financialization would be approached from ever more overt perspectives; along the way, science fiction—most notably in its fascination with temporal flexibility—would prove to be an important generic tendency within the stories, worlds, and systems that game developers would create. What's more, these developers would be at the vanguard of creating new, digital-based communities of consumers, fans, and enthusiasts that would provide models of both enmeshment within and resistance to the newfound financialization of daily life. It is fitting, perhaps, that a game called *TradeWars* (1984) would help to herald these changes.

3.4 TradeWars: Capitalist Metagames

Figure 2. A typical activity in TradeWars: entering a tavern to catch up on galactic news. Image credit to old-games.com

A young man, steeped in the latest consumer technology products, returns home from work in 1989, tired but still looking to do something with his evening. He thinks through his options and realizes that it has been a few days since he's logged into his local Bulletin Board System, or BBS. First appearing in 1978 Chicago near the beginning of the home computer revolution, a BBS can be helpfully likened to an early attempt to create a functional internet (Edwards). It works by hooking a single computer to a home phone line, which other users can then call using their own modem. Much of the activity that occurred on BBSs—chatting in real time, emailing, file sharing, and so on—are recognizable to contemporary internet users, even if the interface was far less sophisticated. Early BBSs—think here of the late 70s and early 80s—were text-based and required some basic knowledge of computer command prompts and coding

to navigate. Only later in the mid-80s did BBS system operators (sysops) develop basic ANSI artwork to decorate and differentiate their domains and make them more easily navigable using simple number prompts. As their name might indicate, BBSs were a remediation of classic bulletin boards: full of local rhetorical flavor, responsive to individual users, and each attracting their own local community (Edwards).

Yet they differed from the modern internet in one major aspect: BBSs were not corporate platforms. They were hobbyist endeavors, created and maintained on a not-for-profit basis by those who ran them; as a result, they were often idiosyncratic in structure. Each had its own visual theme, often with its own basic ANSI art, to set it apart. All features were nonstandard, and it was quite likely that users would never interact with BBSs based in other cities. This is a far cry from the corporate uniformity seen in Web 2.0, or even in the arcade halls of the early 80s. While the social setting of the arcade may differ from location to location, the ludic experience offered by a game like *Pac-Man* would be more or less consistent everywhere, to say nothing of the fact that many arcades were located in malls, which enforced a strict corporate

uniformity. Not so for a BBS, where sysops held full creative and content control, essentially acting as gatekeepers and monarchs of their own digital fiefdoms.

Figure 3. Screenshot from a contemporary BBS called "The Keep." Image credit to Beni Edwards.

Back to our young man. The BBS that he frequents, Octopus Garden, has many of the system's most typical features: an active chat room, options to send electronic mail to other users in the system, and a repository of shared programs that users can download. After he logs in for the night, he chats back and forth with a couple of other users, discusses his day, and catches up on local news through various user-posted bulletins. But he tires of this quickly, and soon gravitates to his favorite section on the BBS: the shared games files.

In the late 80s and early 90s, BBSs were hotbeds of what are now called massively multiplayer online games. BBSs pioneered file-to-file sharing between computers through the use of "doors," essentially digital paths that connected a BBS user to a networked, external application. This is how various games and programs are added to the BBS the young man frequents, including the games added to the "Online Games" section. So, he keys in and sees

what is available. *Space Empire Elite*, a multiplayer game where players control an interstellar empire and attempt to conquer each other? On another night, perhaps, but it's been a long day, and he needs something more low-key. *Legend of the Red Dragon*? An instant classic, for sure, a fantasy-inspired turn-based game with fighting and quests. *Murder Hotel*? It is as it says on the tin: a player checks into a hotel and tries to murder other players while dodging death themselves. But all of these games are so intense, so much focused upon conquest, or fighting, or direct competition with another player. No, this young man wants something a little more thoughtfully paced, something slower and easier to get into.

Then he sees a new game waiting for him, or at least one that has only been recently added: *TradeWars*, originally developed and released by Chris Sherrick in 1984. The game was created, so Sherrick claims, "as a cross between *Star Trader* [an earlier space trading game with only a single player able to play], the board game *Risk*, and *Hunt the Wumpus* [a text-based game where players hunt a monster named a Wumpus]" (*TradeWars* Museum). It combines a gameplay loop of trading and economics with the multiplayer competition of *Risk* and *Hunt the Wumpus*, though it obfuscates its multiplayer nature at first. Our player keys into the game and is asked a series of questions: "Do you wish to make up a new Alias for your Trader Name, or would you rather use your BBS name? What do you want to name your ship? What do you want to name your planet?" These questions are all estranging, yes, but are not inherently unfamiliar. This is clearly a science fictional game, and in the 80s, science fiction is only becoming more mainstream. The player notes that this science fiction universe has certain capitalist assumptions baked into it: the ownership of private property (a ship and an entire planet), the necessary influx of starting capital to become an active trader (a planet with extractable resources available to trade, along with 300 "credits"), and most importantly the existence of an economic

infrastructure to support capitalist accumulation at all. After all, the player reasons, there must be someone to trade with out there in the reaches of space.

After answering these questions, the player is booted into the game. He begins on his planet, which is assigned to a random "sector" in the game. The original version of *TradeWars* had 60 such sectors that a player could explore. This planet is not uninhabited; rather, it is populated by "colonists" counted in units of 1,000. In addition, there are three types of resources that a planet can create and that he can subsequently trade: "Fuel Ore," "Organics," and "Equipment." Each resource is worked by a specific number of colonists, creating a daily output that the player realizes he can then haul to various trading posts throughout the galaxy. The prices for various goods are dynamic, and the buying and selling of various goods at these ports form the core gameplay loop.

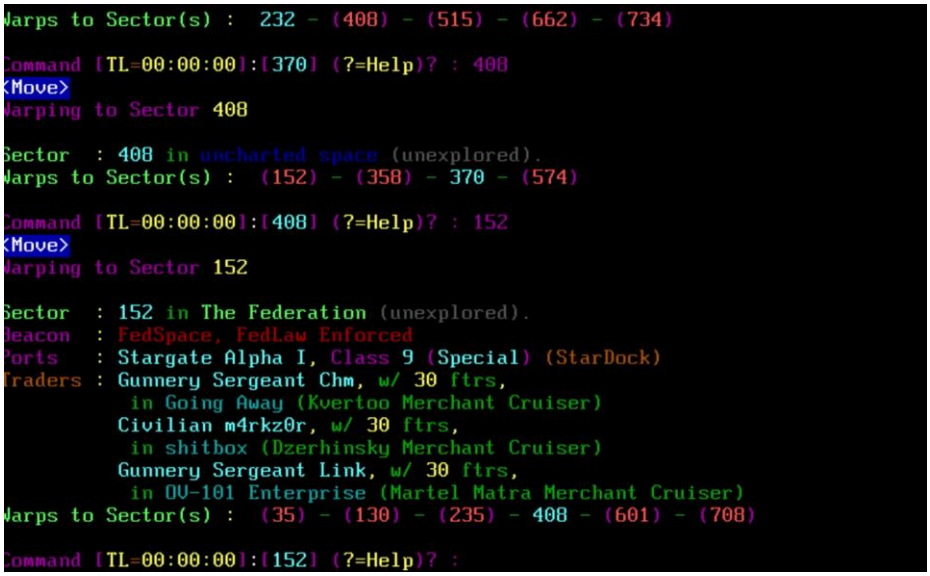

Figure 4. The basic user interface of a TradeWars match. Image credit Aaron A. Reed.

The player engages in basic trading, eventually accumulating a fair degree of capital after several sessions of gameplay. There is no real end goal to the game, although there are only a limited number of "turns" that he has. Every few actions he undertakes—mining, trading, visiting the "Tavern" on the galactic hub and interacting with other players—tick the turn count forward. Every time he logs back in, he is excited to see how the prices for various goods have

changed and how his colonists are faring. As he accumulates more credits, he upgrades his ship, outfitting it with weapons and shields, making it all but impervious to attack from the main antagonistic force of the game, the Ferrengi. In truth, he isn't quite clear about what he's doing. Even as he becomes deft at navigating the game's various menus, he senses that there are hidden depths that he can't quite wrap his head around. This will come back to haunt him, because though he gets richer, he fails to invest in his original starting planet. As this is his first playthrough, he doesn't even realize that such upgrades are possible, or that he can colonize new planets that are more resource rich to expand his trading empire. He logs off one night, and when he logs in the next day, he sees that his planet has been destroyed, his ship scrapped, his goods stolen, and his player character adrift in a capsule in deep space. A message—not from the game, but from another player—flashes on the screen tauntingly: "better luck next time :)".

A game that seemed relaxed and meditative takes a more sinister bent as he thinks over the violence visited upon him. He takes a breath and starts a new game. This time, he thinks, things will be different. This time he'll settle a more defensible world, build up defenses, and invest more wisely. And if he finds another player's planet, he won't hesitate to destroy them before they can become a threat to him.

A melodramatic account, perhaps, but one that is accurate to how a player new to *TradeWars* in the 80s would have found the game and slowly learned about it. By 1989, the young man would not have thought twice about what was, when *TradeWars* was first released in 1984, one of its primary developments: the introduction of networked, though asynchronous, multiplayer competition. Players have a wide variety of options for interacting with each other in *TradeWars*, though these interactions mostly fall into two broad categories: cooperation and antagonism. Players can gain information on other players through finding Taverns and reading

announcements that other players have posted; form "corporations" that pool resources and ships together for mutual defense (a development that would, in the words of Gary Martin, almost always "stir the pot and cause more conflict amongst players" rather than "create safety in numbers"); trade resources with each other; attack and rob another player's ship or planet; complete bounties against each other; and other various activities (Martin, qtd. in Reed).

Like other "door" BBS games, only one player on the network could be logged into it at a time. Early BBSs had limits on the number of people who could be doing anything on the system at a given moment, and games in particular could only be activated by one person at a time. As a result, a large share of the affective weight of the game was found in the moments not spent playing the game: "'It was the anticipation of the game that made it so addictive'…The tension of hearing a busy signal and wondering if someone else was messing up your shit" turned waiting to play the game into itself a sort of game, one that happens *around* the game but that still dictates and responds to what happens *within the game itself*. This is an instantiation of what Stephanie Boluk and Patrick Lemieux call a "metagame," a "truly broad label for the contextual, site-specific, and historical attributes of human (and non-human) play" (Boluk and Lemieux loc. 357). Given this social and technical history, *TradeWars* makes for an excellent cultural artifact to explore as both game and metagame.

In its simplest form, a metagame is a game that happens "to, from, during, and between" a game, a term that helps to "describe players' lived experiences and the historical contexts in which games are played" (Garfield, qtd. in Boluk and Lemieux loc. 315). If this definition seems somewhat circular, that is because metagames are irrevocably enmeshed within the games they arise from: "Metagames are where and when games happen, not a magic circle within which unnecessary obstacles and voluntary pursuits play out, but a messy circle that both constrains

games and makes them possible in the first place" (Boluk and Lemieux loc. 321). Metagames are made up of the expectations, stories, strategies, and communities that arise around games and that place them within a particular historical context. Game playing—particularly *TradeWars*—becomes, in this sense, not something confined to a screen but something that permeates and becomes intertwined with lives between play sessions. The game extends into life itself, away from a game machine. A player would still be playing *TradeWars* as they were driving to work, picking up their drycleaning, cooking dinner, precisely because the affective and sensorial state of anticipation carried out into the non-digital world. To say that *TradeWars* is made up of metagames is to draw attention to the "difficult to design, impossible to predict, deeply collaborative, and always ephemeral" engagement that players had with it (Boluk and Lemieux loc. 502). In the context of Boluk and Lemieux's argument, this means that video games are not, in and of themselves, actually games, but rather "software sandboxes" that serve as staging grounds for the creation and playing of metagames. Video games are too closed off, too hermetically sealed, to be anything other than an object that people interact with to create more meaningful games. To carry Boluk and Lemieux's sandbox metaphor further, consider the following formulation: though you can play games in a sandbox, a sandbox itself is not a game.

I do not object to the theoretical and historicizing agitation that Boluk and Lemieux insist upon. What we call "video games" are historically situated objects that serve as platforms for people to play in ways that break the sealed-off "magic circle" of games (though I am not quite as insistent on the point that video games are not games, as such; there is something to be said here for the historically mutable category of "game" that expands to include newer and more diverse forms of play, even ones which might seem more closed off than others). I will further explore here how *TradeWars*, like the BBS ecosystem that the game emerged from, operates as a

platform for metagames in ways that anticipate the formalization of gameplay loops that are now taken for granted but which were, in fact, radically contingent. I will also explore how *TradeWars* operates using what I will call here the metagames of capitalism: the interactivity of commodities, the thrill of competition against and amongst faceless adversaries, wagers, gambits, speculation, market shifts, all the metagames that go into the anticipatory affective appeal of capitalism. In this way, *TradeWars* is a metagame in the truest sense of the term, a game made up of other financialized games that serves as an arena in which the lessons of capitalism must be internalized to achieve victory. In this sense, the digital medium of *TradeWars* disciplines players along algorithmic lines, teaching them how to operate within a cultural field that is infiltrated by the logic of games. But I also seek here to understand how it is that *TradeWars* paradoxically operated using capitalist structures yet also thrived in a digital, file-sharing BBS ecosystem that was decidedly *not* profit-driven. In *TradeWars*, anticipation operates along two valences: first, in training players to operate according to the principles of speculative finance, and second, in working towards a future that would allow for the continued free proliferation of *TradeWars* and games like it. The former is yet to pass, but the latter is a dead dream entirely.

3.5 The Margin Call at the End of the Universe: Playing, Competing, and Trading in TradeWars

In much the same way that the early development of science fiction was concomitant with colonial ventures, it was also concomitant with the maturation of capitalism into the global means of production. In 1979, Peter Fitting noted that "Western SF is…a form of ideological production, one of the ways in which capitalism speaks itself and determines our ways of perceiving reality, one of the ways through which the real problems and conflicts present in

society are transformed into false problems and imaginary resolutions" (Fitting). The primary way science fiction achieves this blunting of utopian hope for a better world is by not only reducing the "social to the personal, but also [displacing] the personal/social dimension [of social problems] to science" (Fitting). Like Jagoda would note many years later, Fitting sees the systemic nature of science fictional narratives as being a stumbling block to the possibility of science fiction adequately addressing the personal dimensions of life in a highly technicized world: "Character," Fitting notes, "has traditionally been the central focus of the novel, but SF reverses the usual foreground-background structure of the traditional novel: characters are moved into the background, while objects, the products of technical applications of the laws of nature, occupy the foreground" (Fitting). So too are cultural understandings and critiques surrounding capitalism equally centered on technological and financial solutions; consider here the implementation of automatic trading programs as a way to combat known financial volatility. In this way, capitalism can itself be understood as a sort of science fiction, insulated from strident revolutionary critique and metamorphized into a glitchy piece of computer software that must be reined in through technocratic means. In setting the discussion in these terms, however, capitalism is often presented as a sort of game, one that can be learned and mastered by those either skillful enough to navigate its treacherous waters or by those with the capital to play it at a high enough level.

What makes capitalism appear to have the auspices of a game? Part of it, according to Annabelle Mooney, is that the capitalist class has long noticed that "economic activity requires rules. For markets to work, for trade to take place and for people to hold capital and property, rules are needed. Some take the form of laws, others are found in regulation, and still others operate as more or less stable conventions and norms" (Mooney 308). This is a general dictum,

one that Mooney herself admits is debatable, but it serves as a useful starting point for my analysis. The thrust of her argument here is that capitalism is bound by either laws, regulations, or discourses that surround it. That is to say, capitalism is made up of social logics, a term borrowed from Glynos and Howarth, which operate "on a continuum from rules (or law) to norms" that various actors within capitalism follow or don't follow. Such logics are accreted over time, until the actions a specific actor can take are able to have predictive weight, i.e., a certain action is 40% more likely if such and such an event were to occur. These various social roles have certain expectations and actions built into them. Consider this example that Mooney pulls from Dahlberg, who is in turn describing a situation where interest rates rise: "There will be a range of likely responses from a range of actors—with a variety of roles (from parent to banker), goals (from paying bills to maximizing profit) and knowledge of the system—and an associated range of consequences for actors" (Dahlberg 265). This is, of course, a selective metaphor that in part obfuscates the fact that capitalism is not a game of blind chance, as certain economists had written of it in the wake of the 2008 financial crisis (Mooney 310), but the key point is that capitalism is presented, discussed, and thought of as a sort of metaphorical game both by its chief players and by the larger public who listens to these chief players; it is, in short, socially constructed as a game, albeit a dangerous game with terrible consequences for people of color, the planet, and the very chances of creating a healthy and just future.

If metaphor, as Mooney quotes Aristotle as saying, "brings something before the eyes," then what the notion of capitalism as game brings before the eyes is that it is itself made up of metagames. Indeed, this is what Mooney is ultimately describing when she notes that the social logics of capitalism are bounded by informal rules and knowledge about the rules and goals of any given capitalist activity. That is to say, by metagames that occur at the margins of the

"written" rules of capitalism. These metagames of capitalism are naturalized in part through media representation; this is where a game like *TradeWars* comes in. *TradeWars* arises in the mid-1980s, a moment which, as noted in chapter 1, is a period of economic flux. The stagflation of the 70s was eased by the dematerialization of the American goods economy into a financialized credit economy. *TradeWars* is a game, one with rules and boundaries, and it reflects and refracts capitalist principles. How does it do this? And what can be gleaned about the operation of American capitalism—how it works, and more importantly, the stories it tells about itself—from playing it?

TradeWars 2002—an updated version of the game created by Gary Martin and John Pritchett and based on Chris Sherrick's original *TradeWars*—introduced several new science fictional elements, both from pop culture and original content by Martin and Pritchett. Most notably, the Ferrengi—not to be confused with the Ferengi, a hypercapitalist spacefaring species from the hit television show *Star Trek: The Next Generation*—were introduced as a constant threat to trading activity. The Ferrengi are indiscriminate space pirates, just as likely to attack and attempt to rob a new, weak ship as they are a fully loaded and armed Imperial StarShip (another innovation of *2002*: the ability for players to buy and upgrade new ships). The following is a fairly standard Ferrengi greeting: "Greetings HooMan! This is Daimohn Shargat Goarbaig commanding the Elois Nikitur. Lower your shields and prepare to be boarded. We will exact tribute from you and be on our way; otherwise, we will turn your excuse for a ship into so many pieces of space junk" (Fandom).

The first capitalist metagame observable in *TradeWars*: the presence of threats beyond the stated game of market capitalism. Unknown threats lurk in the depths of space, waiting to rob you and blow up your ship, your one way of increasing your capital gains. For new players, the

Ferrengi are a cross between a black swan event—something that cannot truly be planned and accounted for—and stateless terrorism. They have no demands beyond the satisfaction of robbery. To put it in more contemporary terms, the Ferrengi operate as a troll, an attempt by the game developers to play a mean-spirited trick on the players; no one forgets their first raid by the Ferrengi, and after that, players will constantly keep a wary eye out for their ships.[29] Hence the second capitalist metagame they represent: the sense of expansion, not merely for the sake of expansion, but for the sake of protection against hostile takeovers. This was certainly a risk that had intensified most heavily throughout the 80s; corporate raids "dramatically altered the U.S. economy in the 1980s," gesturing towards a larger trend of large companies moving "toward specialization and away from the diversification of the 1960s" (Shleifer and Vishny 745). Players must constantly grow, and expand, else they will be subject to the most hostile of hostile takeovers. That is to say, the players come to anticipate that which cannot actually be seen until it happens: the attack of Ferrengi. They do this by mitigating risk, namely through the investment in ever more extreme security protocols: the purchasing and upgrading of more sophisticated ships, the stashing away of excess resources into hideouts, and the banding together with various other players into corporations.

The third metagame of capitalism that *TradeWars* acts as a platform for, then: the financial necessity of pooling resources for mutual protection. This was itself an emergent element of *TradeWars*, though one that was quickly formalized when Martin realized the chaotic gameplay that forming a corporation encouraged: "The whole point," he noted, "of the TW200x

[29] Amusingly, the Ferrengi themselves are the subject of one of the more notable metagames to come out of the *TradeWars* community. In *TradeWars* tournaments, one of the ways players can win is by conquering and holding the Ferrengi home world of Ferrengal. There is no actual in-game benefit to this aside from halting the creation of Ferrengi pirates. The players gain no extra resources, and in fact must expend vast amounts of capital to achieve this. To be powerful enough to conquer Ferrengal, the Ferrengi will have long since stopped posing a threat.

design was the underlying concept that 'No one wins in a war'. When it comes down to fighting, both sides lose…The whole corporate design was there to stir the pot and cause more conflict amongst players" (Martin, qtd. in Reed). Corporations allow for several options that are not available to independent traders. Various player guides from the height of the game's popularity in the late 80s and early to mid-90s make these advantages clear. "Gypsy's Big Dummy's Guide to *TradeWars*," written by Rick Mead (who went by the alias "Gypsy" in various BBSs), notes that corporations allow for the following actions: "Credit Transfer," which allows for the transfer of money between corporate members; "Fighter Transfer," which allows for the transfer of attack ships between corporate members; "Mines Transfer," which allows for the transfer of money-making mines between corporate members; and "Shields Transfer," which allows for the transfer of ship defenses between corporate members. Corporate C.E.O's also gain access to the "Corporate Flagship," a ship which is debatably the best ship in the game, virtually impregnable and immensely powerful. While Gypsy insists early in his guide that "Independent traders can compete quite effectively against large corporations," and that "There is no right or wrong way to play and the possible strategies are limited only by one's imagination," this is undercut by the "About the Author" note that he finishes the guide on: "I put this guide together because I believe the game is in a decline. I think that players are quitting as the mega-corps take over and more and more BBSs are closing their doors. I would like to make it easy for new players to start so that Tradewars doesn't vanish" (Mead). It is unclear here just what Mead means by "mega-corps"; does he mean that in the game, various mega-corps are flattening the game experience for new players, essentially hording the kind of wealth that would discourage new players from even trying to compete against them? Or is he referring to the mega-corps that are taking over the internet at the time of the guides writing in 1997, thus removing the incentives for playing

text-based games on a BBS at all? Or beyond that, is he imagining the encroachment of massive corporations like Wal-Mart and Amazon on traditional small businesses and services? It is difficult to say from a plain reading of the text itself, but it is worth pointing out here the irony of saying that individuals can compete against corporations when BBSs were simply unable to compete in the face of an increasingly centralized corporate internet.

As the quote from Martin about how both sides lose in a conflict indicates, however, *TradeWars* corporations are not strictly for maintaining peace or allowing for easy cooperation between corporate members. Rather, they are designed to enable war on a larger scale. The fourth metagame of capitalism, then: the war of all against all. The purpose of hoarding resources collectively is to protect yourself, but eventually those resources will be expended in a costly inter-corporate fight. There is no strong incentive for this to happen, of course. In theory there is plenty of profit to go around for everyone.[30] This does not stop inter-corporate war from happening, however. Such wars are important events that determine a player's moral alignment. The game features a rudimentary alignment system, dubbed "good" and "evil." Corporations are highly incentivized to turn evil early on, for various reasons.[31] Per Mike Magero, a long-time player of the game, evil corporations don't need to worry about colonizing worlds or providing basic quality of life benefits for the people under their control: "Don't worry so much about building maxed out planets or hauling in tons of people if your [sic] going to play evil. Planet Farming [the act of building up a planet and making it habitable and profitable] is a Good Alignment problem it's not something us evils have to worry about. Sooner or later one of the

[30] The actual Ferengi from the *Star Trek* series have two maxims that speak to the profitability of war and peace: "War is good for business" and "Peace is good for business," two "rules of acquisition" that speak to the overtly capitalistic ideology of the Ferengi.

[31] There are shades here of Google, a company that was, in its infancy, renowned for its credo of "don't be evil." This, of course, did not hold.

Planet Farmers will unwillingly donate a nice well populated and stocked planet to your cause" (Magero). What Magero is describing here is essentially robbery. Playing "evil" allows you to attack and steal planets that "good" aligned players have built up over time but have yet to fortify. The only problem, Magero goes on to note, is that "good" players have allowed economic inefficiencies to creep into their planets: "to make the most of [the planet]," Magero tells a player on a BBS message board, "you'll have to find a way to get rid of all that stupid rabbit food and left over equipment. After all you should be selling the same 250 holds of equipment over and over again to some fool of a port worker. You don't need no stinking rabbit food!" One can imagine real-world corporate memos that are written in the same tone, perhaps even using similar language. This kind of "evil" play is indicative of the sixth capitalist metagame that TradeWars mirrors: the escalation of efficiency. Why build up a planet on your own when, through force of arms and the deployment of capital, you can simply buy out planets? This is essentially what happens when a planet is conquered.

There is no tactical combat in TradeWars, no units to control or deploy on a board. Rather, combat is determined strictly numerically; whoever has the bigger numbers wins, every time. It is in the players' best interests to speed up their acquisition of ever larger profits, ever more powerful ships, and ever faster actions. This is where "macros" come into play. According to Aaron W. Colman (who went by the names "Singularity" and "Dnyarri" in various BBSs), macros are "a set of pre-written commands sent all at once in a [sic] one large burst" (Colman). Macros arose early in the history of computing, "ever since bandwidth was limited and people needed to navigate the first remote shell and telnet systems…They've been useful for ages, and in TW2002 they are backbone [sic] of modern play" (Colman). In fact, macros are actually much older than Colman gives them credit for; though he says they arose 20 years or so before the

writing of his guide (he wrote in 2006, so the proposed date of 1986 puts the rise of macros in Colman's mind as more or less simultaneous with the advent of BBS multiplayer games like *TradeWars*), in actuality macros were first theorized in the 50s before seeing further development in the 60s. Macros are essentially pieces of computer code, and "the initiative for [the] use of macros came mainly from computer manufacturers," for the explicit purpose of "[reducing] programmer coding time by providing shorthand facilities and, to a lesser extent, improve readability" (Layzell 30). Macros were created in response to industry pressure for computer code that is quick, easily repeatable, and easily parsed by other programmers; that is to say, computer code that is efficient, or that enables more efficient workflow. It is perhaps no great surprise that BBS users in general and *TradeWars* players in particular recognized the potential use of macros in the multiplayer game. The technical expertise required to log-in to and interact with a BBS—to say nothing of the requirement of specialized hardware and equipment, including a modem—drew a userbase of hobbyist specialists, people—perhaps mainly men—who would read computer trade magazines and who would perhaps work in the computer field. These men would have a build-in familiarity with computer systems, including macros.

This can be seen on even a cursory scan of Colman's guide. "The basic macros," he starts, "are just key strings. For instance if you're in a game and want to lay a fig in a sector without any. F1^Mcd: Fighters, 1, Enter. Corp. Defensive" (Colman). What this command does is drop a fleet of fighter ships into a system and then orders them into a defensive crouch, meaning that they will be harder to destroy for other players who may wish to fight them and take control of a given system. There are a range of other such macros: macros for automatically building up armadas of ships, for automatically attacking a given system, and for moving your ship quickly from danger should it come under attack by another player. These are only the

simple macros that Colman recommends "newish and rusty" players use to improve their gameplay. The commands get exponentially more complex from there. At the highest levels of *TradeWars* play, competitions between players resemble something akin to hackers fighting in the matrix of *Neuromancer,* all fast typing and weaponized computer code.

I hope it is clear by now that *TradeWars* operates according to capitalist logic not only in the representation of basic capitalist iconography and terminology—a simulated market and prices that go up and down—but in the embodied practices that *TradeWars* requires players to embrace in order to achieve high profit margins. As a video game, it "[engages] and [entangles] us in a circuit of feeling between [its] computational systems and the broader systems with which [it interfaces]: ideology, narrative, aesthetics, and flesh" (Anable loc. 126-138). Its ideology is capitalism, and a particularly ruthless form of it at that, wherein each player represents a state engaged in interstate anarchy; its narrative, insofar as an emergent is one of near-endless expansion steeped in bloody conflict and more or less random terror; its aesthetics are text-based, all digital obfuscation and hard plastic separation; its flesh is the anticipation players feel when they log on to their BBS, wondering if they have been robbed by another player and left floating in the seemingly endless drift of imagined space. It achieves this through the communal development of metagames: the stated goal during tournaments of the neutralization of the Ferrengi menace, the expansion of individual resources for the sake of protection, the pooling of these resources into larger corporations, and the development of macros to increase efficiency. At every level, these are metagames present within capitalism itself, as well.

But is that all *TradeWars* is good for? Does it merely serve as a platform for training in capitalist metagames? I cannot believe this to be the case. For one, even though the player guides offer a useful archive for exploring the feelings—the affects—of players within the *TradeWars*

player base, they are not necessarily representative of the larger *TradeWars* community. These guides—all of which are available on the *TradeWars* museum webpage—are only the ones handed down by those with a vested interest in maintaining a certain image of *TradeWars*, namely, its status as one of the first competitive online computer games. This has assured that its legacy and basic gameplay loops are reflected in later games that took up its space trading mantle; think here of *EVE Online*, which mirrors—some would say mimics—*TradeWars* in several fascinating ways, such as the implementation of massive corporations which leads to interstate anarchy. In truth, given the ephemeral nature of early digital culture—indeed, of digital culture in general even today—it is impossible to say for sure how players actually played the game. The guides describe the "most optimal" and "most efficient" ways of playing the game. But there was an entire community that these guides tend to paper over in their quest to describe ideal states of play. What of the players who merely hung out in the star ports after a few runs in nearby systems and watched movies at the cinema? Or who merely wanted to build up their initial planet into a veritable utopia for their colonists? Or who made it their mission to maximize profits using only a starting ship? Nothing is said of these quixotic imagined players in the guides, but they must have existed.

Figure 5 A representative "film" shown in the starport cinema. Image credit to TradeWars Museum.

Little is also said about the world in which *TradeWars* takes place. There is no imagined history to this imagined future. There is instead pastiche, a seemingly endless parade of science fiction imagery and callbacks. The greatest enemy (aside from other players, of course) a player can face, the Ferrengi, are as noted before obvious references to an alien race from *Star Trek: The Next Generation*. The star port, the space trader, space battles, questionable cantinas; these are the stock images of classic science fiction, remediated into a new genre and medium, taken from the books, stories, and films of years before and made into a heady, digital brew. In this way, *TradeWars* is not at all anticipatory; this is retro styling and little else. However, in another sense, it is anticipatory insofar as it anticipates and generates the development of an entire genre of video games centered around space trading. It also broadly anticipated the ways in which capitalism infiltrated digital spaces. After all, it is nearly impossible to find an example of a game that is not in some way overdetermined as part of a market. Again, though, we come to the central question: what feelings does *TradeWars* generate? What affect is it embodying through

players? Ultimately it is one of competition: against the Ferrengi, against its simulated market, and eventually against other players. It also breeds familiarity, hailing science fiction knowledge. Moreso than *Pac-Man, TradeWars* makes clear the connected nature of video gaming.

But as impactful and endearing as *TradeWars* is, it is worth remembering that it had a limited audience. BBS users were never that numerous, and though official numbers are difficult to come by—again, BBSs were never centralized—it is probable that the player count never quite reached into the millions, perhaps not even the hundreds of thousands. Compare this with the next game up for discussion: *The Oregon Trail*, which by 2011 had sold at least 65 million copies. Much more so than a game like *TradeWars*—which was limited in its reach by the convoluted means one had to deploy to even play—*The Oregon Trail* was widely distributed. As it wasn't multiplayer, it could be accessed on a simple home computer setup, although this was not where most of its initial audience would encounter it. Instead, they would encounter it in the one place that it would have made sense at first to see it: in their school. Yet though the most famous version of *The Oregon Trail* was first released in 1985, it has a much deeper history, one that stretches all the way back before the first wave of commercially available computers.

3.6 The Oregon Trail: Mitigating Risk

Unlike the previous two sections, where I imagined fictitious players of *Pac-Man* and *TradeWars* respectively, it is appropriate here to center my own story with *The Oregon Trail*, if for no other reason than my story with the game is the same as so many others. I first encountered the game in second grade, in 1998. This was the Apple II version of the game, originally released in 1985; the rural town in Southern Ohio that my family lived in at the time had not upgraded their computers since the mid-80s, and in fact now that I'm thinking about it,

probably had gotten these computers for cheap in a clearance sale in the early 90s. It makes sense. After all, they only needed these computers for teaching typing and allowing children to practice basic math and grammar skills on various educational programs. It was a stroke of fortune—or perhaps the actions of a kind teacher—that there were several copies of *The Oregon Trail* on floppy disk available for use. One day, after completing a reading lesson early, I sat down and booted up the game while the other children were still studying.

I had played video games before this, of course, mostly console games. *Super Mario Brothers*, *Donkey Kong Country*, and *Yoshi's Island* had made up the bulk of my childhood experience with video games, all bright primary colors, fast platforming, and childlike psychedelic whimsy. Why does Mario grow when he eats mushrooms? Why does Donkey Kong come out of a barrel? Why does Yoshi turn enemies into eggs when he eats them? These questions speak to the level of abstract unmoored absurdity that most video games of that era thrived on. They are, for lack of a better term, silly, almost weightless in their approach. What matters is their internal consistency, their "if this/then that" design. Push button, jump. Jump far enough, and land on the other side of the bottomless chasm. These are, above all else, predictable games.

At the beginning of the game, I was confronted with four choices: "Travel the trail," "Learn about the trail," "See the Oregon Top Ten," and "Turn sound off." It was tempting to go directly to travelling the trail, but I recall being drawn first to learning about the trail.[32] The option led to a short tutorial, a set of slides that detailed various elements of the game: buying supplies, hiring ferries, fording rivers, and so on. One of the last slides, however, is the one that stuck with me: "If for some reason you don't survive—your wagon burns, or thieves steal your

[32] I was a very lonely child, as you might imagine.

oxen, or you run out of provisions, or you die of cholera—don't give up! Try again...and again...until your name is up with the others on The Oregon Top Ten" (*The Oregon Trail*). For one, this slide presented a range of possible failure states that other games simply did not include. There are only so many ways to lose a game of *Mario*, and they almost all involve jumping to the wrong spot. More than this, however, it meant that the ludic patterns I had utilized in other video games meant nothing in this new context. Already, *The Oregon Trail* felt like something entirely different.

This sense of newness was borne out in play. I named my wagon members after members of my own immediate family—dad, mom, Polly, cat, and myself—and was deposited in Matt's General Store. I do not remember what I bought from Matt's General Store, which provides players initial provisions—food, clothes, wagon parts, bullets, and so on—or in what capacities I bought them in. It must not have been a very efficient shopping trip, however. In only a few short minutes, I had set the pace of travel for my wagon to grueling, run out of food, and promptly gotten a couple members of my wagon killed by various diseases and ailments. My hunting expeditions ended in abject failure. My attempts to trade with other pioneers were similarly rejected; they had everything I needed, but I had nothing they wanted. Since I had chosen to set off in March rather than a warmer month, the party members who did not die of disease soon met their end through hypothermia or hunger. Though progress is marked in the game through reaching various landmarks, I only made it to Fort Kearney, about 324 miles

Figure 5. A typical gameplay scene, particularly for young players who are not very good at managing resources. Image credit to Shortmandesigner.

into the game. I was not prepared at all for the dangers the trail presented. I failed to account for hunger, have enough bullets to hunt, or have warm enough clothes to brave the wet and cold spring, and my party members paid the ultimate wages for such carelessness.

You might think, given this total failure and subsequent annihilation of my virtual family, that I would have drifted away from the game. Other students in the class bounced off of it. But I was drawn back to it, again and again. I got better at picking out my initial supplies, more cautious when setting travel pace, and more merciful when party members got sick. I rested more on the trail, tried to hold onto my initial resources, stretch every pound of food. Hunting trips which used to net no food were soon profitable. I learned never to attempt to ford a river, no matter how shallow or slow-moving the water appeared. In short, I learned to anticipate disaster before it struck, to think, strategize, plan, and ultimately mitigate risk. When I wasn't playing, I drew up new plans for how to attack the trail, always measuring out future scenarios. Perhaps it would be beneficial, I thought, to set the pace to grueling early on and bump off a few wagon members; fewer mouths to feed meant less food consumed. Less food consumed meant making food last longer, which meant that I wouldn't have to buy bullets. I eventually stopped giving my party members actual names; to me, they existed only as 1, 2, 3, 4, and 5. The game was an opportunity to learn about a specific history of the trail, of course, but for me, it was also one of the first times I was taught to look at people as purely instrumental objects to be managed.

The Oregon Trail "constituted multiple [such] important firsts" for US children born between the mid-1970s and the early 1990s: "likely their first exposure to narratives of nineteenth-century westward expansion, their first narrative-based computer game, and, for many, part of their earliest contact with a personal computer" (Slater 376). All these were the case for me. It is no exaggeration to say that I learned how to operate a computer at least in part

through my early encounters with *The Oregon Trail*: how to use a floppy disk and open a file, navigate a GUI, input commands using keyboard prompts, manipulate images using all the tools at my disposal. It also, as Slater goes on to note, constructed my earliest senses of the dominant narratives of "westward expansion" in American history, one which celebrates the trek to Oregon as one made primarily by heroic white families. In so doing, the game naturalizes social, gender, and racial hierarchies, "using its status as a pedagogical tool to simultaneously defend and obscure ideological categories" (Slater 378). In this manner, the game is as much a "game of empire" as it is a game of survival; indeed, the two become intertwined, with the survival of empire relying on the sacrifices made by heroic white men in a dangerous wilderness. This is the narrative of conquering a land, of *American Progress* writ large.

It is ultimately within this pedagogical context—its depiction of the history of the American west, how students respond to it, and its influence on the broader history of educational video games—that *The Oregon Trail* exists in academic literature. A brief review of available literature shows that the game is still referenced even today in contemporary educational video game literature. It merits reference, for example, as a game that "[focuses] directly on…history" in one meta review of trends in educational gaming (Young et. al), and in another as perhaps the vanguard game of the computerized educational push: "The 1980s saw a push to get computers into the classroom, and schools adopted early educational games such as *Oregon Trail* to help teach schoolchildren about geography and pioneer life" (Gentile 75). The conversations surrounding educational video games have themselves expanded far beyond the simpler bounds of *The Oregon Trail,* of course, and besides that, the game has taken on a pop cultural cachet that other educational games simply have not. The wide proliferation of memes from *The Oregon Trail*—"You have died of dysentery," as just one example—speak to its

continued relevance as a cultural artifact, to say nothing of the continued commercial success of the various iterations of the game. To this date, *The Oregon Trail* and its various sequels and spinoffs have sold over 60 million copies, to say nothing of the vast number of bootleg versions of the game.

To understand how anticipatory affect is operating through *The Oregon Trail*, I will first take some time to discuss the game's colorful development history: how it went from a BASIC computer program created by a group of Minnesota high school educators to a dominant cultural force within greater popular culture. This narrative—often repeated in critical accounts of the game—reifies accounts of the oncoming cultural dominance of computers, such that several cultural spaces—childhood, the classroom, and the greater commercial marketplace—are indelibly stamped by the inevitable advent of the computer. In short, retellings of the game's creation naturalize the historically contingent development of a recognizably digital culture. This is a sort of backwards-facing anticipation, a narrative shorthand that ensures digitality is the standard mode of cultural being. Second, I will then discuss the gameplay of *The Oregon Trail*, and how its emphasis on strategic elements—buying and selling goods, linear progress towards a specific goal, and the mitigation of risk, all important skills in a neoliberal economic order—over moment-to-moment tactical decision-making acts as a kind of primer for anticipatory affect. That is to say, *The Oregon Trail* inculcates its players within a regime of anticipation, keeping them ever on the lookout for ways to leverage their capital assets for profit.

Though the most famous version of *The Oregon Trail* was published in 1985 for the Apple II, the game had much humbler beginnings stretching back to the early 60s. During this timeframe, Minnesota was what Jessica Lussenhop describes as a "Midwestern Silicon Valley", playing host to several computer firms: "IBM, UNIVAC, Honeywell, and Control Data

Corporation," among others (Lussenhop). As an area playing host to the very bleeding edge of consumer and professional computer innovation at this time, the metro area of Minneapolis was able to monopolize educational access to computer technology. During this time, a man named Dale LeFrenz—a math teacher at a Minneapolis high school—"and a handful of other educators helped found a body called Total Information for Education Systems. Through TIES, and with federal grant money, schools in 20 districts were able to purchase a teletype" (Lussenhop). Though originally trademarked in 1928 as a sort of electric typewriter by the Teletype Corporation, teletypes found later use as the interface of choice for the burgeoning computer market. Consisting of an electric keyboard that typed on a long sheath of printer paper, teletypes were an early forerunner to the desktop computers consumers know today. As a user input various commands and prompts, the computerized teletype would respond back with a set of predetermined responses according to the specific program it was running, which was often stored on punch cards. The teletype was not a new technology in and of itself; rather, computer technology remediated the earlier medium of the typed word, imbricating itself within a media form that was recognizable to the people using them. In this way, the teletype was an instance of a new media form "commenting on, reproducing, and replacing" an older media form (Bolter and Grusin 55).

It is tempting to say that this is simply how media technology works: the gradual absorption and displacement of one predominant form with another. But I wish to underscore here how the adoption of a built-in keyboard by computer technology firms was a historically contingent development, one that has as much to do with the professionalization of the labor force these companies were pulling from as it does the seeming "naturalness" of a keyboard as a defining characteristic of consumer computing. Put another way, it was the bureaucratic and

technical proficiencies of a workforce that had grown used to typing as the predominant means of technical communication that determined (as much as anything) the shape of computing to come. To be clear, there is nothing "natural" about a media form, particularly one so seemingly disruptive as consumer computing. It is itself a sort of classic science fictional *novum*, a device that dramatically splinters time itself, laying out the contingent nature of history. In this view, even the rollout of teletypes to the Minneapolis school districts was a matter of historical contingency; there was nothing ensuring that computing technology would be introduced to schools so aggressively.

The rollout of teletypes to 20 school districts was, however, an unequal distribution of resources, which was recognized at the time by the Minnesota legislature. Because of this, the legislature decided in 1973 to form the Midwest Educational Computer Consortium, or MECC. This state-funded consortium was responsible for the equitable distribution of computer technology to public schools across Minnesota. Beyond its specific goal to equitably provide computer technology to schools, however, MECC's mission statement, as defined by the legislature, was quite broad: "It is proposed that MECC provide computing facilities and support staff to serve the needs defined by education" (qtd. in Lussenhop). MECC constantly looked for software to push to its constituent schools. It found that content in a teletype game created by three men who had been intimately connected with the initial push for teletypes in Minneapolis schools: Dan Rawitsch, Bill Heinemann, and Paul Dillenberger. All three men "were student teachers finishing their degrees at Carleton College and living together…Dillenberger and Heinemann taught math in south Minneapolis, and Rawitsch taught American history in north Minneapolis" (Lussenhop). In trying to teach his students about the westward expansion of white Americans, Rawitsch had sketched out using a long sheet of printer paper

> a board game tracing a path from Independence, Missouri, to the Willamette Valley in Oregon. The students would pretend to be pioneer families. Each player would start with a certain amount of money and buy oxen, clothes, and food. Students would advance with the roll of a die, along the way encountering various misfortunes: broken limbs, thieves, disease. In roughly 12 turns, the kids would simulate the 2,000 mile journey that thousands of pioneers made to the West Coast in the 19th century. He called it 'Oregon Trail.' (Lussenhop)

Perhaps it was seeing the printer paper that sparked their recognition that the board game could be turned into a computer program, as clear an example of remediation as you can get. Either way, upon seeing it, "Heinemann peered over [Rawitsch] through his glasses. 'That,' he said, 'would be a perfect application for a computer program'" (Lussenhop). After writing the code for the game in less than two weeks, Rawitsch took it to his history class. The program was simple and primitive, using text-based prompts to usher the player forward; hunting, for example, was prompted by the teletype asking the player "Do you want to (1) hunt or (2) continue?" If the player selected the option to hunt, the teletype would then respond with "Type BANG"; if the player could do this quickly and accurately, the program would type "Nice shot! Right through the neck—Feast tonight!!!" If they player could not, the game would in turn taunt them: "A little slow on your Colt .45" (Lussenhop, Lipinski). In its earliest iteration, the game was meant to be played in a group, with someone determining the pace of travel, someone keeping track of money and resources, and so on, each student playing a particular role in the trip to Oregon. The game essentially presented itself as a series of choices, with a random algorithm determining the results of the various choices the students took. By all accounts, it was a grueling

game with an incredibly low success rate; only a couple of groups managed to complete the trek to Oregon that day.

The game proved a massive hit with the students that Rawitsch made it for; indeed, it was such a hit that when the three developers put the program on the MECC "time-sharing" server—basically a compendium of all the programs available to Minnesota schools—it quickly became "the most popular software program in Minnesota," even surpassing an early form of email that MECC schools utilized for inter-network communication (Lipinski). Yet for all its success, *The Oregon Trail* remained a uniquely MECC- and Minnesota-specific endeavor. It was only until the late 70s and early 80s that MECC software would find its way outside of Minnesota for the first time. From there, the game would be further iterated on, until finally, in the mid-80s, it would be commercially released in 1985 on the Apple II home computer. Representing a shift away from the simpler text-based approach, the 1985 home version of *The Oregon Trail* was the first graphical entry in the series, with the player directly influencing the pace of a wagon cart and family travelling to Oregon. This is the version of the game that launched *The Oregon Trail* franchise into a new stratospheric level of financial success. Given the nature of bulk purchases by schools for their own computer systems, it is impossible to say for sure just how many copies of the 1985 version were sold; the 65 million copies sold figure seemingly collates the various versions of the game that have been released over the years. However, it is a simple fact that the number of players is significantly higher than this 65 million; each classroom copy alone would have been played by multiple students over the years.

In recounting the development history of *The Oregon Trail*, I wish to emphasize two broader trends in culture that were happening at the time. The first is that there was a sort of casual anticipation that computers would come to occupy a central location in cultural spaces

outside of the workplace by those who worked in and with computers. As noted by LeFrenz, the adoption of computers in the classroom seemed obvious, perhaps even inevitable. Until 1973, computers had been predominantly corporate in nature in part due to their size; large mainframes were unwieldy for inclusion in a school, too niche and esoteric in their usage for dependable and easy operation by non-technical users such as young students. It is only when the technology was shrunk down and placed in teletype machines that it was deemed appropriate for classroom usage. In other words, the anticipation of computers coming to be more widely used drove the creation of more easily operated and portable computing machines, not the other way around. It was the desire for more users that drove the creation of computer technology that more people could use. Anticipation does not merely arouse those who feel it; rather, it spurs change and activates creation. It aligns an as-yet undetermined future with a present feeling. Anticipation is active; it shapes.

The second is that the narrative of The Oregon Trail's development serves as a sort of bite-sized miniaturization of the commercial digital turn narrative in general, a backwards-facing anticipatory moment that justifies the centralization of the tech industry around a few industry titans. Often when the story of the game's creation is deployed, it is placed within a larger context of the nascent gold rush of home computer manufacturers during the 70s and 80s: Commodore, Processor Technology, GE, and most importantly Apple. It features many of the same elements of grand mythologizing that has taken root in popular depictions of home computer development: a ragtag band of misfits, always young and male, shaking up a bureaucratic system made up of older brands and companies. The red tape and antiquated thinking of organizations like IBM are no match for their willingness to try new things, their comfort and familiarity with the new digital means of production, and their long hair and don't-

give-a-shit-for-your-rules attitudes. These men are no corporate drones in gray flannel suits; they are here to change to world, to move fast and break things. This is, of course, the origin story for Silicon Valley and the modern American information-industrial complex. Never mind that The Oregon Trail itself arose as a product of government programming, or that its creators were nebbish educators rather than iconoclastic programmers; that it was, in short, a far more culturally boring origin than the sun-drenched Palo Alto vibes of Apple's creation. In short, this development story evokes a sort of nostalgic anticipation. Look at how this digital revolution started, it seems to say; where before there was non-digital frontier, just waiting to be filled in with the fruits of the radically new, now there is data as far as the eye can see. It was inevitable, natural, right that it should happen this way.

Yet this story also speaks to an inflection point in American technological development during the 70s and 80s, a melding of private and public when it came to the development and popularization of digital media. It was a moment of radical possibility that was closed in rapidly in the tidal wave of expected profits. The Oregon Trail had started as a simple coding project designed to get a particular audience of students invested in learning (a certain version of) American history, and it had become one of the largest and most successful commercial video games, a shining beacon of the scale and scope of software that is widely shared between educational institutions. This early story, however, is only prelude to MECC's ignominious end; convinced that it should receive private funding to compete in the burgeoning home computer market, in 1991 the Minnesota legislature sold MECC to a venture capital fund called North American Fund II for $5.25 million. Though MECC had been incorporated since 1983 as a more-or-less independent business owned by the state, this sale would eventually lead to the company's closure in 1999, a casualty of corporate mismanagement.

But this story is incomplete without an analysis of what it feels like to play a game of *The Oregon Trail*, embedded as it is within narratives of brutal colonialism and anticipatory affect. The game systematizes anticipation along financialized lines. In this way, it becomes just as much about teaching the effective management of capital resources as it is about teaching the history of American conquest of the west.

3.7 To Tame a Land on a Dollar a Day

As mentioned before regarding *Pac-Man,* it is hard now for contemporary eyes to see all the ways in which *The Oregon Trail* would have been entirely new for its first players. For one thing, the game represented one of the first instances of the simulation genre of video games, insofar as it represented an attempt by its developers to accurately simulate for players the experiences of white colonizers moving west. This includes simulating at least in part the range of colonizer backgrounds who made the trek westward. When a player boots into the 1985 Apple II version of the game, they are prompted to choose from three separate backgrounds:

1. Be a banker from Boston
2. Be a carpenter from Ohio
3. Be a farmer from Illinois

The goal of these separate backgrounds, along with illustrating the range of settler backgrounds, is to illustrate how the initial capital of the various settlers played an outsized part in the success of the journey. If one chooses to be a banker, for example, the player starts with $1600. This money allows the player to buy a full team of oxen, enough warm clothes, and 2000 lbs. of food, good for an entire trip along the Oregon Trail at a grueling pace, and money left over for the various river crossings to minimize risk. What's more, this means that the player will not have to

hunt for their own food, which means that they will not have to spend money on ammunition; the upshot of this is that the player's money can be spent on food further along the trail, where the prices become quite exorbitant. If the player does not care about maximizing survival chances for their team, it is almost guaranteed that they will safely reach the Willamette Valley, which is the endpoint of the Oregon Trail. In other words, the banker background is the most efficient choice for players, as it nearly ensures reaching the end of the game.

This is not the case, however, for the farmer from Illinois, who starts off with a measly $400. Where the banker can afford food for the entire trip, the farmer must ration their food wisely and hunt for food on the trail. They must trade for supplies from other pioneers. It is likely that, at the beginning of the game at Matt's General Store, they will be undersupplied; in my playthrough before writing this section, buying an appropriate amount of food, spare wagon parts, bullets, and other goods had left me unable to purchase warm enough clothes for the journey; as a result, I lost two wagon members to disease on the way to Oregon. At the end of the trail, if the player does not ration their money and pay for safe passage on the Barlow Toll Road, they will have to take their chances and float down the Columbia River, which is deathly perilous; hitting even a single rock flings a passenger of the wagon off into the rapids, leaving them to drown. In preparing to write this section, for example, I lost no fewer than three of my travelling party to drowning after striking rocks in the final stretch of the river. By the time the player reaches the Columbia River with the farmer, however, their wagon members are doubtless sick, tired, and hungry. Since the farmer has such little money, the player is forced to make a series of potentially devastating decisions, each compounding upon the other in an endless chain back to the initial choice of playing a farmer at all. This is important: the very fact that one is a farmer is itself the perilous choice. Where the banker can mitigate risk to the point of success

being more or less assured, the farmer must carefully weigh and measure every decision. The banker has no need to rest on the way to Oregon; they buy food and warm clothes at Matt's, set the pace to grueling, and pay their way on the safest roads. The farmer must rest but cannot afford to, every day wasted only lowering their food totals. Instead, they must hunt for food, make good trades, and brave deadly wilderness. Once their money is gone, it is gone forever.

This is a finance-based anticipatory arc. Like other selectable backgrounds, the Farmer's journey is first centered on the most efficient spending of money on initial supplies for the trek to Oregon. In this way, Matt's General Store is something of a bottleneck; if a Farmer player chooses poorly when outfitting themselves for the expedition, their chances for success go down dramatically. It is entirely possible for a player to lose the game before the journey even starts; all that would remain to a player who doesn't buy enough food, for example, is to play out the slow degradation of their wagon members as they starve to death on the trail. That is to say, the player can anticipate that their money will not stretch far, and so they anticipate that the journey will be harrowingly difficult as they scrounge for food and other resources. It is also a journey that cannot end in a way other than isolated success or death. Although the player can encounter other travelers on the trail turning back and returning to Independence, the player does not have this option. The player cannot settle on another piece of land and try to make their luck in a place other than Oregon. They march on, and either die or settle in the Willamette Valley. The trail is an all-or-nothing game for the player. If the game is pedagogical, then this is part of its lesson to the player: the wise investment of resources in a zero-sum economic game is a matter of life and death. Success is eased along by greater initial capital investments, while those with less money will struggle to thrive in this brutally financialized environment. Random disaster can strike at any time, but such risks can be mitigated by proper investment strategies.

The digital Oregon Trail—that is to say, *The Oregon Trail*—is, like *Pac-Man* and *TradeWars*, an inherently financialized space. In its more overt stylings as a realistic game simulating the trek to Oregon, the game presents monetary resources as proof against future disaster, the means by which making literal investments will pay off in success. As the player plays the game over time—mostly failing but sometimes winning—they learn to be better investors. The players—who were predominantly young children at the height of the game's popularity throughout the 70s, 80s, and early 90s—are in this way indoctrinated not only within colonial narratives of American history, but within a financial system that had only recently been concretized in wider culture. On a deeper level, the level of homology that digital games operate within, *The Oregon Trail* serves as a behavioral and affective training ground for future investors, a safe space where risk management can be abstracted, naturalized, and internalized. After all, that the player would ever consider not travelling the trail is never meaningfully depicted. At the end of it is a wondrous land of promise and opportunity, the ultimate investment that pays off. Who could say no to that? Who would *want* to say no to that? It's right there, just over the horizon. Imagine what it must be like, and make your preparations; buy enough food, stock up on warm clothes and bullets, yoke your wagon, and take that first step.

3.8 Conclusion

There existed a strain of anticipatory financial discourse in digital games throughout the 80s. The ghostly, dematerialized finance of *Pac-Man*, the capitalist metagames of *TradeWars*, and the mitigation of risk in *The Oregon Trail*; each game metonymically stands in for a larger conversation that was happening as the material and financial reality of America changed over the decade. These conversations play out today, of course, and they have a history stretching

back to before these games. But what I hope to have proven here is that they entered here into the mainstream in the form of abstracted games, which broadened their audience and changed the tenor of the discussion. Finance moved from a more specialized realm of experts and into the realm of popular culture. Though official financial markets might have been walled off from everyday consumers, the logic of market capitalism lanced through entertainment and educational products.

With them, of course, came the anticipatory logics that these financial markets had come to be based on. I want to stress here: anticipation is a feeling, one that keeps a person fixated on the future results of present decisions. These games represent the mass transmission of anticipation on an individual level. If I make this move in a labyrinth, this ghost won't kill me yet; if I upgrade my ship, no one will steal my resources; if I buy enough food now, I won't have to stop and hunt for food and risk dying. This transmission of anticipation is the critical affective move that was made in the early 80s amid the wider distribution of digital technologies into the public and private spheres. To return to the inciting incident of this section, the Black Monday disaster was wrought in part by the formal embracing of digital technologies by financial firms, creating a spectacular media event. Part of the failure of that day was the failure to anticipate such a crisis occurring.

But it is time now to turn away from thinking through the dissemination of strictly financial logics. Following the emergence of advanced predictive computer models in the 80s, there arose in the 90s an energized refocus on environmental issues. In the next section, we turn then to issues of climate, and explore how anticipation of climate disaster is mediated through the literature and video games of the time.

Section 2: Climate

Climate is the second of the two prisms I am using to explore the development of anticipation as a predominant cultural feeling in late 20th century America. I begin this section on climate with a short chapter detailing the leadup to and events of the N30 protests, a clash of labor/climate activists against Seattle police in the shadow of the third ministerial conference of the World Trade Organization. Tensions had been developing throughout the 80s and 90s between the forces of global capital on the one hand and labor and climate movements on the other, as the neoliberalization of the economy heralded labor and climate policies that these activists saw as actively threatening to the future of the planet. I focus on these tensions both to show how financial anxieties brought on by the introduction of anticipatory technologies and climate concerns are intimately linked, and to demonstrate that climate anxiety is inherently situated around concerns about vast and complex interlocking systems. This means that science fiction literature and video games—both of which are centered on questions of systemic interactions—prove to be ideal media through which to observe cultural modulations in anticipated climate disasters.

Following this historical and theoretical underpinning, I will chart how anticipatory affect operates with regards to climate anxiety across six texts, spread out over two chapters and divided by medium. I start in chapter four with three science fictional literary novels: Michael Crichton's *Jurassic Park* (1990), Octavia Butler's *Parable of the Sower* (1993), and Karen Tei Yamashita's *Tropic of Orange* (1997). These works detail how science fiction of the 90s demonstrates the deep structural concerns at the root of climate anxiety, which is almost always linked to questions of labor exploitation. Given its generic reliance on depicting large-scale

systems, science fiction is ideal for attempting to understand the emergence of global, anthropogenic climate anxiety in the 90s.

These texts are forerunners to what came to be known in the new millennium as "cli-fi," a wide-ranging conglomeration of (largely science fictional) texts that detail the imagined future history of the Anthropocene. *Jurassic Park* imagines the creation and capitalization of biologically modified dinosaurs and the attempts by Palo Alto-based genetic engineering company InGen to create a contained environment for creatures that refuse to stay still. What's more, the novel details the crass exploitation and destruction of third-world workers and their natural environments by the technological elite of the west. *Parable of the Sower* picks up on these themes of careless environmental destruction, making the financialization of private life at the expense of the environment clear in its depictions of the newly-corporatized town of Olivar, a suburb of Los Angeles that is slowly sliding into the sea as the water level rises. Inhabiting this world is Lauren Olamina, a young woman who develops a new religion called "Earthseed" which teaches that change is constant in all things. Every element of life is in constant flux, and the boundaries between one thing and another are always porous. *Tropic of Orange* furthers this discussion of the breakdown of barriers between the social and the natural, showing the interconnected relations between different times, places, and peoples. It also highlights the importance of media technologies in capturing these breakdowns. Taken together, these texts speak to the transformative effects that the knowledge of global climate change had on the speculative environments of the United States. Though science fiction had long been concerned with issues of potential ecological degradation, these texts were written in a period in which global climate change was a more or less confirmed possibility.

In chapter six, I explore how the push to dominate and mold natural environments inherent to the speculative financial practices of the 90s is mirrored in computer strategy video games of the same decade. Three video games are discussed: Maxis' *SimEarth: The Living Planet* (1990), Westwood Studio's *Dune II* (1992), and MicroProse's *Civilization II* (1996). I argue that these games constellate an ecological imagination that is overdetermined by financial practices, such that players are turned into environmental managers for the purpose of extracting as much value out of these spaces as possible.

SimEarth represents one of the first ludic attempts to capture the staggering complexity of ecological systems and biological evolution in exacting scientific detail. Influenced heavily by the Gaia hypothesis—that the earth, taken collectively, represents a single massive organism—the game allows players to mold the ecological conditions of the world as they see fit. Though graphically primitive by today's standards, it remains a rare achievement in the simulation genre. *Dune II* flattens a science fictional work of vast sociological, ecological, and political depth into an ultimately simple game of resource extraction and management. Taking control of one of three political factions—Atreides, Harkonnen, or Ordos—players are tasked with harvesting the spice mélange so that they may build military infrastructure, procure military units, and annihilate their enemies. Taking after tabletop wargames like *Risk*, *Dune II* imagines a future environment that is not only politically tumultuous, but one in which the planet's ecology is so innately hostile to humans that naked force is the only reasonable way to interact with it. *Civilization II* allows for a similar level of player control as *SimEarth*, though over a nation rather than an entire planetary system. In attempting to capture a certain nation-state driven narrative of human cultural and political development, however, the game rendered the possibility of global climate collapse. If players—either human or AI—accrue enough industrial

waste, the simulated polar ice caps of the world will melt. This renders climate change as both a potential world-changing disaster and a manageable problem solved by the same instruments—namely, bureaucratic nation-states—that causes the problem in the first place. Taken together, these games chart a transition from the risk management of individuals seen in the games of the 80s to risk management on a global scale. Players were consequently trained to think in terms of systems rather than individuals, and to account for wide-ranging influences on these systems. Climate change represented an easily gamified problem through which to encourage this kind of systems-oriented thinking.

Chapter 4: N30, Climate Change, and Imagined Ecologies

The earth is finite. Its ability to absorb wastes and destructive effluent is finite. Its ability to provide for growing numbers of people is finite. And we are fast approaching many of the earth's limits. Current economic practices which damage the environment, in both developed and underdeveloped nations, cannot be continued without the risk that vital global systems will be damaged beyond repair."—World Scientists' Warning to Humanity (1992)

4.1 N30 and the Mediation of Climate Anxiety

In the leadup to the third ministerial conference of the World Trade Organization—scheduled to begin on November 30th in downtown Seattle—Seattle Mayor Paul Schell wrote a four-page letter to local business owners underlining the economic opportunities the conference would bring to the city: "In a highly competitive process, Seattle was selected by the White House over 40 other potential sites. It is estimated that approximately $11 million dollars of revenue will be generated through sales receipts during the week of the event" (Schell 00670). Mayor Schell saved his thoughts on rumored protests against the conference for the start of the letter's fourth page. One march in particular—the AFL-CIO March, scheduled for the opening day of the conference and expected to draw thousands—weighed heaviest on Schell's mind. He insisted, however, that the "AFL-CIO is committed to a peaceful march and protest," and that "Seattle has a long history of level-headed citizen expression and demonstrations" (Schell 00672-00673). Publicly, the mayor's letter evinces a sort of civic confidence, assuring his readers that the planned protests would in fact reflect well upon the city for their orderliness and economic non-disruption.

When writing to federal audiences, however, Schell sounded a distinctly less optimistic note. Letters to FEMA made Schell's anxieties clear: "As you know," he wrote the organization, "the threat situation for the conference is fluid and temperamental. While identified terrorist

threat levels have initially been considered low, the media is reporting that several anti-trade groups are mobilizing thousands of members to conduct demonstrations at several venues" (Schell, Sept. 13). Schell paints a grim portrait of the kind of violence the city thought possible through a list of requested materials to combat this anti-trade threat: "additional personnel, self-sufficient and self-contained, who could provide field treatment [for at least 5,000 casualties]"; "additional pharmaceutical caches" in the case of a WMD attack; and tools that would allow for "additional capability to detect and decontaminate all known military chemical agents" (Schell, Sept. 13). Taken together, these letters represent official attempts by the Schell administration to modulate anticipatory narratives of the conference and its opposition according to the demands of their various audiences. In public, the protestors were valued citizens performing a noble civic duty responsibly. In private, they were potential leftist terrorists.

As Mayor Schell was working through official channels of communication, internet message boards provided a haven for anti-globalization labor and environmental activists to plan large-scale resistance to the conference. Through "the use of both the Web and the discussion list, or listserv," protestors were able to communicate and organize on a level that had been unimaginable only a few years before (Eagleton-Pierce 332). Digital communications networks—the development of which fueled the boom in speculative capitalism and the advancement of neoliberal policies in the 80s—now served as a staging ground for the sharpening of activist messages and organization. The internet offered crucial space for planning anti-WTO protests as well as a massive expansion in both the scale and scope of information that could be rapidly shared with other activists. After all, "the strongest attribute of the web interface is its capability to connect information, places and organizations that are mediated by a range of social practices and institutions. In many respects, and particularly in facilitating a space for

counter-hegemonic discourses, the website enhances the [protest planners'] credibility and their argument's persuasiveness" (Eagleton-Pierce 332). The 1999 WTO protests—mass direct action known in leftist lore as "N30" which played a critical role in eventually shutting down the third ministerial conference—proved one of the first examples of large-scale public resistance organized largely online, a precursor to later anti-globalization and anti-authoritarian movements like Occupy Wall Street and the Arab Spring.

Much can be said about the particularities of the protests and the events leading up to the shutdown of the conference, but what interests me here the most is the anticipation that animated N30, particularly for protestors who took environmental degradation as their *cause célèbre*. A mass sense of certainty regarding the possibility of imagined future events marked the protests, a certainty which catalyzed action and can be traced in the literature that the protestors produced. Activist literature circulated in preparation for the protests centered threats to the environment as one of the primary critiques leveled against the WTO. For example, the "Mass Nonviolent Direct Action Packet" features responses marchers can give to either news media or bystanders who might question them on why they are protesting the WTO, including such environmentalist-tinged answers such as: "The WTO makes it impossible to enforce our own environmental, labor, and human protection laws"; "The WTO have already made it unnecessary for corporations to obey the U.S. Clean Air Act and the Endangered Species Act"; and "The WTO have ruled in favor of big business over the environment in *every single* case they've heard" ("Action Packet," emphasis original). The phrase "climate change" is curiously absent from the literature; perhaps the shared cultural language that in our contemporary moment seems so omnipresent simply was not mature enough to merit mention in documents that were intended to guide responses to local and national media. However, it is difficult to imagine how environmentalism would have been

so at the forefront of the N30 movement without the growing futural dread that surrounded fears of climate change.

It is this futural dread that I am here interested in exploring further, and my tool for doing so is science fiction. It is my argument here that science fictional texts—including works of fiction and video games—make up a particularly useful archive for analyzing the anticipatory affective experience of living within a period of anthropogenic global climate change. The narrative tendency that Patrick Jagoda so aptly identifies in science fiction—that "the space operas and global narratives that remain common within [the genre] tend to privilege the systemic nature of networks, as well as interactions between various nodes and links"—becomes a strength when attempting to describe the truly global nature of the problem and the ways in which its futural dread is both expressed and thought of (Jagoda 41). A lack of emphasis on networked reality is why so-called "literary" fiction has yet to adequately address the full oncoming scale of the climate crisis, as Amitav Ghosh would have it. If high modernist contemporary literature continues to focus on individual experiences of those living within climate networks today—rather than the mass affective experience afforded by those networks in and of themselves in both the near- and far-term future—then it will continue to miss the mark in mediating the oncoming climate crisis. As Ghosh himself notes,

> when the subject of climate change occurs, it is almost always in relation to nonfiction [including in works by authors who otherwise write fiction]; novels and short stories are very rarely to be glimpsed within this horizon. Indeed, it could even be said that fiction that deals with climate change is almost by definition not of the kind that is taken seriously: *the mere mention of the subject is*

often enough to relegate a novel or a short story to the genre of science fiction.

(Ghosh, emphasis mine)

However, it is worth noting here that, for all the cultural capital that literary fiction accrues—between polished profiles of authors in publications like *The New Yorker* and prestigious awards like the Man Booker and Pulitzer—literary fiction, as a genre, *simply does not reach as large an audience as a commercial genre like science fiction does*. It is the simplest matter of economics. With the possible exception of *Tropic of Orange*—itself a bold formalist experiment—the works discussed in the following chapters are commercial products first and foremost. Put another way, authors like Michael Crichton and Octavia Butler and development studios like Maxis, MicroProse, and Westwood were not producing texts with the goal of gaining elite commendations, but with the purpose of reaching as wide an audience as possible.

What's more, the personal focus of much literary fiction and its drive towards demonstrating what Ian Watt termed "the study of the particulars of experience by the *individual* investigator, who…is free from the body of past assumptions and traditional belief" is precisely what is holding much literature back from fully appreciating and representing the climate crisis, as it is not an individual failing of virtue that is changing the climate but rather a collective failure to beat back the tide of climate-damaging economic behaviors (Watt 12, emphasis mine). To be clear, science fiction is not the only cultural mode that can capture the vast and networked terrors of the climate crisis, and in fact, no single text or genre or indeed medium can do this, if for no other reason than that the problem is simply too vast to capture through one channel. Rather, for the purpose of understanding the anticipatory energy that has animated the cultural mediation of the climate crisis, science fiction has often been the vehicle through which this energy has been channeled.

4.2 Discovering, Perceiving, and Discussing Climate Change in 20th Century America

It is here worth pausing and considering not only how the knowledge of global climate change came to be, but how the fear it evoked (and continues to evoke) was mediated and understood in the American public sphere in the 90s. The discovery of global climate change has a long and winding history, filled with false starts and half-realized scientific truths, but researchers generally agree that it begins with the near-simultaneous discovery of the greenhouse effect by American amateur scientist Eunice Foote and British scientist John Tyndall, in 1856 and 1859 respectively.[33] The greenhouse effect, put simply, is the process by which the earth's atmosphere traps heat, thus ensuring that the earth can sustain life without getting too hot or too cold. Thanks to Foote and Tyndall's discoveries, scientists in the middle of the 19th century came to understand that carbon dioxide—the gas that was released in high quantities through the burning of coal, and thus one of the major industrial byproducts of the Industrial Revolution—was perhaps the greatest driver of climatological shifts in the world. But again, the discovery of climate change was hardly linear: "The story of the discovery of global warming looks less like a processional march than like a scattering of groups wandering around an immense landscape. Many of the scientists involved are scarcely aware of one another's existence" (Weart ix).

Much of the progress was made not by the efforts of individual scientists, but rather by the creation of a weather measuring infrastructure that allowed for the systematic comparison of a vast array of climates: "Since the middle of the nineteenth century, meteorologists have been building a global information system of enormous scope and complexity," a web of sensing

[33] This is a controversial statement in and of itself and begs questions of how one counts what qualifies as a scientific discovery. In brief: Foote's contribution to the question of how the earth stays at temperatures above freezing was the discovery that carbon dioxide and moist air captured heat, while Tyndall, with more specialized laboratory equipment, was able to tease out and measure the effects different gases had on this capturing process; both speculated that this could change the earth's climate (Jackson). In other words, Foote described the phenomenon while Tyndall described the physical processes behind the phenomenon.

equipment that spans from the strictly terrestrial—"weather stations around the planet, on land and sea"—to the more radically long-ranging—"satellites, aircraft, radiosondes, and many other instrument platforms [that] measure variables in the vertical dimension, from the surface to the atmosphere's outer edge" (Edwards 4). The data collected from this global observing system is then remediated through the global telecommunications system to be parsed as regional weather information—for example, the tracking and cataloguing of hurricanes—and global climate patterns, which are archived and compared against past climate patterns. This mass of information is used to inform national meteorological services, such as local weather reports and disaster prevention organizations (Edwards 5). The sheer amount of information involved in the process of capturing a snapshot of global climate—averaging hundreds of terabytes per year—is staggering (Edwards 6). The internationalization of production and management that accelerated in the nineteenth century—that is, of the emergence of a sort of primitive globalization—also brought with it the tools for measuring in concrete terms the full extent of the changes such internationalization brought to the global climate (Coleman, et. al 1-3). In expanding the scope of human power, so too was the cognizance of human power brought into focus.

Yet issues of global climate were absent from the earliest concerns of the American environmental movement. The movement saw its first steps towards contemporary maturation with the publication of Rachel Carson's *Silent Spring* in 1962. A former federal employee at the Fish and Wildlife Service, Carson discussed in her famous book "the problems created by the indiscriminate use of the insecticide DDT and its spread through the food chain" (Kline 77). She made clear in her work that "the chemicals being poured into the nation's waters were 'the synthetic creations of man's inventive mind, brewed in his laboratories, and having no counterparts in nature.' As a result, an enormous number of people were unknowingly

contaminated by the poisonous wastes of an unregulated industrial economy" (Kline 77). Carson's work on the widespread and unintended consequences of DDT usage bespeaks a paradigm shift in American ecological thought. Finis Dunaway, in his work on the "emotional history of American environmentalism," speaks of this change in the following terms when he describes how Carson's text, along with other elements within culture,

> helped produce ideas of environmental citizenship that placed new demands on the state to protect the citizenry from ecological harm. The materiality of environmental danger merged with the emotionality of environmental politics to popularize what I describe as an ecological lens: a way of seeing that placed human bodies and nonhuman nature in a shared, interlinked realm of escalating danger. This ecological lens—with its emphasis on the interweaving of humans and nature—differentiated modern environmentalism from wilderness preservation…Rather than calling upon the state to protect distant realms of sublime nature, the new environmentalism worried about the survival of people and the nonhuman world in ecological systems increasingly threatened by pollution, toxicity, and other threats to futurity. (Dunaway 142)

In short, the publication of *Silent Spring* marked a move away from the attempted marshalling of state power to conserve natural space for recreational use and towards a notion that the environment must be protected for the health of future life on earth. In doing so, it popularized philosophical notions of "deep ecology," which would come to define the contemporary American environmental movement. First appearing in a 1973 article by Arne Naess, deep ecology came to be broadly concerned with the idea of diversity in the natural world, namely that the diversity of the natural world led to the health of an environment. Carson's work was the first

to put this philosophical notion in popular scientific terms. Per Carson: "It took hundreds of millions of years to produce the life that now inhabits the earth, eons of time in which that developing and evolving life reached a state of adjustment and balance with its surroundings. The environment, rigorously shaping and directing the life it supported, contained elements that were hostile as well as supporting" (Carson). The idea of widespread, systemic, industrial, and above all *anthropogenic* change to natural environments emerges in a moment of transformation regarding the very nature of ecology, which proved to be far more interconnected than was previously supposed, and that much of the American environmental movement matured in an era when the anthropogenic nature of environmental degradation was taken as a given.

These shifts were only further calcified by the findings of a 1992 scientific expedition to Greenland. Two teams—one European and the other American—travelled to Greenland to take samples of ancient ice cores from relatively undisturbed glaciers. While the teams had hoped to work together, such hopes "had broken down, and each team drilled its own hole" ("Rapid Climate Change"). But "an ingenious decision transmuted competition into cooperation" (Ibid.). Each team drilled a hole into the ice far enough away from each other that "anything that showed up in both cores must represent a real climate effect, not an accident due to bedrock conditions" (Ibid.). In so doing, the teams hoped to analyze ancient air bubbles so that they could understand how the earth's climate had changed over time. What they found was shocking, and upended the timescales associated with global climate change irrevocably:

> Ice core analysis by Dansgaard's [European] group, confirmed by the Americans' parallel hole, showed rapid oscillations of temperature repeatedly at irregular intervals throughout the last glacial period…for one group of American scientists on the ice in Greenland, the 'moment of truth' struck on a single day in

> midsummer 1992 as they analyzed a cylinder of ice (dated 13,000 years old)…they saw an obvious change in the ice, visible within three snow layers, that is scarcely three years!. ("Rapid Climate Change")

Here at last was evidence that the Earth's global climate pattern could shift, not in thousands or hundreds of years, but within the span of decades or even years. The work done on ice cores in 1992 led to a sobering conclusion by Dansgaard's team: that "recent climate stability (in the Holocene epoch) may be the exception rather than the rule" (Dansgaard et. al.; Kerr).

These findings were supported using computer-aided climate models. As Paul Edwards notes, these simulations "first gained a foothold as predictive tools around 1970 during the controversy over the supersonic transport, but full acceptance did not come until they achieved a rough consensus on greenhouse warming predictions in the late 1970s" (Edwards 15). Computer models, in their abundance of information, point to the necessity of a global climate knowledge infrastructure in order for the common person to understand and imagine the global nature of climate at all. Computer models "are [climate sciences'] most important technical gateways; since the 1960s modelers have progressively linked models of the atmosphere to models of the oceans, the cryosphere, the biosphere, and human activities," the relationships of which become all the more apparent—all the more *materially recognizable*—during the late 80s and early 90s (Edwards 19). This is because "without…infrastructure,"

> knowledge can decay or even disappear. Build up a knowledge infrastructure, maintain it well, and you get stable, reliable, widely shared understanding. The concept of knowledge infrastructure resembles the venerable scientific paradigms, but it reaches well beyond that, capturing the continuity of modern science, which

> keeps on functioning as a production system even while particular theories, instruments, and models rise and fall within it. (Edwards 19)

But the buildup of climate infrastructure and knowledge, along with the threat of climate change that it revealed, would be politically useless without the anticipatory energy that computer models provide. Computer models provide a seemingly quantitative way of "seeing" and interacting with the future, which aids in imagination because of its seeming neutrality (though of course, no model is ever entirely neutral). After all, "policy makers care much less about the past than about the future. The overriding questions for them take the form of 'What will happen if…?" (Edwards 357). That is, the development and mediation of climate information made it possible for people exposed to that information to imagine the possibility of devastating climate change, to ask "what if?" questions that ended in the disruption or disappearance of human civilization.

The technocratic concerns of policymakers, however, are not enough to ignite a cultural conversation. For that, you need something far more immediate and public. It was only in the late 80s—the 1988 testimony of James Hansen, a NASA climate scientist, to be specific—that the issue of climate change came to the forefront of the environmental movement. The testimony was a dramatic turning point in the climate debate in two primary ways. First, as it was delivered in the midst of one of the worst US droughts on record, a period marked by extreme weather events such as large forest fires in Yellowstone and mass crop failures, Hansen was able to capitalize on contemporary kairotic forces to bolster his point (Edwards 391). Second, it was in his dramatic testimony that Hansen revealed that computer models demonstrated a "99 percent" chance that the drought was the direct effect of global warming. Per Hansen, "The Earth is warmer in 1988 than at any time in the history of instrumental measurements…There is only a 1

percent chance of an accidental warming of this magnitude…The greenhouse effect has been detected, and it is changing our climate now" (Hansen, qtd. in Edwards 391). The use of computer models to quantitatively measure the threat of climate change—that is, to *anticipate* it—led to an immediate reversal of climate change's public perceptions. After Hansen's testimony, and leading into the 90s, some 75% of the US indicated in surveys that they were aware of the climate change problem. So, when the environmental protestors marched against the WTO in Seattle, they had in their minds that not only could they see the visible effects of climate change around them, but that it was a mathematical certainty that the worst was yet to come.

The discovery of climate change was made possible only by shifts in technology that allowed for the comparative analysis of vast quantities of information, indeed through the same advances in computer modeling that also enabled the development of speculative capitalism, as discussed in chapter one. These computer technologies were the earliest digital examples of what Edwards calls "infrastructural globalism," which "in the context of meteorology…refers to how the building of technical systems for gathering global data helped to create global institutions and ways of thinking globally" (Edwards xviii). Compare this with Csicsery-Ronay's claim that "although [science fiction] does not generate story-structures of its own, it transforms popular cultural materials by reorienting their concerns toward its characteristic horizon: the transformation of human societies as a result of innovations attending technoscientific concepts" (Csicsery-Ronay 7). Just as satellites, weather balloons, and various other climate-sensing technologies allowed researchers to grasp the enormity of the planetary climate system, so too does SF allow for the processing of what these shifts in planetary consciousness look like and what it means for life in such a globalized society. If, as Csicsery-Ronay argues, SF stories function as "historically ambivalent and complex fables of technohistory," then it is worth

exploring just how this ambivalence and complexity is played out when confronted with an existential threat such as climate change.

4.3 Environment, Affect, and the Cultural Ecology of Science Fictional Artifacts

There are several compelling reasons to analyze culture at the cross-section of media studies, science fiction studies, and ecocriticism. Media studies, for its part, has a historical fascination with how media forms interrelate. Quoting Sergei Eisenstein's observation that "as the silent film cried out for sound, so does the sound film cry out for color," Marshall McLuhan notes that the "hybridizing or compounding" of media forms "offers an especially favorable opportunity to notice their structural components or properties" (McLuhan 53). "These media," he goes on, "depend upon us for their interplay and their evolution. The fact that they do interact and spawn new progeny has been a source of wonder over the ages" (McLuhan 53). Beyond that, much late 20th and early 21st century cultural production takes as their central objects of concern the new media forms that have come to dominate this era: large scale digital networks, screens, algorithms, and so on. In this sense, they "remediate" older media forms, "refashion[ing] their predecessors and each other in their efforts to convince us of their transparency or to confront us with a striking variety of media and meditations" (Grusin and Bolter 87). Interested as it is in the hybridization of forms, media studies allow a framework to makes sense of the printed word in relation to the larger ecological and science fictional impulses so often identified within operant within American cultural production.

Science fiction also takes as one of its primary interests the hybridization of forms. In his work on *The Seven Beauties of Science Fiction*, Istvan Csicsery-Ronay argues that consumers of the genre "expect disturbing anomalies that fulfill two requirements: (a) they appear as

immediate challenges, threats, puzzles, or wonders to human characters, and (b) they are perceived as general challenges to the conception of reality as something stable enough to be understood by human beings" (Csicsery-Ronay 188). This is often achieved in science fiction through the deployment of three figures, each of which points to the modern anxiety regarding the dissolution of so-called "natural" borders: interstitial beings, cyborgs, and aliens (Csicsery-Ronay 202). Uniting these figures is the "recognition of an embodied, physical anomaly, a being or an event whose existence or behavior cannot be explained by the currently accepted universal system of rationalization" (Csicsery-Ronay 191). Enmeshed as humans are within techoscientific neoliberal regimes of resource extraction, they have become beings "who combines elements of two ontological/cultural domains that 'should be' incompatible: the machine and the human…the cyborg can combine the powers of the human (which, from its perspective, is the apex of animal existence) and the machine (the augmentation of both reason and violence)" (Csicsery-Ronay 199). That is to say, humans in the Anthropocene are both animal and machine, wedded to the cultural logics of both the organic and the technological, a fitting construct for a constructed environment.[34]

Csicsery-Ronay is elsewhere careful to differentiate between the aesthetic weight of SF and its many "beauties" and the "mode of awareness" that it engenders. SF inculcates the human within a mode of awareness that is "a complex hesitation about the relationship between imaginary conceptions and historical reality unfolding into the future. SF orients itself within a conception of history that holds that science and technology actively participate in the creation of reality, and thus 'implant' human uncertainty into the nonhuman world" (388). In other words, SF operates as a tool to engage in anticipation, unsettling the temporal distinctions between the

[34] This observation will become particularly important when discussing *Jurassic Park* below.

present and the future, and particularly between the world as it is and the world as it will or could be. Computer models that anticipate climate futures are then expressive of how this SF imaginary has permeated popular culture.

Yet SF is not alone in this anticipatory project, either in larger culture or in literary criticism. Ecocriticism also offers useful tools for discussing the role of anticipation in imagining climate futures. This is because ecocriticism "[helps] return a much-needed sense of the indispensable role and importance of the humanities at a time when a neoliberal agenda of economic utilitarianism, along with empirical-quantitative models of science, threatens to dominate universities" (Zapf 1). The humanities also find value in ecocriticism precisely because they explore "sustainable cultural alternatives to a merely economic or technoscientific vision of globalization and of the future of humanity on the planet" (Zapf 1). Ecocriticism is in part a meditation on the critical function of imagining the struggle against neoliberalism, which so often features as part of its agenda the extraction of value from the so-called natural world. For Zapf, this leads to the necessity for a field he calls "cultural ecology," in which literature takes a role of prime importance:

> [L]iterature can itself be described as the symbolic medium of a particularly powerful form of 'cultural ecology'…Literary texts have staged and explored the manifold and complex interactivity between culture and nature in ever new scenarios, and have derived their specific potential of innovation and cultural self-renewal from the creative exploration of this boundary. What this means is that literature is not only a preferred discursive site for representing and negotiating the culture-nature-relationship but that in its aesthetic transformation of

> experience, it acts like an ecological force within the larger system of culture and of cultural discourses. (Zapf 140)

What Zapf is arguing here is that literature—and by this, Zapf means the sort of "literary" literature that Ghosh claims does not adequately capture or discuss the climate catastrophe—demonstrates an underlying ecological consciousness insofar as it very often blurs the line between culture and nature, showing how both evolve symbiotically. Literature is uniquely suited to capture the affective shifts of culture and nature because it emerges from the interplay of these forces. Literature in its manifold forms can be understood as a vast archive of affective experiences, ones that are only recently being explored and considered within the framework of ecology and affect.

As yet, however, the ability of cultural artifacts to fully capture the realities and dangers of climate change remains limited. Perhaps it is appropriate that this is the case; after all, given the interdisciplinary nature of the discovery of climate change itself, to say nothing of the sheer scale of the problem, it is doubtful that such artifacts could ever manage this. If this were simple, explaining and capturing would hardly be necessary. But I contend that it is precisely the need to fully capture aesthetic and affective currents that so defines the development of a fully realized, mature,[35] and global anticipatory affect. I say "mature" here to mean that anticipatory affect came into its own as a recognizable cultural affect in the 80s and 90s. As I have elsewhere noted, anticipation is not *new* in the late twentieth century; rather, it was the push to automate financial

[35] I use "mature" here to mean that anticipatory affect came into its own as a recognizable global phenomenon in the timeframe this dissertation discusses. As I have noted several times so far, I am not arguing that anticipation is a *new* affect in the late twentieth century and early twenty-first century; rather, I am saying that the push to automate financial markets turned anticipation into a valuable affective commodity that economic institutions sought to marshal.

markets and more accurately prognosticate future financial conditions that turned anticipation into a valuable affective commodity.

To know the directions of anticipatory energies is to understand how to direct attention and motion; more important, it is to understand the social context of the feeling. Though written in an anthropological context, Roberto Barrios's question about the social location of affect rings out: "If emotions and affect are differently experienced, then what evokes an emotion or bodily reaction for whom and why?" (Barrios 6). Affect, he goes on to note,

> has both historicity and ecology, meaning that bodies are not given in nature with a predetermined or hardwired way of sensing the world and relationships around them; instead, they emerge in relation to socially structured and meaning-laden relationships with people and things in what I call an ecology of affect. A concern with affect, then, bridges the gap between meaning and materiality and collapses a number of binary representational conventions that limit anthropological analyses of people and cultural practice: nature versus culture, subject(ivity) versus object(ivity), and static "traditional" past versus changing present. (Barrios 6-7).

Barrios makes many crucial moves here, but most important for my purposes is the notion that culture both reflects and constructs affective responses. There is no culture without nature, no nature without culture, and the affective experiences of humans caught within this mesh are multifaceted. My question becomes, then, how does the affect surrounding interconnected networks of environment and culture come to be represented in the 90s? To what extent is anticipation reflected and constructed in its cultural artifacts? For though the answers offered by the texts discussed here are necessarily incomplete—which is to say, they fail to answer the

questions sufficiently—their incompleteness is itself illuminating of the sheer scale and complexity of the questions being asked.

Chapter 5: Presenting Anticipatory Environments in 90s Science Fiction

I laid myself down into bed

To sleep away the night

A vision from inside my head

A sun with no sunlight

Death would grip humanity

A new Solar Ice Age

An Earth that no science could save

— "Dreams of Escaton" by Manilla Road

5.1 Anticipating Slow Violence

How can writers present legible portraits of ecological disasters when the events and agents that make up such disasters are spread out both temporally and spatially? To begin to answer this, Rob Nixon invokes in the first chapter of *Slow Violence and the Environmentalism of the Poor* (2011) Raymond Williams' 1983 call "for novels that attend to 'the close living substance' of the local while simultaneously tracing the 'occluded relationships'—the vast transnational economic pressures, the labor and commodity dynamics—that invisibly shape the local" (Nixon 44). The central challenge in representing these occluded relationships, as Nixon sees it, is in figuring out how to adequately communicate the unimaginably long and imperceivable time spans over which these relationships occur. The task for environmental writers, then, is "finding imaginative forms that expose the temporal dissociations" that make up ecological catastrophes (Nixon 45). The "temporal dissociation" that Nixon here describes is *slow violence*, "a violence that occurs gradually and out of sight, a violence that is typically not viewed as violence at all…neither spectacular nor instantaneous, but rather incremental and

accretive, its calamitous repercussions playing out across a range of temporal scales" (Nixon 2). Slow violence is largely invisible, a violence which cannot be seen in isolated moments but rather in the panorama of many times, places, and agents both human and nonhuman. Nixon draws our attention to the experience of environmental violence as one of a slowly-rolling disaster, leading—perhaps paradoxically—to ever-quickening death tolls as moments of slow violence compound upon each other. This is doubly so for communities already made vulnerable by the ravages of neoliberalization: communities of color, the poor, those with disabilities both physical and cognitive, and more.

The long time-span of slow violence itself often conceals the root cause of catastrophe. In terming the violence of environmental degradation "slow," Nixon seeks to "keep front and center the representational challenges and imaginative dilemmas posed not just by imperceptible violence but by imperceptible change whereby violence is decoupled from its original causes by the workings of time" (Nixon 11). For Nixon, to say that time is *slow* is not merely to measure the temporal distance between a single event and its observers, but rather, a means of describing the affective relationship between that moment and those who experience its slowly unfolding consequences. This slow experience, wherein "violence is decoupled from its original causes by the workings of time," is further complicated by the advent and adoption of high-speed digital technologies. The tendency of digital media to "infowhelm" and distract users makes it difficult to perceive the long, slow implications of ecological violence over time (Nixon 12-13). There is a necessary binary at work in Nixon's formulation of environmental violence: as digital technology gets faster, and the more facets of daily living are plugged into digital networks, the harder it becomes for people (particularly in the geopolitical West and Asia, awash as they are in networked media) to ascertain the long workings of slow violence.

Further hindering the perceptibility of slow violence is a "representational bias" that Nixon describes at length. Namely, there is a profound disconnect between how violence is spatially and temporally framed and the actual violent toll a supposedly singular "event" can incur. By way of example, Nixon contrasts the culturally closed 12-year timeframe of the Vietnam War and its official 1.5 million death toll with the much more widespread—and far less spatially and temporally traceable—violence of the war's aftershocks. Agent Orange, for instance, continues to deform and kill long after the official end of the war in 1975. This inability to perceive slow violence is not, Nixon insists, a natural state of humans but a symptom of a culture that perceives time as a series of disruptive and significant moments rather than a connected whole that must be understood in its entirety. In particular, Nixon identifies the terrorist attacks of 9/11 as a crucial historical turning point in which the question of how to represent slow, environmental degradation suffered a near-mortal blow. 9/11 "reinforced a spectacular, immediately sensational, and instantly hyper-visible image of what constitutes a violent threat," an image so psychologically all-consuming and traumatizing that it "[set] back by years attempts to rally public sentiment against climate change, a threat that is incremental, exponential, and far less sensationally visible" (Nixon 13). I am interested here most in what those "attempts to rally public sentiment against climate change" actually looked like in this pre-9/11 moment. Discourse surrounding what counts as violence has a material history which can be traced and affects that can be grasped through cultural production. The attempts to rally public consciousness against climate change which Nixon describes should then be detectable in 90s science fiction texts. Indeed, it is, as the three texts discussed in this chapter plainly show.

Central to this representational project is the work of writer-activists. "To engage slow violence," he writes, "is to confront layered predicaments of apprehension: to apprehend—to

arrest, or at least mitigate—often imperceptible threats requires rendering them apprehensible to the senses through the work of scientific and imaginative testimony" (Nixon 14). It is in the work of apprehension that writer-activists are most useful. Nixon is clear on this point: "Writer-activists can help us apprehend threats imaginatively that remain imperceptible to the senses, either because they are geographically remote, too vast or too minute in scale, or are played out across a time span that exceeds the instance of observation or even the physiological life of the human observer" (Nixon 15). Writing can "help make the unapparent appear, making it accessible and tangible by humanizing drawn-out threats inaccessible to the immediate senses," as well as "challenge perceptual habits that downplay the damage slow violence inflicts and bring into imaginative focus apprehensions that elude sensory corroboration" (Nixon 15). This is a rhetorically effective strategy because imaginative writing neatly sidesteps the problem of time and distance by making slow ecological violence tangible, perceptible, and coherent. In short, imaginative writing can turn a potentially abstract concept into an actionable and accessible idea.

Absent from Nixon's analysis, however, are two key concepts which I wish to foreground here. The first is any consideration of science fiction's place in the work of writer-activists. In one sense this is understandable. Though Nixon does not address science fiction in particular or speculation in general, one can easily imagine that, in his focus on "real" or "actual" moments of ecological violence, such overtly fictive writings necessarily fall by the wayside. However, speculation can be an engaging front in the battle against climate change. In a review of *The Future We Choose: Surviving the Climate Crisis*, Nixon himself notes that speculative nonfiction "[wagers] that making room for the long view might help shift public policy and private behavior. It is to wager that, as we degrade the equable conditions that have sustained humanity and Earth's life systems, we can marshal scientifically responsible, emotionally arresting stories

to help bend the curve of probability" (Nixon). I argue that the stakes Nixon identifies in the production of speculative nonfiction are the same in science fiction that deals with climate concerns, if for no other reason than that, if the riddle of representational challenges and imaginative dilemmas in the presentation of climate change to a seemingly digitally stupefied public is to be solved, then all the tools available to writer-activists across mediums and genres must be marshalled. Science fiction permits the representation of future climate disasters that are otherwise imperceptible by humans, allowing for affective and imaginative engagement with otherwise cold and sterile climate models. There is no account of climate change, whether fiction or non-fiction, speculative or realist, that is not being produced in a stretched temporal moment of ever-escalating seriousness. There is no lever in the struggle against climate change which, being potentially useful to pull, should not be pulled.

The second is the role that anticipation plays in the perpetration of slow violence. The temporality of slow violence is long and grinding, playing out on exaggerated time scales such that it becomes intergenerational in nature. The temporality of anticipation, on the other hand, is one of suspension. To anticipate is to be trapped between the known past and the contingent future. Anticipating something is affective labor, an attempt to understand, rationalize, and prevent something that you might fear is coming but that you can do nothing to prevent. When a person anticipates something, they feel themselves moving through time towards a future that can feel, in a sense, predetermined. Indeed, as anticipation is itself a physical feeling—an affect that modulates the human body, a sensation with a political and cultural life all its own—the anticipation of environmental harm is as much a part of the slow violence perpetrated upon vulnerable communities as the generational dumping of toxic waste and the use of chemical weapons. These temporalities—the long temporality of slow violence and the suspended

temporality of anticipation—are not mutually exclusive, but often complementary. The temporality of anticipation can intensify the effects of slow violence, rendering those most at risk of slow ecological violence, like Hofstadter's American paranoiac, a double sufferer: first of ecological violence, and then of the anticipation of further violence committed upon them and their communities.

The critical framing of slow violence, however, necessitates a grounding of the works I analyze in a specific location. After all, like the writer-activist Nixon champions, my goal here is—at least in part—to reveal the operation of slow violence in specific moments and histories, as well as to reveal how the temporality of anticipation doubles the affective strain of those who suffer in slow violence. I have chosen to analyze works that feature California, in particular (though not limited to) Los Angeles and its various environs. Generally speaking, California is a useful location for centering discussions of anticipation because of the development in the latter 20th century of what Richard Barbrook and Andy Cameron term the "Californian Ideology," a series of vague business-friendly precepts that blend the economic principles of high-tech neoliberal capitalism with the social-libertarian values of American leftist counterculture. This loosely defined ideology was derived from a "loose alliance of writers, hackers, capitalists and artists from the West Coast of the USA," from which was derived the Western response to the development of digital, networked technology. California is a useful prism for this project because it figures as a central speculative site of anticipatory environmental affect.

The works I analyze in this chapter bring to the forefront both science fiction and anticipation in works that center environmental concerns. They are concentrated on the long, temporal scales of environmental violence perpetrated against vulnerable communities, a key difference in how anticipatory affect is structured in environmental as opposed to financial

speculation. Where certain strains of science fiction in the 80s centered on questions of technology and its influence on the valuation of the human, the science fiction of the 90s that I discuss here—*Jurassic Park*, *Parable of the Sower*, and *Tropic of Orange*—is centered on how the human is enmeshed within histories of ecological violence.

5.2 "Everybody knows its coming, but not so soon": Anticipatory Environments in Michael Crichton's Jurassic Park

Michael Crichton's *Jurassic Park* recounts, through various viewpoint characters, the planning, construction, and catastrophic soft opening of the titular wild animal preserve off the coast of Costa Rica. The animals are dinosaurs, cloned from the genetic material left over in ground-up dinosaur bones and mosquitoes preserved in amber. Six visitors—Drs. Allan Grant and Ellie Sattler, a paleontologist and paleobotanist respectively conducting field work in Montana; Dr. Ian Malcolm, a mathematics professor specializing in chaos theory from the University of Texas-Austin; Donald Gennaro, a lawyer with the San Francisco firm Cowan, Swain, and Ross who represents the parks investors; and the grandchildren of the parks founder, Tim and Lex—are invited by International Genetic Technologies, Inc. (InGen) CEO John for a weekend at the park. Given reports of several deadly incidents both at the park and on the mainland, the goal of the visit is to settle the park's Japanese investors' nerves so that InGen can meet their goal of opening the park to the public within the year. However, Dennis Nedry, the park's computer specialist who is secretly on the payroll of InGen's competitor BioSyn, shuts down the park's power so that he can steal frozen embryos for his employer. Before he can abscond with the embryos and turn the power back on, Nedry is killed by a dinosaur, setting off a cascading chain reaction which sees many of the park's workers die, along with Malcom and

Hammond, when the dinosaurs are freed from their electrified pens. The novel ends in the eventual razing of the island and its dinosaur inhabitants by the Costa Rican government.

Except for the ending, this is largely the plot of the 1993 Spielberg-directed film adaptation as well, a version that looms far larger in public memory than the book ever did. Unlike the novel, the film spends nearly all of its time in the park itself, leaving much of the planning and prep work and setup of the guests coming to the park either unstated, glanced over quickly, or changed entirely.[36] Like many late-century science fiction novels, however, the book is concerned with the larger systems of technological and capital development that underline and allow for the action of the book. The novel begins with an introduction to the dangers of the commercialization of genetic engineering: "Biotechnology," the novel intones, "promises the greatest revolution in human history. By the end of [the 90s], it will have outdistanced atomic power and computers in its effect on our everyday lives…But the biotechnology differs in three important respects from past scientific transformations" (Crichton ix). Compared to these previous revolutions, the genetic engineering revolution differs primarily in terms of scale, purpose, and oversight. To wit: genetic engineering is "broad-based," the effort of thousands of labs and over 500 corporations; it is "thoughtless or frivolous," insofar as it is centered on aesthetic and human-centered pursuits like making fish paler for better visibility while fishing; and it is "uncontrolled," overseen by neither comprehensive government policy nor clear ethical guidelines (Crichton ix). Genetic engineering is portrayed from the earliest pages of the novel as an unchecked and ultimately trivial commercial pursuit by corporations who wield genetic power, to quote the films version of Ian Malcolm, "like a kid who found his dad's gun" (Spielberg).

[36] Gennaro, in particular, suffers in the adaptation, turning from a more-or-less likable family man trying to do his job to, in the words of Richard Attenborough's decidedly friendlier John Hammond, a "blood-sucking lawyer."

Also like many science fiction novels, *Jurassic Park* is intensely skeptical of the injection of capital into the scientific process. Though much has been said by critics regarding the scientific skepticism of Crichton's novel—that is, about the reflexively critical view that Crichton seems to hold regarding the pursuit of scientific discovery in the field of genetics—it is more accurate to say that Crichton is skeptical of the commercial, profit-driven motives of commercial science. As the introduction notes,

> It was confidently expected that [Watson and Crick's discovery of the structure of DNA] would be selflessly extended to the greater benefit of mankind. Yet that did not happen. Thirty years later, nearly all of Watson and Crick's scientific colleagues were engaged in another sort of enterprise entirely. Research in molecular genetics had become a vast, multibillion-dollar commercial undertaking… (Crichton x)

This critique of the commercial elements of genetic research is further rooted in history. Istvan Csisery-Ronay notes that science fiction can be an imaginative, though "credible," projection of real history, and such is the case with *Jurassic Park*. Crichton traces the origins of the commercialization of genetic research to April 1976, "the date of a now famous meeting, in which Robert Swanson, a Venture capitalist, approached Herbert Boyer, a biochemist at the University of California…Their new company, Genentech, quickly became the largest and most successful of the genetic engineering start-ups" (Crichton x). In keeping with science fictional tradition, Crichton is projecting an already known recent history of the commercialization of genetic engineering to its most extreme speculative outcome. The dinosaurs of Jurassic Park are carelessly made, trivial entertainment products literally devouring their consumers. As an unsubtle critique of the dangers of unchecked capitalist speculation, *Jurassic Park* stands tall in

the commercial sphere of the 90s. The true end of history, the novel seems to argue, is found not in the end of ideological struggle between capitalism and communism and the advent of neoliberalism, but in the single-minded and ultimately destructive pursuit of profit in all sectors of life. In this sense, it shares many of the economic concerns of the various fictional texts explored in Chapter 2. It is certainly as critical of neoliberalism as any of those texts.

In particular, the novel is critical of the Californian Ideology. Though the development of genetic technology is not, in itself, part of the push towards techo-neoliberalism that Barbrook and Cameron describe in their essay, InGen arises in the novel out of the same paradoxically countercultural yet neoliberal environment that saw the birth of such tech giants like Apple, Microsoft, Atari, Oracle, and Hewlett-Packard. Like these companies, InGen—based as it is in Palo Alto—sprung up around the Stanford University campus, animated in the text by the same kind of techo-futurism that animated the real-world ascendency of the Californian Ideology. The character of Hammond is nothing so much as a collage of intrepid Silicon Valley characters, a charlatan with a willingness to move fast and break things, but heedless of the consequences, a "flamboyant…born showman" (Crichton 60). Consider, for instance, Hammond's chosen method of demonstrating the power and potential of genetic technology to his potential investors: "In 1983 he had had an elephant that he carried around with him in a little cage. The elephant was nine inches high and a foot long, and perfectly formed, except his tusks were stunted…Hammond would give his usual speech about the prospects for developing what he called 'consumer biologicals.' Then, at the dramatic moment, Hammond would whip away the blanket to reveal the elephant. And he would ask for money" (Crichton 60). Created by Norman Atherton—a Stanford geneticist who worked with Hammond—Hammond always fails to mention that the elephant is not the product of genetic engineering but of simple genetic

mutation; that it is prone to extreme sickness and infections; and that it has the mean temperament of a caged rat rather than an elephant. Such chicanery for the purpose of investor hype is the stuff of Silicon Valley legend. Consider here the faked computer speech during Steve Jobs' initial presentation of the Apple II, or in a more contemporary moment, the faked positive blood tests of Elizabeth Holmes' Theranos. Hammond is selling a vision of consumer biologicals that he cannot hope to achieve, as clear an indictment of the Californian Ideology's tendency toward glorifying "resourceful entrepreneur who are the only people cool and courageous enough to take risks" as any fictive text in the 90s (Barbrook and Cameron).

This techno-parable interpretation of *Jurassic Park* is its most well-known, a reading reinforced by the overwhelming popularity of the movie which foregrounds it. I argue, however, that the more interesting reading—the reading most illustrative of the novel's engagement with anticipation—arises from its treatment of rapid, anthropogenic environmental changes. More than demonstrating a mastery of genetic engineering, Ingen's creation of cloned dinosaurs represents a mastery of time. By bending something so ancient into the modern world, the Jurassic Park scientists disrupt and even break linear time. This mastery over time is something that is anticipated. As noted, the eventual (though careless and commercialized) widespread application of revolutionary genetic engineering to situations both rare and common is presented as just that in the introduction: *eventual*. It is accepted as a point of fact that scientists will pursue such technology *in extremis*, even to the point of catastrophic environmental failure through the reintroduction of extinct species competing for survival against humans. The novel operates as a generator of anticipatory affect along primarily environmental lines, both capturing a certain dread of future technological developments while also rendering the development of such technologies seemingly inevitable.

I use the more general term "environmental" rather than the more specific term "climate change" here for two reasons. The first and most simple reason is that the novel itself does not concern itself with issues of climate change *per se*. Insofar as climate is discussed in the novel, it is in regard to the attempts of the Jurassic Park scientists to create a sealed-off facsimile of the Mesozoic world using ancient plants and creatures, which of course proves impossible. Much of the novel's discussion of the environment is found primarily in its depicted struggle of an artificial environment to not succumb to the natural environment. The second and more problematic reason is that Michael Crichton was a climate change denier. As the 90s and early 00s progresses and climate scientists became more certain that recent changes in climate were not only anthropogenic but certain to get more severe unless "lawmakers…pass new regulations that govern carbon dioxide emissions," Crichton in turn became more convinced that "the science is mixed at best, and that lawmakers should take that into consideration when they decide what they might do about it" (Janofsky). This skepticism climaxed in the publication of his 2004 novel *State of Fear*, which was laced with misleading claims and downright erroneous graphs and charts that cast doubt on the scientific consensus on the reality of anthropogenic climate change.

Given Crichton's extreme distrust of large corporations and concerns regarding ecological exploitation, as exemplified in *Jurassic Park*, this climate change skepticism seems remarkable. Certainly, that was the case for me when I learned of it, and for someone who was seemingly so careful about following the science closely in his fiction, it is disappointing to realize that he failed to grasp both the reality and the threat of anthropogenic climate change. Such denialism does not rear its head in the text of *Jurassic Park*, but one cannot but help to see how the underlying assumptions in Crichton's writing might have informed his later turn towards

climate change skepticism. For example, is Crichton's reflexive skepticism regarding the potential uses of genetic technology the same skepticism that drove his climate denialism? Does his distrust of science as an institutional practice mean that he is inherently skeptical of all scientific conclusions? Did he see the push to control the environment as part and parcel of the environmentalist cause? After all, he noted in a speech to the Commonwealth Club of California that "one of the most powerful religions in the Western World is environmentalism" insofar as it represented the irrational abandoning of hard climate science for the comforting narratives of Armageddon and salvation. In his own words, he despised the politicization of science, perhaps not seeing how ongoing anthropogenic environmental shifts themselves are inherently political events. The political and social dimensions of environmental degradation certainly did not escape his imagination in his fiction, as *Jurassic Park* itself shows.

Despite the contentious history of its author, however, *Jurassic Park* remains an intriguing point of entry for thinking through how the concept of rapid environmental shifts—particularly shifts wrought by extreme human technology—was mediated to a pre-9/11 mass audience. Though it does not discuss climate change in detail, it still allows for—and again, *anticipates*—the reality of rapid, anthropogenic shifts in environment. This is a vision of human technological capability that would only become more pronounced as the 90s went on. Beyond that, there are few answers to Nixon's riddle of how to represent environmental catastrophe more memorable (or, as it turned out, more profitable) than the image of genetically-engineered Mesozoic monsters hunting and feasting on park guests. There is, after all, a certain sense of environmental justice in seeing an abused nature turn around and attack its violators. But from its earliest pages, *Jurassic Park* troubles such notions of eco-vengeance by asking who gets hurt first when the environment suddenly and purposefully changes.

5.3 (Simulated) Anticipatory Environments, or, How and Where and Why do You Make Dinosaurs?

Before it gets to the park, the novel spends many of its early chapters detailing the impact that the introduction of immensely ancient animals has on native Costa Ricans. The prologue opens in Bahía Anasco, a fictional fishing village on the Pacific coast of Costa Rica. A helicopter from Isla Nublar, where InGen is building Jurassic Park, lands at the local clinic with an injured worker. The doctor who works at the clinic, Roberta Carter, notes of the park's construction that she "could imagine it—one of those huge American resorts with swimming pools and tennis courts, where guests could play and drink their daiquiris, without having any contact with the real life of the country" (Crichton 4). But the seeming impermeability of an American-style resort is destroyed by the introduction of dinosaurs to the Costa Rican environment. InGen, it turns out, has been hiring locals to assist in the building of the park, and one of those dinosaurs—a velociraptor—has mauled a young worker "no older than eighteen": "A big tearing laceration ran from his shoulder down his torso. At the edge of the wound, the flesh was shredded. At the center, the shoulder was dislocated, pale bones exposed. A second slash cut through the heavy muscles of the thigh, deep enough to reveal the pulse of the femoral artery below. Her first impression was that his leg had been ripped open" (Crichton 4-5). Carried in by "two black crewmen" taking orders from a white executive named Ed Regis, Dr. Carter can only watch as the young man "explosively vomit[s] blood" and dies on the table (Crichton 7). InGen brought the life of the country to the park, and the park is now spilling out into the country. There is no barrier between the two.

As an introduction to the actual narrative of the novel, it is interesting that Crichton chooses to frame the narrative first in terms of the dangerous and exploitive labor that goes into the creation of Jurassic Park rather than the spectacle of the dinosaurs themselves. From context

clues, it is obvious that this young man is not well-compensated for his extremely risky labor, and as we shall see throughout this chapter, the labor of and violence perpetrated against black and brown workers—consider here the two black crewmen who are forced to carry the mauled young man into the clinic—is essential to the operation of neoliberal projects. Yet a reader also gets the sense throughout the novel that workers like this mauled young man are meant to become invisible. The exploitation of third-world labor is critical to InGen's faux-historical project, a trait shared by all attempts at creating easily-consumed safari zones. Per Nixon,

> In the temporal enclaves of [tourist spaces such as] the island refuge ringed by ocean and in the game reserve ringed by electrified fences, the tourist is guaranteed full immersion in the eco-archaic, which is not to be confused with the historical. To enter this refuge is to enter a charmed space that is segregated, among other things, from the history of its own segregation. (Nixon 184)

The mauled corpse of a young, brown, exploited worker—an artifact of the brutal neocolonial project that InGen has embarked upon in exporting their genetic projects to the third world—is antithetical to the fantasy of undisturbed dinosaurs that InGen is selling its customers. Yet running parallel to the charmed space of Jurassic Park itself is the unspoiled environment of Costa Rica. In choosing the island of Isla Nublar as the setting for their park, InGen depends upon the otherness and ecological richness of Costa Rica to stand in for the "eco-archaic," even as they radically destabilize the temporal dimension of the country, and of modernity itself.

Indeed, the image of black and brown workers and the labor and temporal violence committed against them at Jurassic Park is a recurrent theme throughout the early parts of the novel. A continual point of contention between Hammond and his multinational investors is that there are scattered reports throughout the Costa Rican coast of small, unidentified lizards biting

children. These "lizards," of course, are dinosaurs, in particular a herd of *Compsognathus*—a small dinosaur about a foot tall—that has escaped to the mainland and is moving further into the nation's interior. A Costa Rican doctor named Marty Gutierrez, who is investigating this spate of lizard attacks, notes how a local medical officer confirms a story of "a nine-day-old infant, sleeping in its crib, had been bitten on the foot by an animal the grandmother—the only person actually to see it—claimed was a lizard" (Crichton 21). These attacks—there are at least two other confirmed incidents that Gutierrez discovers, each involving children and infants—are likely undercounted. A brief aside in one chapter details an attack by the *Compsognathus* on another child who dies, with the death reported as an incidence of sudden infant death syndrome. What is important to note here is that these accounts of bizarre biting attacks—which are noted in the novel as events that never happen with other native lizard species such as basilisks—are never followed up by either larger international scientific organizations or by InGen itself. As they are centered on native Costa Rican populations, they are discounted. For Jurassic Park and its many failings to last in secret as long as it does necessitate that these large, Western institutions ignore the violence perpetrated on these communities.

It is, in fact, as if these communities are not only discounted in the flows of global capital, but that they are displaced from their temporal firmament and made into what anthropologist Thayer Scudder terms "developmental refugees" (Scudder, qtd. in Nixon 152). Though the term was originally used in the context of those displaced by the creation of megastructures like large dams, it can also be helpfully applied to the native Costa Ricans who find their way of life impinged upon by escaped dinosaurs. True, these people are not being forcibly moved by the creation of Jurassic Park, isolated as it is on an island off the coast of the mainland. However, the introduction of dinosaurs has made them temporally displaced. Like

Scuddy's developmental refugees, the Costa Rican's are a "poignantly paradoxical figure" because, while "development" might imply a sense of growth towards a better and more equitable future, "refugee implies flight from a grave threat" (Nixon 152). The twist in *Jurassic Park* is that this grave threat is not a static piece of infrastructure whose creation demands the displacement of peoples, but a temporal disruption that moves through the communities themselves. The imposition of the past into the present renders a future environment that cannot be escaped, and indeed, the novel ends with the observation by Dr. Gutierrez to Grant that there have been reports of small, biting creatures retreating into the Costa Rican interior.

It is worth noting exactly what kind of victim does get attention from these institutions. Tina Bowman, a young, white, American girl on holiday with her parents in Costa Rica, is attacked by the *Compsagnathus* on a beach in a national park and nearly dies. Thus begins a lengthy description over many chapters of how the information and raw data surrounding this attack eventually finds its way to Drs. Allan Grant and Ellie Sattler. Crichton descends to painstaking levels of detail to recount this. In short: Gutierrez, though he initially diagnoses the bites Tina suffers as being from a basilisk, has doubts when he looks through various digital medical databases and finds no reference to any basilisk bite. After finding the corpse of a *Compsagnathus* killed by a monkey, he sends the corpse to the lab of Edward H. Simpson, a zoologist at Columbia University. Though Simpson is not in, the lab seems to confirm the initial suspicion that Tina was attacked by a basilisk, but later tests on the saliva present on Tina's bites confirm high degrees of proteins that are not present in basilisks. The skeletal structure of the corpse is eventually, months after the fact, confirmed by Grant and Sattler as belonging to a dinosaur rather than a lizard, as initially suspected. I list these steps to illustrate two points: first, that this level of scientific inquiry is initiated only on behalf of a white victim of InGen's

negligence while the spate of Costa Rican victims is ignored and covered up, and second, that the successful identification of Tina's attacker is achieved only through the cooperation of a vast network of elite scientific institutions and actors.

I will interrogate the first of these points here and save the second for later. Nixon explores in *Slow Violence* again and again the racial and temporal politics inherent in game reserve tourism. He particularly focuses his critical attention on South Africa and its complex system of private game reserves. South African reserves operate as spaces wherein "the segregations of humans from nonhumans have long been implicated in the violent segregations of humans from humans. South Africa's traumatic history of colonial conquest, land theft, racial partition, and racist conservation places particular pressure" on activists and politicians who would attempt to challenge and redefine such cultural histories of nature (Nixon 175). Such is the case as well for Costa Rica, a nation which has its own "traumatic history" rooted in colonialism, racial segregation, and racist conservation practices. Crichton is careful to imbricate his imagined Jurassic Park within the very real history of a postcolonial nation trapped in what Nixon calls "racialized ecologies of looking in relation to environmental amnesia" (Nixon 176). This formulation is made up of two binaries: seeing/not seeing and remembering/forgetting. In the novel's case the creation of Jurassic Park relies on national, international, and scientific authorities *seeing* the glamorous promise of cloning living dinosaurs while *not seeing* the bloody cost of their genetic extraction, *remembering* the promise of untold capitalist accumulation when the park opens while *forgetting* the deadly compromises and shortcuts they took to achieve these riches. The children and infants the dinosaurs attack on the Costa Rican mainland are, for these authorities, neither seen nor remembered. It is Tina Bowman who is seen, remembered, and eventually avenged by the Costa Rican state at the end of the novel.

I wish to push further this point that Jurassic Park is historically situated within colonialism. In his work *Colonialism and the Emergence of Science Fiction*, John Rieder notes that the concretization of science fiction into a recognizable constellation of genre features—think here of such features like aliens, a future setting, new and bizarre technology, and so on—is inextricably linked with "the realignment of local identities that accompanied the restructuring of the world economy" during the height of European colonialism:

> As local economies ravaged by the new extractive industries (oil, rubber, tin, copper, precious metals) and regional specialization of agriculture (cotton, sugar, pineapple) became "underdeveloped" and dependent, so too the cultures that the traditional economies had supported often were thrown into shock and disarray. What the dominant ideology recognized as the relation between civilization and savagery, and between modernity and its past, can be read at least in part as a misrecognition of the corrosive effects of capitalist social relations on the traditional cultures of colonized populations and territories. (Rieder 26)

This misrecognition that Rieder identifies is how, in part, non-Western, colonized lands and peoples come to be associated with a distant past while European technologies and cultures come to be associated with the present (and, as science fiction developed into a recognizable genre, with the future). Colonized spaces are areas where it is easy to anticipate a speculative future because the rich, complicated, and above all *present* reality of the land and its people are so easily unseen and forgotten. This is why, when InGen leases an island from the Costa Rican government to create Jurassic Park, it is so easy for them to imagine the ultimate speculative product that it will host. It is easier for InGen to imagine the peaceful, frictionless presence of

genetically engineered dinosaurs in a nation rife with bloody colonial legacy than it is for them to imagine how such a temporally-flattening scheme might go awry.

Despite all this, however, the actual work of condemning the creation of Jurassic Park is by and large not left to native Costa Ricans. Though the novel centers the violence perpetrated against Costa Ricans in the early part of the novel, actual Costa Rican reactions to the park itself are rare. It is only at the end of the novel that it becomes clear that the Costa Rican government intends to destroy the park and all its dinosaurs with napalm. Instead, the novel spends much of its time centering elite discourse around both the extreme difficulties inherent in getting the park up and running and the inevitable failure of the park. That is to say, the novel is primarily focused on how individuals in academic, legal, and business circles see and understand how the park is always already a failure, whether for reasons of ontological impossibility of the park staying a closed-off environment or for more mundane legal and financial purposes. In what follows, I will focus on the academic critiques of the park, and how this aligns with a keen understanding of both the impossibility of anticipating future events and the sense that future disaster is inevitable.

The most consistent critic of the park is Ian Malcolm, the chaotician who works at University of Texas-Austin. Far from the sexy, debonair nerd that the movie presents Malcolm as, the Malcolm of Crichton's novel is an aggressive and crass womanizer. The first thing he says to Sattler is "you're extremely pretty, Dr. Sattler. I could look at your legs all day" (Crichton 72). Malcolm's bravado is more consistently applied, however, to his grand proclamations that the park is destined to fail. Malcolm's introduction lays out his theories for why the park will fail more or less clearly, which has all to do with chaos theory, or "to be more precise, because of the behavior of the system in phase space" (73). Classical physics, he explains, are exceptionally

good at describing the regular movement of large objects, but terrible at solving "anything to do with turbulence," which is what chaos theory is meant to solve. To introduce the theory, Malcolm starts by making a historical connection to attempts to measure and predict weather using computer models: "Chaos theory originally grew out of attempts to make computer models of weather in the 1960s…But what the early researchers learned from computer models was that, even if you could understand it, you still couldn't predict it. Weather prediction is absolutely impossible. The reason is that the behavior of the system is sensitively dependent on initial conditions" (74).[37] Despite the differences that emerge over time in complex systems with similar initial conditions, however, these complex systems "have an underlying order" that can be used to predict the future. The trick, however, is that "it turns out you can't predict more than a few seconds into the future" because of random developments that emerge in even the simplest system. This is why Jurassic Park will fail: not because its creators haven't tried to disaster-proof it, but because the unpredictability inherent in such a large and complex system makes it impossible to predict the problems it will develop. Malcolm is essentially walking a rhetorical tight-rope between declaring the impossibility of anticipating the problems the park will face and declaring with certainty that he anticipates the park will fail. In this sense the novel's primary theoretical challenge to Jurassic Park—and, as an extension, to the commercial enterprise of genetic engineering writ large—is rooted firmly in an anticipatory sense that the center cannot hold, that such extreme genetic experiments, when contacting the systems put in place to control them, cannot possibly do anything other than break these systems.

This is a view also held—though expressed in different terms—by Henry Wu, Jurassic Park's chief geneticist. In a conversation with Hammond before the park's electricity is shut

[37] This failure to understand the purpose of computer modelling of weather and how it might contribute to a scientific consensus is also a place where one might sense the early seeds of Crichton's climate change skepticism.

down by the villainous Nedry, Wu notes of the park's dinosaurs that the primary problem with them is that "they're real dinosaurs"; that is, they seek to mimic, as best Wu can manage, the real biological qualities that dinosaurs had in life (Crichton 121). Framing this initially as an aesthetic concern, Wu insists that because the dinosaurs are "real…in certain ways they are unsatisfactory, unconvincing. I could make them better" (Crichton 121). The problem, he insists, is one primarily of speed: "they move too fast. People aren't accustomed to seeing large animals that are so quick. I'm afraid visitors will think the dinosaurs look speeded up, like film running too fast" (Crichton 121). Ultimately, however, the aesthetic framing that Wu uses to try and convince Hammond to liquidate the current stock of animals is dropped in favor of his real, and far more terrifying concern: "We've got a whole array of [containment and elimination] devices now and they're all too slow" to adequately defend workers and visitors against potential dinosaur attacks (Crichton 123). In essence, the dinosaurs move too fast to anticipate, slipping into the troubled present from the distant past and running headlong into an uncontrollable future. Born of the neoliberal pursuit of capital in a postcolonial context of extreme exploitation, the dinosaurs are a profound break in the anticipatory order; like chaotic weather, they spiral ever further from any knowable path. Elite discourse, whether academic or otherwise, is situated in anticipation. InGen and their investors anticipate the windfall of profits that creating and merchandising dinosaurs will allow for; the legal representation that InGen has hired anticipates that the park will be liable for any disaster that might ultimately befall patrons and workers; and the academics that create and inform the park are convinced of its inevitable failure, sketching out anticipatory scenarios that are ultimately proven correct.

What we find in Jurassic Park is an account of an environment of anticipation, from the highest echelons of InGen to the lowest rungs of the park's labor force. This failure, as we have

seen, is deadly. It represents a gross mismanagement: of science, of capital, and ultimately, of life. This is Crichton's answer to the riddle of how to represent rapid, anthropogenic environmental shifts. All one has to do is merely show how anticipatory assumptions about how something will develop are inherently flawed. It pays to turn our attention to a novel that sees the liberatory potential of anticipation, a novel that is interested in exploring the social and political dimensions of speculation as an act of ecstatic creation.

5.4 A State-Sponsored Donner Party: Octavia Butler's Parable of the Sower and the Dying Earth

Octavia Butler's *Parable of the Sower* details through collected journal entries the early life of Lauren Olamina, a black woman who, in 2020s California founds a new religion called Earthseed and its first community, Acorn. The United States of America which Lauren grows up in is conservative and neoliberal, slowly and violently crumbling as resources become scarcer and climate events more extreme. Her father, a pastor, attempts to instill a sense of Christian ethics in his children, but the slowly worsening social and environmental problems Lauren witnesses eventually leads her to question and ultimately reject such trite conservative religion. What's more, because her mother abused a futuristic drug in her pregnancy, Lauren can feel the pain of others merely through observation. If someone in her presence is shot or breaks a bone, for example, Lauren will share their pain. She has an affective connection to the dying, broken world into which she is born. Eventually, she and her followers make their way to northern California, where she founds Acorn.

Broadly speaking, Butler's novel is perhaps best understood as a "dying earth" story. Originally coined in 1950 by Jack Vance, a dying earth story details the far-flung end of the

world, not through fiery apocalypse, but by entropic exhaustion.[38] In these tales, resources are depleted, people are weary, and social and political institutions have succumbed to a new and hopeless dark age. Typically, in dying earth stories the sun is either dying or will soon be dead. These stories have a long history within the development of science fiction as a recognizable mode of literary production, with roots stretching back to H.G. Wells's *The Time Machine* (1895) and William Hope Hodgson's *The Night Land* (1912) (Encyclopedia of Science Fiction). The argument put forth in dying earth stories is that the decay of contemporary norms of living occurs over long stretches of time. There is often not a singular catastrophic break in the imagined history of these stories, but rather, like Nixon's critical provocations, a slow and grinding history of violence that eventually tears the fabric of global society such that it is unrecognizable. Thus, their nearly-absurdly stretched out timeframes—they are often set many thousands, if not millions of years into the future—provide excellent frames for understanding the long arc of political and ecological violence that leads to degraded social settings.

The earth that Butler describes in *Parable*, though presented quite differently than a traditional dying earth story, is without question dying. The key difference is that the oncoming death of the earth that Butler describes is far more urgent than more traditional dying earth stories. Butler places the entropic forces that slowly degrade a dying earth into a new dark age squarely within the realm of contemporary politics and economics rather than the far-future death of the sun. Lauren notes throughout the text that "most people have given up on politicians. After all, politicians have been promising to return us to the glory, wealth, and order of the twentieth century ever since I can remember" (Butler 18). The politician that Lauren focuses on in her

[38] Examples of dying earth stories include Vance's own *Tales of the Dying Earth* (1950), Gene Wolfe's *The Book of the New Sun* (1980-1983), N. K. Jemesin's *Broken Earth* trilogy (2015-2017), and Paul J. McAuley's *Child of the River* (1997).

journal entries the most is Christopher Morpeth Donner, a "symbol of the past" and "human banister" with "no substance," who's seeming only political appeal is "[making] people feel that the country, the culture that they grew up with is still here—that we'll get through these bad times and back to normal" (Butler 56). Throughout Lauren's journal, Donner appears again and again as a sort of apostle of neoliberal privatization. For example, he slashes funding for space exploration, a shortsighted move in Lauren's eyes considering that "The Destiny of Earthseed 11/Is to take root among the stars," and instead privatizes near-space communications and experimentation programs (Butler 84). What's more, Donner favors the suspension of "overly restrictive" labor laws that affect minimum wage, environmental regulations, and worker safety (Butler 27). Through Donner, neoliberalism is presented as a cannibalistic politico-economic system incapable of producing a worthy future of humanity, a literal Donner party that is as self-destructively violent as it unsustainable. Its shortsighted pursuit of profit and its seemingly paradoxical embrace of a rhetoric of cultural and social conservatism—consider here the breakdown of the traditional nuclear family as men in the novel "prove they're men by having one wife and a lot of beautiful, disposable young servant girls"—has sequestered the future into a grim feedback loop of social decay. There is a tension between the nostalgia of an America that never was and the future of space travel and settlement that Lauren anticipates.

Earth's decay in *Parable* is not presented as some kind of far-off eventuality, but an urgent near-future certainty that must be avoided now. Though the history of violence presented in *Parable* is long—Lauren is aware, for example, of Donner's status as only the latest in a long line of American Presidents that perpetrate systemic injustices—both the speed at which change occurs and the necessity of responding decisively to these changes is emphasized. Speaking to

her friend Joanne, Lauren impresses upon her how time moves faster at some times than at others, how the catastrophic events of a given time are opportunities for creating a better world:

> "Did you ever read about the bubonic plague in medieval Europe?...Once they realized it wasn't [the end of the world], they also realized there was a lot of vacant land available for the taking, and if they had a trade, they realized they could demand better pay for their work. A lot of things changed for the survivors."
>
> "What's your point?"
>
> "The changes…They were slow changes compared to anything that might happen here, but it took a plague to make some of the people realize that things could change…Things are changing now, too. Our adults haven't been wiped out by a plague so they're still anchored in the past, waiting for the good old days to come back…This is just one of the big jumps instead of the little step-by-step changes that are easier to take. People have changed the climate of the world. Now they're waiting for the old days to come back." (Butler 56-57)

The violence perpetrated upon marginalized communities has a deep history, and Lauren is sensitive to this. Yet she is also sensitive to how moments of extreme crisis can not only reveal these violent patterns, but also make them actionable and desirable. The old ways have led to a geopolitical dead end and new ways must be found. That is the central message of Earthseed.

Octavia Butler engages in the sort of writer-activism that Nixon speaks to when he casts about for solutions to the riddle of how to represent ecological violence. She does so by imagining a world that is exhausted by the neoliberal political and economic order, hemmed in on all sides by rapid-onset anthropogenic climate change and threatening to collapse into general anarchy. It is the goal of this section to explore just how Butler makes these representational

moves, and how her novel speaks to the centrality of ex-centric voices in these discourses. Where *Jurassic Park* valued elite academic, legal, and business perspectives on the violence of rapid environmental shifts, *Parable of the Sower* is concerned far more with the experience of marginalized communities living within grinding, slow ecological violence. It does this through form—most notably through the application of epigraphs and the use of the journalling frame—and through plot, where the horrors of neoliberal privatization are shown to be thoroughly inadequate answers to the climate crisis.

5.5 "Olivar needs special help": Black Science Fiction and The Parable of the Disappearing Town

Parable opens with an epigraph, religious scripture penned by Lauren. "Prodigy," Lauren writes, "is, at its essence, adaptability and persistent, positive obsession. Without persistence, what remains is an enthusiasm of the moment. Without adaptability, what remains may be channeled into destructive fanaticism. Without positive obsession, there is nothing at all" (Butler, preface). This passage is from the fictive *Earthseed: The Books of the Living*. At the top of the page is the year "2024" in bold type-face, and it isn't immediately clear whether this indicates that the novel itself is set in 2024 or if the scripture was originally written in 2024 and the action of the book takes place later (it is, ultimately, the former). What is clear, however, is that this early reference to Earthseed operates as an opening novum, an alternate historical signifier through which Butler's story enmeshes its readers within an imaginative world extended from its contemporary moment of publication. The total effect of the epigraph is to indicate a wider world within the fiction of the text. In its focus on persistence and adaptation—particularly in the context of the then far-off date of 2024—the epigraph encourages readers to wonder just what

goal needs be persisted toward, against what catastrophe the reader of this scripture must adapt to face.

This epigraph's estranging heft rests on the social and literary conventions that attend its presentation as an epigraph. The use of epigraphs in literary writing emerges from the tradition of commonplacing in the UK and US in the 18th and 19th centuries. Appearing especially in mid-19th century works written by women and people of color, epigraphs denote "an index of sensibility and refinement" that imbues texts with "continuity between the literary past and the present, as the former reaches into and shapes the latter" (Stokes 207-8). Epigraphs serve an important literary function insofar as they embed a work and an author within authoritative cultural discourse, "which were necessary attributes for midcentury women and writers of color entering the public sphere of print" (Stokes 209). Epigraphs operate as rhetorical shortcuts, building credibility through calculated appeals to the past. Butler's epigraph indexes both in its form and rhetorical deployment "sensibility and refinement," indications that make the reader feel that the novel is engaged in serious work.

The authority that epigraphs offer is also important in the context of African American literature. The imitative gesture of quotation in epigraphs is ubiquitous in mid-19th century African American literature, leveraging the stereotype of African Americans as "natural mimics" so that black writers in that time could achieve social mobility in an overtly hostile racial environment (Stokes 214). In the words of Frederick Douglass on the issue, "I think the disposition to imitate what is a little in advance of what we before knew is one of the most civilizing qualities of the human mind, and I am going to imitate all the good I can, and leave unimitated all the bad I find in the world" (Stokes 214). For Butler, the use of a fictional epigraph of her own creation—one which exists within the cognitively estranging world of the

novel itself and was written by the novel's young narrator—claims authority that is derived from something new, something derived from an explicitly female and African American anticipatory imaginary. In this sense, it is entirely science fictional, a strategy of building a "realistic irreality" that a reader engages with (Suvin #).

Understanding Butler's work as not only science fiction, but specifically as Black science fiction, opens both new ways of understanding the critical dialectic work that the genre partakes in and how the genre has been utilized to discuss issues of race relations in America. Much of the scholarship surrounding the novel has dealt with how the text situates the intersections of race and gender in the face of mass catastrophe. Given Butler's positionality within the field of science fiction as it was produced and marketed in the late 20th century, this is not surprising. Octavia Butler was among the first African American women to achieve a degree of critical and commercial prominence within a genre that author Charles Saunders once described as "white as a Ku Klux Klan meeting" (Saunders, qtd. in Edwards 1). Butler herself noted in the 1989 essay "Positive Obsession" that "there was exactly one other Black science-fiction writer working successfully when I sold my first novel: Samuel R. Delany, Jr. Now there are four of us" (Butler 134). Because of this lack of meaningful representation, Butler reports that she was often asked in conferences and conventions "What good is science fiction to Black people?" (134). Butler's response is telling:

> What good is any form of literature to Black people: What good is science fiction's thinking about the present, the future, and the past? What good is its tendency to warn or to consider alternative ways of thinking and doing? What good is its examination of the possible effects of science and technology, or social organization and political direction? At its best, science fiction stimulates

> imagination and creativity. It gets reader and writer off the beaten track, off the narrow, narrow footpath of what "everyone" is saying, doing, thinking—whoever "everyone" happens to be this year. And what good is all this to Black people? (Butler 134-135)

Butler's work foregrounds the "blackground" that Isiah Lavender, III identifies in American science fiction. "Science fiction," Lavender argues, "often talks about race by not talking about race, makes real aliens, has hidden race dialogues. Even though it is a literature that talks a lot about underclasses or oppressed classes, it does so from a privileged if somewhat generic white space" (Lavender 7-8). Science fiction often operates according to racial logics that are hidden, entrenching it as a generically white space. However, Lavender goes on to argue in agreement with Butler, "science fiction actually does think about the fact that things could be different" (Lavender 8). Black experience, and therefore black science fiction, is uniquely situated to both think through and situate anticipation as a dominant cultural force in the late 20th century. Rather than being written in a culturally dominant space and therefore running the risk of simply reinscribing white capitalist assumptions, black science fiction allows for a bottom-up reimagining of society.

For the purposes of this chapter, thinking about how Butler's text works as specifically black science fiction also allows for thinking through how the then-oncoming climate crisis is imagined as happening along racially mediated lines. The forms of slow environmental violence that Butler ponders in Parable—global warming, pollution, increasingly catastrophic climate events—are densely interconnected in the text. In a telling passage from her journal, Lauren contemplates the devastating effects of an extreme hurricane in the Gulf of Mexico, capturing in a science fictional context the very real stakes of climate disaster:

> It's bounced around the Gulf, killing people from Florida to Texas and down into Mexico. There are over 700 known dead so far. One hurricane. And how many people has it hurt? How many are going to starve later because of destroyed crops? That's nature. Is it God? Most of the dead are the street poor who have nowhere to go and who don't hear the warnings until it's too late for their feet to take them to safety. Where's safety for them anyway? Is it a sin against God to be poor? (Butler 25)

There are two primary concerns at work in Lauren's description of this "early-season storm." The first is of a more eschatological nature. The God that allows for the horrifying devastation of the storm—the God of Lauren's father, a "big-daddy-God or a big-cop-God or a big-king-God"—is evil, or at least uncaring (24). By aligning this God with the devastation caused by the hurricane, Lauren draws a connection between God and the earthly political authorities that allow for conditions like this early-season storm to wreak as much havoc as it does. The second concern aligns with this. Lauren points out that environmental devastation disproportionately affects the poor and marginalized. After all, "climate change is the child" of colonialism, of destructive extraction practices operating at a quickened geological pace (Elizabeth Yeampierre, qtd. in Gardiner).

The storm is the heightened climatic spectacle that punctuates slow violence. It brings attention to the structural violence of global climate change, and the financialization of the global economy that allows for climate change to thrive. Climate change is the result of a legacy "of extraction, of colonialism, of slavery," and so its victims are primarily brown-skinned and poor, the leftover detritus of global neoliberalism. Jerry Philips notes that Butler is not so much imagining a future as she is "bending the future back into the present," showing the reader that

"late capitalist society cannot generate a future worth believing in" (Philips 304). Certainly, there is anticipation inherent to Butler's futural framing. Yet the prophetic tension in Butler's text—the drive to imagine and create a world freed from the technological shackles of the speculative capitalist order—is frustrated by the arresting worldview of neoliberalism, the capitalist realism that posits the pursuit of profit and the protection of private property as the only viable economic model. In this sense, the future is already written, the profits of tomorrow already assured. As such, "the only authentic image of [this] future must be the present, with all its manifest shortcomings" (Philips 304).

Butler's representative strategy—displaying in first-person perspective the exhausted world of neoliberalism and the effects such economic policies have on poor, marginalized communities in a world of rapidly worsening climate—is one answer to Nixon's questions of imaginative dilemmas. This strategy can also be seen in the novel's depiction of the neoliberal takeover of the coastal Los Angeles suburb of Olivar. The history that Lauren gives of the town is short and typical: incorporated as a small city in the 80s, Olivar "is just one more beach/bedroom suburb of Los Angeles, small and well-to-do. It has little industry, much hilly, vacant land and a short, crumbling coastline" (Butler 118). Economically, people in Olivar "earn salaries that would once have made them prosperous and comfortable," but its coastal location has made it vulnerable to worsening climate, and it suffers earthquakes periodically (Butler 118). Per Lauren: "Parts of [Olivar] sometimes crumble into the ocean, undercut or deeply saturated by salt water" (Butler 127). Because the community, like other parts of Los Angeles, is being slowly abandoned by the government, the town finally accepts, "after many promises, much haggling, suspicion, fear, hope, and legal wrangling…to be taken over, bought out, privatized" (Butler 128). This is a strange and poignant remediation of the cyberpunk aesthetic, the privatization of

the globe played out on the local level. Lauren herself echoes this argument, noting that "this business sounds half antebellum revival and half science fiction" (Butler 129). Lauren notes that the partitioning of Olivar into a corporate town represents "the future—one face of it. Cities controlled by big companies are old hat in science fiction" (Butler 132). Butler demonstrates that this imagined endpoint of neoliberalization— the purchasing of public and private property and the reinstatement of company towns—has been anticipated by science fiction. More importantly, it has been anticipated by the neoliberal logics of global capital. This is the future not worth believing in that Philips identified at work in the text, and it remains one of the more frightening sections of the book.

That Olivar is literally built on a slippery slope bespeaks the anxiety of the slowness of neoliberalization. Lauren's father recognizes that the corporatization of Olivar is the result of a long period of economic strangulation: "Kagimoto, Stamm, Frampton: Japanese, German, Canadian. When I was young, people said it would come to this. Well, why shouldn't other countries buy what's left of us if we put it up for sale" (Butler 130). What is striking here is that Lauren's father is pointing to the slow numbing of the population to the inevitability of this kind of corporate political ascendancy. The implication is that multinational conglomerates have come to take on the traditional functions of the state: providing food, security, shelter, public utilities, and so on. In taking on this function, KSF—the company that buys Olivar—has seemingly enacted a new social paradigm where the corporation is now the center of functional political authority. There are attempts to rationalize this arrangement. Lauren's brother Marcus, for example, muses that Lauren would be safer and happier in Olivar. After all, "you share pain every time you see someone get hurt…there'd be a lot less pain in Olivar" (Butler 130). Lauren, however, maintains that the same abuses that proliferated in the neoliberal state will only be

repeated within a corporate space given over completely to neoliberal aims: “There would [also] be all those guards. I’ve noticed that people who have a little bit of power tend to use it. All those guards KSF is bringing in—they won’t be allowed to bother the rich people, at least at first. But new, bare-bones, work-for-room-and-board employees…. I’ll bet they’ll be fair game” (Butler 130). Power—in this case, figured as the ability to perform violence with no oversight—is doled out in similar terms in both the violent world of Parable’s Los Angeles and the freshly privatized world of Olivar.

Psychologically, Lauren is suffused with the dread of anticipation. Consider her response to Joanne’s question about whether or not there will be more privatized cities: “Bound to be if Olivar succeeds. This country is going to be parceled out as a source of cheap labor and cheap land. When people like those in Olivar beg to sell themselves, our surviving cities are bound to wind up the economic colonies of whoever can afford to buy them” (Butler 137). It is through her reading of science fiction texts—specifically company town stories that “always seemed to star a hero who outsmarted, overthrew, or escaped ‘the company’”—that Lauren sees the contours of what Olivar will become (Butler 132). Given the actions of the citizens of Olivar, however, science fiction has not anticipated quite the sense of economic and environmental desperation that they feel. It is the anticipation that their town will be overrun by looters and thieves, along with their fears of the town sliding into the ocean as the water level rises, which leads the citizens into the arms of privatization. Or, as Lauren puts it: “I’ve never seen [a story] where the hero fought like hell to get taken in and underpaid by the company. In real life, that’s the way it will be. That’s the way it is” (Butler 132). The future of Olivar, though bleak, is not unexpected, and Lauren is careful to point out that the story in many ways is already written.

Privatization, securitization, and the breakdown of the Westphalian state are par for the course, more a mundane fact of reality than an overtly dystopian trauma.

I wish to emphasize again here that these two horrifying events—the Gulf hurricane and the privatization of Olivar—are presented in the text as linked anthropogenic disasters. Both are products of long-practiced extractive capitalism and a push to maximize private profits over any sort of general public wellbeing. In Parable, neoliberalism is no longer an abstract economic theory, but a force of devastating global impact. That climate change and neoliberal privatization appear in the novel inextricably linked is indicative of a profound shift in human cognition regarding the unitary wholeness of the planet that occurred late in the twentieth century, one afforded by technological systems that can measure the geological and climactic impact of human actions. This change was heralded by the publication of the famed "Earthrise" photo, which showed in color for the first time in 1968 the full totality of the planet. The publication of this photo is what led Lawrence Tribe to declare the "fourth discontinuity," a perspective shift "as massive…as those brought on by Copernicus, Darwin, and Freud" (Edwards 1). This was also the basis for the famous David Brower distillation of the newly found global perspective: "Think globally, act locally" (Brower, qtd. in Edwards 2). "Thinking globally," in this modern perspective, means

> Seeing the world as a knowable entity—a single, interconnected whole—but in a sense that lacked the secure stasis of maps, parlor globes, or pre-Darwinian cosmologies. Instead, it meant grasping the planet as a dynamic system: intricately interconnected, articulated, evolving, but ultimately fragile and vulnerable. Network, rather than hierarchy; complex, interlocking feedbacks, rather than central control; ecology, rather than resource: these are the

> watchwords of the new habit of mind that took Earth's image for its emblem. (Edwards 1-2)

The impact of "Earthrise" on the germination of the idea of an interconnected world has of course been overstated. As discussed in Chapter 1, the Bretton Woods agreement was the vanguard of the post-World War II "One World" movement, among other factors such as the founding of the United Nations and the development of systems thinking (Edwards 3). However, this history of global-scale planetary thinking led directly to the development of a global ecological consciousness, the necessary scientific, technological, and ideological framework which allows for the discussion of global climate change that Butler engages in.

Enabling this global ecological consciousness is the technology that allows for both the measurements of global climatological patterns and the communication of these data across vast stretches of time and space. The ecology that Butler describes is a sort of tele-ecology, one that operates at multiple distances and temporalities simultaneously. "How can we really live," Paul Virilio asks, "if there is no more here and everything is now? How can we survive the instantaneous telescoping of a reality that has become ubiquitous, breaking up into two orders of time, each as real as the other: that of presence here and now, and that of a telepresence at a distance, beyond the horizon of tangible appearances?" (Virilio 37). It is tempting to say that Lauren and Virilio share little ontological similarity with each other, even as they both describe large-scale changes and their environmental and social effects. After all, what Virilio seems to be saying here is that change is almost impossible now that time and space have flattened into a single plane of existence, a persistent now that stretches into the future. Lauren, for her part, believes that "Things are changing now…Things are always changing. This is just one of the big jumps instead of the little step-by-step changes that are easier to take. People have changed the

climate of the world. Now they're waiting for the old days to come back" (Butler 66, emphasis mine). Yet what unites them is a sense that the world—that time and space—has telescoped dramatically. The hurricanes in Texas that Lauren discusses are the same weather conditions that cause the mass displacement of people happening in LA, driving the town of Olivar to corporatize.

What for Virilio is a deadened terminal identity, however, is for Lauren the acceleration of the process of change. Lauren exists in a time of the extreme acceleration of capital, a situation of "intrinsic exploitation, in which capital directly incorporates labor and subjectivity within its own processes" (Shaviro 28). "This means," Shaviro goes on to note,

> that labor, subjectivity, and social life are no longer "outside" capital and antagonistic to it. Rather, they are immediately produced as parts of it. They cannot resist the depredations of capital, because they are themselves already functions of capital. This is what leads us to speak of such things as "social capital," "cultural capital," and "human capital": as if our knowledge, our abilities, our beliefs, and our desires had only instrumental value and needed to be invested…Under a regime of real subsumption, every living person is transformed into a capital stock that must not lie fallow but has to be profitably invested. (Shaviro 28)

Lauren is embedded in neoliberalism, a political and economic environment that has poisoned the possibility of human growth and evolution, impeding humanity's destiny of reaching to the stars. Neoliberalism flattens difference, crushes everything that attempts to subvert it. The only way out of such a system, she argues, is to embrace the diversity that neoliberalism so admonishes: "Embrace diversity./Unite—/Or be divided, robbed, ruled, killed/By those who see

you as prey./Embrace diversity/Or be destroyed" (Butler 203). The roots of *Parable's* dying earth are present in this predatory capitalist system that Lauren here summarizes so succinctly. The anticipatory project that Butler undergoes as a writer-activist is to illustrate the necessity of diversity and collaboration in building more just worlds, particularly in the face of mass financialization and death. In this sense, the affective structure of anticipatory affect in both economic and ecological senses are intimately linked, as it was the continued financialization of everyday life that animated (at least in part) concerns of continuing ecological devastation. Or, to put it another way, worsening and unequally distributed ecological crises—in the case of *Parable*, the gulf hurricane, as well as the fate of Olivar—are made worse by already unequally distributed economic divisions.

5.6 Presenting Los Angeles through Post-Colonial SF in Karen Tei Yamashita's Tropic of Orange

Los Angeles yearns for speculation. In a conversation between William Deverell, David Ulin, and Nathan Masters, Deverell noted that this is due to the "caricatured sensibility [of Los Angeles] as the place where the future happens" (Masters). Ulin, for his part, notes that Los Angeles serves as a historical generator of science fiction, both in the earliest days of Hollywood studios and the residence of foundational science fiction authors like Ray Bradbury, Robert Heinlein, L. Frank Baum, and Edgar Rice Burroughs (Masters). Krista Comer goes beyond these broader historical trends when she writes that the turn towards speculative genres in fiction written in and about Los Angeles in the 90s is in part reflective of the search for "fresh, newly relevant ways to represent western life at century's end," a turn toward mass-market sensibilities rooted "within a larger political impulse and cultural context that we might at least initially call

'post-Civil Rights" (Comer 405). By the term "post-Civil Rights," Comer draws attention to the late-century unsettling of whiteness as the racial default by minority authors, wherein texts

> do not take racial alterity as a starting, radically disruptive fact. Nevertheless, the reader is cautioned not to assume that the "retreat from race" means writers represent racism as a social legacy America has outgrown. Rather, I see these texts as productive of a new racial subject and/or series of racial formations invested in updating and reformulating the status of the nonwhite racial other in ways that account for the enormity of the changes of recent years, especially, most obviously, globalization. (Comer 406)

The "post" in post-Civil Rights fiction refers to the self-conscious positioning of 90s Los Angeles writers in relation to the "proud national drama" of the 60s Civil Rights era, a drama in which 90s writers would both not be able to see themselves and have no voice (Comer 407). "Where," Comer asks, "are young writers to struggle with the enormously complex, cynical political landscape of the 1970s and 1980s?" (Comer 407).

The answer, it seems, is science fiction. If Los Angeles imagines itself as the "place where the future happens," then it follows that young writers might choose to confront the futural valence of a radically restructured social, political, and economic sphere using science fiction, a genre that values wholesale construction of new and speculative worlds. This is especially true considering the role Los Angeles played in the global economic turn towards speculative capitalism that I outlined in chapter 1 and chapter 4. Mike Davis notes that Los Angeles in the 80s "was at the forefront" of speculative capitalism, "subsidizing globalization without laying any claim on behalf of groups excluded from the direct benefits of international commerce" (Davis, qtd. in Vint 404). In speculative 90s Los Angeles-centered fiction, the nonwhite racial

other has a degree of "newness." This is not to say that the presence of the nonwhite racial other in Los Angeles is new. The history of the American west can only be written if it includes the labor, hopes, dreams, exploitation, and blood of nonwhites. Rather, it is to say that nonwhite racial others have taken on a new importance within the neoliberal economic order that matured during the 70s and 80s: as laborers, migrants, and agents within a hostile economic norm that governed transnational relations. These racial and ethnic minorities are the groups "excluded from the direct benefits of international commerce" precisely because they are the necessary necrocapitalist sacrifices that must be made to keep the neoliberal economic order churning.

Though she is not mentioned by Comer, Octavia Butler was just as enmeshed within the project of representing speculative, post-Civil Rights era Los Angeles as any other writer in the 90s.[39] In *Parable of the Sower*, Los Angeles is an important front of climate change, a place where the poor and destitute are abandoned by local and national government to violence and anarchy. To leave, one must walk the freeways: "It's against the law in California to walk on the freeways, but the law is archaic. Everyone who walks on the freeways sooner or later…the freeway crowd is a heterogeneous mass—black and white, Asian and Latin, whole families are on the move with babies on backs or perched atop loads in carts, wagons, or bicycle baskets, sometimes along with an old or handicapped person" (Butler 176). This passage, along with others from *Parable of the Sower*, is quoted by Karen Tei Yamashita in the epigraph of her 1997 novel *Tropic of Orange*. Unlike Butler, Yamashita is one of the authors that Comer holds up as an example of this speculative turn. Indeed, the Los Angeles of Yamashita's *Tropic* is vast and sprawling, a site of tectonic social and economic changes. As one of the crossroads of the

[39] Michael Crichton was also living in Los Angeles when he wrote *Jurassic Park* in the late 80s, having moved there in the 60s to work at the Salk Institute for Biological studies. To make the point again: Even if *Jurassic Park* does not take place in California, its action is lanced through with bitter satire of the Californian Ideology.

Pacific, Los Angeles is one of the most diverse cities in the world, a nexus where the cultures of the Pacific meet and mingle. It is "a city existing now on sufferance from the ever-hotter desert and the ever-rising sea, and that feels every day, to many of us, like a mirage as it waits for its great quake" (Ventura, qtd. in Yamashita). It is a city of seething movement, of people and ideas and entire histories moving zanily about, pressing upon each other, shaping, and being shaped by one another in turn.

Tropic charts this zany movement. The novel begins with an orange, part of a shipment of fruit that serves as cover for cocaine smugglers. From there, it expands ever outward, focusing on seven point of view characters—Rafaela Cortes, Bobby Ngu, Emi, Buzzworm, Manzanar Murakami, Gabriel Balboa, and Arcangel—over seven rather eventful days. The point of having seven perspectival characters is to allow for representations of vastly different experiences of Los Angeles, and therefore of the "fantasy of frictionless capital…connected to the myths of LA" (Vint 404). Throughout the novel, characters weave recklessly in and out of the narrative: between disasters and sites of urban chaos, between new models of urban utopianism found in the abandoned cars of the freeways and the neoliberal ruins of globalization, between Mexico and the United States with little regard for the supposed opacity of the border, in and out of each other's stories, never staying in one place for very long. Along the way, Arcangel—who may or may not be a supernatural figure—brings the forgotten orange from the beginning of the novel north with him, moving the Tropic of Cancer itself north, blurring the lines between the Global North and the Global South. It is, ultimately, an optimistic novel insofar as it recognizes "that the imaginary lines that have divided the world to the benefit of global capital may yet be remade into other configurations, that we are not trapped on the deterministic train…but can imagine the world otherwise" (Vint 402).

I have noted before that *Tropic* is a science fiction novel, and it is. But it is more specifically an example of postcolonial science fiction, a group of stories that take "the meme of colonizing the natives and, from the experience of the colonizee, critique it, pervert it, fuck with it, with irony, with anger, with humor, and also with love and respect for the genre of science fiction that makes it possible to think about new ways of doing things" (Nalo 9). Part of what the novel critiques, perverts, and ultimately fucks with is the long history of representing the exploitation of nonwhite racial others in the Los Angeles area. Like Butler's *Parable*, Yamashita's *Tropic* explores the historically grounded structural inequities that lead to the slow violence that minority communities face in an economically and socially hostile world. It does this through a focus on the physical, psychic, and historical infrastructure of Los Angeles, "[employing] infrastructure to map a distinct set of relations between ethnic American subjectivity and literary production, shifting narrative aims toward interdependency" rather than a stylized myth of individual mastery (Kim 3-4). A focus on the novel's infrastructure brings to our attention the in/visibility of the structures and histories of Los Angeles that are otherwise forgotten. Though it is not so much focused on the explicit future effects of climate change as *Parable* is,[40] *Tropic* does offer an intriguing meditation on the infrastructural and economic operation of slow violence insofar as it attempts to map—incompletely, always incompletely—a comprehensible accounting of how the environment of Los Angeles is weaponized against its most vulnerable populations. In doing so, it presents to the reader a mode of environmental perception that is thoroughly late-century, even an early 21st century understanding of the world: situated in a global mindset, cognizant of the electronic mediation of the environment, and rooted in anticipation.

[40] This is not to say that it is disinterested in ecological concerns, of course, as I will show shortly.

With all this focus on infrastructure and economics, it is perhaps tempting to say that *Tropic* is perhaps better suited to analyzing the financial rather than the ecological elements of anticipation in late 20th century America. Certainly, the novel is a splendid example of the interplay between these two structures and how they reinforce each other throughout the 80s and 90s. However, I do not want to lose sight of the fact that the analysis I embark upon here is one rooted in an *environmental* understanding of Yamashita's postcolonial science fictional Los Angeles. Chiyo Crawford notes that the novel "draws an important environmental connection between seemingly incongruent social phenomena to reveal that environmental justice is not only a recent urban struggle but also one that is rooted in the past with long-term physical and psychological effects" (Crawford 86). Elizabeth Ammons notes that the urban landscape of *Tropic* is "one of madness and alienation, an *ecology* of migrant workers, food, poisons, body organs, and souls" that illustrates the corrosive effects of capitalism both on non-white peoples and larger human environments (Ammons 151). These environmental justice concerns are further taken up by Julie Sze, who states of *Tropic* that it illustrates how "women of color, along with transportation networks, embody how production and consumption work through the flow of goods, garbage, and people in an era of intensified 'free trade'" (Sze 30). Taken together, these three writers (along with many others) point to a large corpus of environmental justice scholars who have taken up analyses of *Tropic*.[41] To make the point as clear as possible, then: when Yamashita focuses on the flow of Western capital, immigrant labor, and exploitative colonial histories in *Tropic*, she is making an inherently ecological claim about how these elements of Los Angeles life and history shape the natural and human environments of its urban spaces. The novel represents, as Crawford states, a "new pluralist approach" to environmentalism that does

[41] Also consider the work of Youngsuk Chae, Ruth Y. Hsu, Sue-Im Lee, and Caroline Rody.

not isolate ecological issues as only ecological issues, but rather illustrates "the interconnectedness of various environmental and social events" (Crawford 87). As Yamashita makes no distinction between the arenas of economy and ecology, I will not either. Rather, I will show how the economic and social situation the novel's characters find themselves lodged within is shot through with an attendant ecological tension.

5.7 "There are maps and there are maps and there are maps": Space/Time Distortions in Tropic of Orange

Tropic of Orange opens with a strange invocation. "Gentle reader," it starts,

> What follows may not be about the future, but is perhaps about the recent past; a past that, even as you imagine it, happens. Pundits admit it's impossible to predict, to chase such absurdities into the future, but c'est L.A. vie. No single imagination is crass or cheesy enough to compete with the collective mindlessness that propels our fascination forward. We were all there; we all saw it on TV, screen, and monitor, larger than life. (n.p.)

Yamashita's epigraph serves a different purpose than Butler's. Where Butler was utilizing the generic form and expectations of the epigraph to claim authority for Lauren's voice and hearken back to a long history of Black writers using epigraphs to root their works in longer histories of literary authority, Yamashita reverses this temporal dimension, bringing to attention how the past has bled into the present, such that the two temporalities exist in a feedback loop. What's more, even though it is difficult to predict the movement of such "absurdities into the future," that does not stop the mass collective from attempting to do so. Such is life in Los Angeles, a cradle of anticipatory energy and a mediator of "worldly sensibility," which is "precisely what is currently being expanded, intensified, and made accessible by the media on which we are becoming ever

increasingly dependent" (Hansen 47). Again, no single person involved in the novel's narrative is well-connected enough or has enough sense-ability to fully comprehend the events that Yamashita describes. This is why the novel's characters rely upon the mediation of "TV, screen, and monitor" to keep events manageably comprehensible. Yet it is the framing of the novel as a media form in and of itself that allows for its points to be perceived. That is to say, the structure of the novel, along with its structure *as a novel*—how it bounces between stories and details, the movement of characters over its depicted seven days—permits the reader to understand the threats the characters face and their enmeshment within almost ludicrously dense and complicated histories. Threats, as Nixon reminds us and as I quoted earlier, "remain imperceptible to the senses, either because they are geographically too remote, too vast or too minute in scale, or are played out across a time span that exceeds the instance of observation," unless they are brought to attention by activist-writers that bring geographically distant places to a reader's full attention, zoom in and out on injustices as needed, and place disparate times together (Nixon 15). This is, in simplest terms, what Yamashita achieves as an activist-writer through using, experimenting with, and stretching the literary genre of the novel to tell this story.

To illustrate this use, experimentation, and stretching, consider the HyperContexts that Yamashita starts her novel with, a "table of contents [which] projects a novel organized by time on its x-axis and character on its y-axis" (Kim 4). On the simplest level, the HyperContexts are a map that allows readers to understand the novel's true order of events, with each viewpoint character's place in the story—both in a spatial and temporal sense—laid out clearly before the narrative even starts. Kim notes that the HyperContexts "evokes the calculated crossing of roads, pipes, and wires that structure a city's chaotic flows," lending the novel a sense of birds-eye-view structure that militates against "official" maps of Los Angeles (Kim 4). HyperContexts is

crucial in considering both how the novel thinks about the organized yet seemingly chaotic movement of its characters, but also how it engages with ecological anticipation. Somehow, in all the zany hyperactivity of the novel, readers can accurately chart not only where a character is on a given day, but where they will move in the future. To structure something—to think systematically about its moving parts and their relationships to one another—is to be able to chart how and where this structure will develop. True, the urban ecology of *Tropic* is vast and almost dizzyingly complex, and the novel exults in the mashup of "the major global environmental concerns of our time—agricultural production and trade, eco-imperialism, migration, urban development and pollution, and global warming" (Crawford 87-88). Still, as the novel's characters—who "hail from [and thus represent] different locations in the global economy"—can be tracked, so too can their representative ecological concerns be traced throughout time, even into the unsettled future (Kim 6).

The novel self-consciously brings to the fore issues of ecological globalism that animated the Seattle protest against the WTO in 1999. Its central *novum*—that an orange from the Southern Hemisphere warps geography as it is brought from the south to the north by Arcangel—metaphorizes the localization of the global. In its concern with the environment of a globalized world, it also represents a shift in ecological thought, with newly urgent "themes of waste, contamination, and ecological destruction" prominent throughout (Gamber 122). What's more, its "predominant setting of the urban core of Los Angeles makes it an ideal subject for ecocriticism as it grows beyond studies of wilderness and rural spaces" insofar as it centers Los Angeles as a site where borders—between humans and nonhumans, built environments and natural environments, and temporalities, among others—become hopelessly blurred (Gamber 122). The shift from an ecology of conservation and limited local issues to an ecology that is

large enough in scope to consider the reality of a truly global climate emergency reaches its mature form in Yamashita's novel.

Returning to the work of Mark Hansen, part of this represented ecological shift is found in the novel's mediation of digital sensing technologies. According to Hansen, twenty-first century media mediate "sensibility itself," making visible "*the sensory basis for [qualitative] experience* (Hansen 47, emphasis original). Twenty-first-century media open the door to a non-human realm of experience, a "digitally mediated and digitally enhanced experience [that] differs fundamentally from the kinds of experience" that typified the recording functions taken up by twentieth century media. In short, if twentieth century media are recording media, then twenty-first-century media are anticipatory media insofar as they capture the affective experience of struggling with the crushing presence of the immediate future. This is digital media par excellence, a "hybrid experience—an experience that combines human sensing with machine sensing and introduces a delay between the operationality of this sensing and the future moment in which it will be fed-back—or rather fed-forward—into consciousness" (Hansen 139). This media opens realms that have been invisible insofar as they remained inaccessible to human perception. Now, however, "experience can no longer be held to occur in a simple present." Rather, with the aid of digital technology, humans now exist in a constant tension and connection to a past that is always receding, a present that remains inaccessible, and a future that is visible only through technologically mediated means. Several of the novels' characters work in televisual media, pinging back and forth between various locations as they attempt to capture the events of the novel's seven days.

This sense of tension between the past, present, and future, mediated in part by digital technologies, is what allows Yamashita to solve the riddle of representation. The wrestling match

between Arcangel, in his persona of El Gran Mojado, and SUPERNAFTA is emblematic of this tension and this shift in mediation as it is televised throughout the world. In a grand wrestling promo early in the novel to a group of Mexican villagers, Arcangel—in the guise of "El Gran Mojado," "a motley personage" that is "part superhero, part professional wrestler, part Subcomndante Marco"— declares "You can see me! I have come to you! But who has seen this SUPERNAFTA anyway? My struggle is for all of you. El Gran Mojado derives his great strength from the noble hearts of his people![SUPERNAFTA] is concerned with the commerce of money and things. What is this compared to great commerce of humankind" (Yamashita 133). SUPERNAFTA is invisible, has never been seen, but even still has the power to force the North onto the South, to impose unfair trade and labor policies, to ruin local environments and flatten local cultures. But Arcangel, in the guise of El Gran Mojado, can achieve the reverse by bringing the South to the North.

Billed as a titanic struggle of the economically dominant Global North against the economically dominated Global South, the match serves as one of the climaxes to the novel, a moment where the tension between these two economic, technological, and ethnic zones is synthesized and relieved. SUPERNAFTA is dressed in "a titanium suit with a head of raging fire…he stood, arms crossed and legs spread like the Terminator or Johnny Mnemonic or the Five Million Dollar Man. National heroes like SUPERNAFTA were usually replicants of some sort" (Yamashita 258-259). SUPERNAFTA is purely speculative, an entity who lives and dominates by the motions of global capital. He has a stranglehold on the future through the intoxicating promise of the freedom such a flow of money and capital has on the vulnerable and the desperate. When confronting El Gran Mojado, SUPERNAFTA is clear on the stakes to all that "multicultural rainbow of kids out there":

> The challenge is this: It's the future. And what's the future? Well, isn't it what everyone really wants? It's a piece of the action! And that's what progress is all about…There's an entire machine of banking computers and technological research and development that's working day and night to put together this billion-dollar package so you can have your cut. That's progress working for you. Some people don't want progress. [El Gran Majado] doesn't want progress. He doesn't care about the future of all you wonderful kids…Before any one of you can be truly free, you need to have enough money to do what you want. The only way that's gonna happen is to free the technology and the commerce that make the money go round. (Yamashita 259)

It is money, SUPERNAFTA argues, that frees people, and the best way for money to get to the people who needs it is for that money to circulate through speculative technology. The "machine of banking computers" that SUPERNAFTA envisions is working around the clock to move unites to the places where it will make the most money. In short, SUPERNAFTA cares only for a glorious, technological future of neoliberal progress. El Gran Majado imagines something quite different, though the stakes he lays out are equally existential:

> *Noble people, I speak to you from the heart.*
>
> *There is no future or past…*
>
> *There is no aging. There is only changing.*
>
> *What can this progress my challenger speaks of*
>
> *really be?*
>
> *…The myth of the first world is that*
>
> *Development is wealth and technology progress.*

It is all rubbish.

It means that you are no longer human beings

but only labor…

I do not defend my title for the future of

starving children or the past of suffering ancestors.

I defend my title for life and death.

The life of our people or the death of our people. (Yamashita 261; emphasis and spacing original).

Yamashita solves the riddle, then—for the novel is on the side of El Gran Majado—by denying the existence of a future that is not rooted in history. The tension between the past, present, and future is resolved by insisting instead on the reality of a long, historical *now* of violence and exploitation that touches everyone on the planet. The world, El Gran Majado seems to say, is itself fed-forward as humans are already living in a hybrid experience with history. This is the essence of Yamashita's stance as a writer-activist.

But again, the titanic civilizational and economic clash that the struggle between SUPERNAFTA and El Gran Majado represents is one that is laced through with ecological tension. When El Gran Majado says that wealth and technology posit that humans are "only labor," he is speaking directly to these ecological tensions. Sze notes that questions of environmental justice—unlike more mainstream environmentalism which centers "the preservation of wilderness and endangered species"—is concerned primarily with "public health and human pollution, particularly affecting communities of color" (Sze 37). The world that SUPERNAFTA promises—a world of cold metal and fire and the continuing exploitation of the Global South—is synonymous with ecological racism and the continuing degradation of

ecological conditions for non-white laborers. This is why El Gran Majado frames this conversation within the crucible of life and death. On this point, he is clear: SUPERNAFTA's neoliberal promises and their attendant and exploitive ecological policies are synonymous with death. Deadly ecological policies only exist because they are financially beneficial to a select few economic elites, the very same interests that SUPERNAFTA ultimately represents.

It is only through narrative that the contours of such large networks of relationality can even begin to be grasped. Frederic Jameson discusses narrative attempts to map out this reality: "the technology of contemporary society is…mesmerizing and fascinating…because it seems to offer some privileged representational shorthand for grasping a network of power and control even more difficult for our minds and imaginations to grasp" the flows of a global, networked capitalism (Jameson 37-38). Like Nixon, Jameson is interested in how something of unimaginable scale can be accurately rendered in narrative form. In particular, he is interested in the "dimly perceivable, other reality of economic and social institutions" that make up global capitalism. *Tropic* attempts to trace these economic and social institutions, and in so doing, "traces the obscured networks of globalization: the imaginary lines of borders that allow capital and commodities but not people to pass; the maze of highways that connect distant urban points in Southern California but bifurcate and displace communities; the mosaic of multiple racial communities in LA that exist in a non-place between a culture geographically isolated from its source and an assimilated LA that never lets them forget that Anglo is the privileged, neutral ethnicity" (Vint 405). In short, *Tropic* attempts to do the seemingly impossible: to map the affective experience of networked living.

It is difficult to map—and therefore, adequately represent—these capitalized affective experiences. This is in part because, much like twenty-first century media, they operate on spatial

and temporal scales that humans have no access to and cannot consciously engage. Jameson notes that so-called "postmodern hyperspace"—which Los Angeles certainly is presented as in the novel—has "finally succeeded in transcending the capacities of the individual human body to locate itself, to organize its immediate surroundings perceptually, and cognitively to map its position in a mappable external world" (Jameson 44). Further, "it may now be suggested that this alarming disjunction between the body and its built environment…can itself stand as the symbol and analogon of that even sharper dilemma, which is the incapacity of our minds, at least at present, to map the great global multinational and decentered communicational network in which we find ourselves caught as individual subjects" (Jameson 44). The illegibility of postmodern space is one of the primary themes of much fiction that has been labelled postmodern (or rather, this is one of the primary generic tendencies of postmodern fiction). That is, mapping a networked space is an imaginative dilemma in the vein that Nixon identifies. Like the question of how to represent large-scale environmental shifts, mapping is itself a riddle. How do you make sure that you're being inclusive? Is there a point at which too much information is included, and a map becomes useless? In short, how does one know what to include in a comprehensible map of networked affective experience? As Jonathan Flatley notes, the term "affective mapping" refers to how "our spatial environments are inevitably imbued with the feeling we have about the places we are going, the things that happen to us along the way, and the people we meet" (Flatley 77-78). So, to ask how we know what to include in an affective map of Los Angeles in the novel is to ask, in essence, what kind of affective experience its residents have.

One answer to these questions might be found in trauma theory. Historical traumas compound upon one another and overlay space. The representation of historical trauma serves the critical purpose of revealing and narrativizing the hidden web of traumatic experiences that

marginalized communities in particular encounter. In doing so, authors ask readers to adopt an empathetic stance towards the represented communities in line with what trauma theorist Richard Crownshaw calls an "ethics of remembrance" (Crownshaw 172). This "ethics of remembrance" brings with it a political dimension insofar as it challenges readers to consider the long span of ex-centric history, wherein interrelated traumatic events compound one into the other. These representations call attention to the possibility that eruptive traumatic events cannot be thought of as singular. Rather, they are simply the most visible manifestations of a temporally stretched, continual state of trauma, with the "chronic psychic sufferings" that inform these events erased from cultural memory (Craps, qtd. in Crownshaw).

Yet the ethics of remembrance can only go so far in helping to inform what goes into a map of affective experience. While it is correct to recenter ex-centric experience in such maps, trauma theory can also be focused too much on strictly human categories of experience. Consider the character of Manzanar, a homeless Japanese American man. A former surgeon and prisoner of America's Japanese internment camps, Manzanar is fascinated by "the complexity of human adventure over lines of transit…The mass of people flowing to work and play, the activity of minds muddling over current affairs, love affairs, the absence of affairs, in automatic, toward destinations beyond streets, parking lots, or driveways: Manzanar followed it all conscientiously" (Yamashita 56). Manzanar likens the patterns to music, and indeed attempts to conduct symphonies using the sounds of the freeway. To do so, he must map the landscape around him and make sense of the many layers of the world: ""There are maps and there are maps and there are maps. The uncanny thing was that he could see all of them at once, filter some, pick them out like transparent windows and place them even delicately and consecutively

in a complex grid of pattern, spatial discernment, body politic" (Yamashita 56). These layers forming the "body politic" go beyond the mere human, and is worth quoting at length:

> But what were these mapping layers? For Manzanar they began within the very geology of the land, the artesian rivers running beneath the surface, connected and divergent, shifting and swelling. There was the complex and normally silent web of faults—cracking like mud flats baking under a desert sun, like the crevices in aging hands and faces. Yet, below the surface, there was the man-made grid of civil utilities: Southern California pipelines of natural gas; the unnatural waterways of the Los Angeles Department of Water and Power, and the great dank tunnels of sewage; the cascades of poisonous effluents surging from rain-washed streets into the Santa Monica Bay; electric currents racing voltage into the open watts of millions of hungry energy-efficient appliances; telephone cables, cable TV, fiber optics, computer networks. On the surface, the complexity of layers should drown an ordinary person, but ordinary persons never bother to notice, never bother to notice the prehistoric grid of plant and fauna and human behavior, nor the historic grid of plant and fauna and human behavior, nor the historic grid of land usage and property, the great overlays of transport—sidewalks, bicycle paths, roads, freeways, systems of transit both ground and air, a thousand natural and man-made divisions, variations both dynamic and stagnant, patterns and connections by every conceivable definition from the distribution of wealth to race, from patterns of climate to the curious blueprint of the skies. As far as Manzanar was concerned, it was all there. A great theory of maps, musical maps, spread in visible and audible layers… (Yamashita 57).

Music is, as has been noted by David Huron summarizing Leonard Meyer, a carefully constructed exercise in managing listener expectations (Huron 2). This management comes in many forms. Sometimes, for example, "composers…thwart our expectations, sometimes delay an expected outcome, and sometimes simply give us what we expect" (Huron 2). As a composer, Manzanar must balance the emotional and psychological variables at play in his music with the cultural expectations of his listeners. But Manzanar never gives his audience "what we expect." Rather, Manzanar is invested in thwarting expectations, eventually helping to found an intentional community centered on a massive, abandoned car lot that has formed on the highways surrounding Los Angeles. Manzanar is then attuned to the affective registers of infrastructural Los Angeles, understanding how it plays on the emotions and feelings of its residents. This affective flow is ultimately what he conducts.

What's more, the Harbor Freeway is "figured in the novel as 'an organic living entity,'" a kind of built environment that "is animated by volatile circuits of social meaning" (Kim 7). That Yamashita remarks upon the seemingly organic liveliness of the freeway gestures at two things. First, that a built environment is no less lively and organic than one that is natural. Second, that Manzanar is attuned not only to a silent symphony of technology, but of nature. He understands the distinctions between the "plant and fauna and human behavior" that goes into the construction of the freeway while also understanding the deep and intimate relations that bind them together with the infrastructure of the city. Again, the economic and urban development of Los Angeles is not and cannot be separate from the ecological realities of the city.

This lengthy passage also bears some similarities to the description of the information-dense Sprawl of Gibson's *Neuromancer*, a "white-hot" map that can only be fully grasped in its datafied dimensions, the "hundred million megabytes per second" "threatening to overload your

simulation" (Gibson 43). Yamashita, like Gibson, is attempting an aestheticization of networks. In this sense *Tropic* is part of the same lineage of contemporary narratives that contains Don DeLillo's *White Noise* and cyberpunk fiction as well. Certainly, the obsession with noir detective fiction that Gabriel expresses throughout the novel bespeaks the longer genre history that Yamashita herself places her work within. *Tropic* is embedded not only in histories of colonialism and economic exploitation, but in histories of genre fiction as well. The very form of the novel—diffuse, with echoes and callbacks to detective fiction and the global scale of science fiction—speaks to its status as a commercial product.

Very well, then. The novel attempts to represent the long, slow-moving histories of colonial exploitation through a postmodern mapping of exploitative infrastructure. It argues that there is no past, present, or future that is not touched and influenced by this long history. Yet is the novel anticipatory? More specifically, is the novel a generator of anticipatory affect? After all, the epigraph insists that this is not a story about the future, but one of the very recent past. It is set in an ambiguous 'now' of around1997, and a contemporary reader of the book likely would not have approached it with the same expectation of futurity that, say, a reader of *Jurassic Park* or *Parable of the Sower* would have had.

The answer to both questions, I argue, is yes. Science fiction need not be about the future in order to be anticipatory. It is enough to have an eye trained on the future, and however much Yamashita's characters insist that there is no future, that there is only an endlessly unfolding and interpenetrated now, there exists in the text a future tense that the characters are working towards. Buzzworm in particular is indicative of this focus on the future tense. At the end of the book, he ponders the influence of myth on reality, rejecting the twin notions that myth comes before reality and that reality comes before myth: "Things would be what he and everybody else

chose to do and make of it. It wasn't gonna be something imagined" (Yamashita 267). Other characters throughout the text demonstrate this speculative orientation: Emi keeps her eye on rapidly developing stories, trying to predict what will happen; Arcangel sees an endlessly played out confrontation between the north and south; Manzanar conducts the flows of traffic and noise for his own ends. True, there is no future history or technology that so often marks a book as science fictional, but this interest in temporality is, itself, a marker of science fictional orientation. Science fiction is a mode of writing rather than a strictly defined genre, one which can be detected in many works that are not typically thought of as necessarily science fiction. So yes, the book is anticipatory.

The question of anticipatory affect is trickier, but the answer is also yes. As noted elsewhere, anticipatory affect is a structure of feeling most commonly characterized by a pervasive sense of dread, but also of hope regarding the future. And though the wrestling match between *El Gran Mojado* and SUPERNAFTA ends with the personified emblem of the global north's economic dominance imploding, SUPERNAFTA also eliminates *El Gran Mojado*: "Bobby saw SUPERNAFTA's final weapon, his pointing finger a missile launcher that sent its tiny patriot into Arcangel's human heart. *And perhaps it was only the catastrophic finale to another fifty-two-year cycle*" (Yamashita 264, emphasis mine). When the match is over, it is further noted that "Somewhere the profits from the ticket sales were being divided. A new champion was being groomed" (Yamashita 265). Though Tropic is largely optimistic about the capacity of the world to change and respond to growing pressures from a global economic underclass, Yamashita is also cognizant of the staying power of gross structural inequality. In this sense, the novel is generative of a kind of anticipatory affect. A reader might wonder, after all,

that the death of SUPERNAFTA is not merely the start of another "fifty-two-year cycle" as it is replaced by another champion of the global north.

5.8 Conclusion

The novel's anticipatory affect is then generated by friction between two prevailing world views. The first is that the course of history is decided by societal trends and forces beyond an individual's control, the second that it is decided by an individual's actions. Yamashita, like many science fiction writers before and since the publication of *Tropic*, is caught between "those two views of history, and of society, which one may label, for the moment, 'Malthusian' and 'Whig'":

> The former is impersonal, technical, economic; it depends on the assumption that societies are bound together by very powerful forces, invisible but not unreal, which can in some circumstances be used positively but which may all too easily betray the careless or ignorant reformer. The latter is mythopoeic, hero-making; it assumes that history is purposive, leading strongly or inevitably towards the superior institutions of the present (or an imagined future). It is perhaps predictable that the former should be the stronger. Nevertheless, it is not quite a forgone conclusion. (Shippey 73-74)

This friction, Shippey goes on to note, has produced many fine science fiction stories, but it also generates anticipatory affect by directing readers to consider—or, more accurately, to feel—the slow, grinding wheel of history spinning in their everyday lives, and to consider how that wheel might continue to spin into the future. *Jurassic Park* asks readers to imagine a near-future of runaway genetic technology and how the commercialization of such technology might reshape

human environments. *Parable of the Sower* asks readers to consider that the world as they know it is in many ways already over, challenging them to reconsider how best to shape social and political relations. And *Tropic of Orange* asks readers to realize that their physical and psychical infrastructures are made up of engagements between competing histories and bodies.

To tell a comprehensible story, Crichton, Butler, and Yamashita must all focus in on the actions of individuals operating in the context of larger historical trends, while at the same time attempting to show how those larger trends overdetermine the course of these individuals' lives. Such are the pitfalls facing authors who decide to answer the riddle that Nixon lays out. But these novels are in essence challenges to an unquestioned neoliberal world order that warps environments for its own economic purposes. The next chapter will take up how 90s video games seek to turn players into an environmentally warping neoliberal actors, embodying and enabling the environmental destruction that science fiction so often condemns in this period.

Chapter 6: Rendering Strategic Environments in 90s Video Games

"[War is] the play of probabilities and chance."—Carl Phillip Gottfried von Clausewitz

6.1 Chang, Buell, and the Anticipatory Aims of 90s Strategy Games

In the introduction to *Playing Nature: Ecology in Video Games*, Alenda Chang describes how the entrenched nature-technology divide in Western culture—between terrifying but free nature and convenient but stultifying technology—fixes video games as a sort of ultimate technological boogeyman for environmentalist critics. Games, these critics say, enmesh players within digitality, separating them from the natural world around them. Chang notes, however, that games share several homologies with nature. For one, "games, like the natural world, can provoke curiosity, interaction, and reflection…games are themselves open-ended and existential experiments that combine subjective and objective facets of everyday experience," much like experiences in the natural world (Chang 2-3).[42] More than open-ended means of engaging curiosity, interaction, and reflection, however, games "offer a compelling way to reconcile a deep connection to nature and the non-human world with an equally important connection to technology and the virtual" (Chang 5). In short, games offer a compelling and embodied bridging of the gap between nature and technology, a bridging which becomes only more urgent as games move out of the private sphere of the home and into the public sphere of digital lobbies and real-world spaces. Much of Chang's analysis highlights contemporary mobile games like *FarmVille*

[42] By way of example, Chang analyzes *Walden, a game* in her introduction, a game which remediates in exacting details the environment of Walden Pond as Henry David Thoreau knew it during his famous stay there from 1845-1847.

and *Pokemon Go*, which either allow or encourage players to go to public spaces as they play the game.[43]

Given this move into the public sphere, Chang's analysis of video games as sites of ecology rests upon a term borrowed from television studies: "ambient" gaming. This term captures both a historical and social transformation of games "from being a largely private and youthful subculture [in the 80s and 90s] to being a ubiquitous phenomenon that now spans domestic and public space and all demographic categories [in the 00s and 10s]" (Chang 5). Despite this claim, Chang allows that video games have always been embedded in their surrounding environments. As discussed in chapter 3, coin-operated games like *Pac-Man* were shaped by the arcade and entertainment halls that they operated in, while computer games like *TradeWars* and *The Oregon Trail* were key elements in forming local and educational communities that defined early digital culture, which was a shared and collective culture above all else. Still, it is difficult to overstate just how critical the shift from more private to more ambient gaming was. Where before games were limited to terminal platforms—coin-operated machines, computers, and consoles, most notably—now games can move between spaces more or less freely. This unmooring makes them key objects of ecological analysis, a critical project that

> would allow for us to think in a more sophisticated way about game environments, which continue to grow more computationally and graphically complex, but often rest on relatively simplistic environmental models, for

[43] As with most everything else involving video games, this move into the public space is not without conflict. *Pokemon Go* in particular was at the bleeding edge of this conflict, with one of the most notable fights surrounding the use of Lake Park in Milwaukee, WI by players. Per one County Supervisor: "It was absolutely a free-for-all. Porta Potties that tipped over, all the sewage went into the park. It was absolute bedlam. Would you want this in your park? And would anyone want this in our parks?" (Bence)

> instance, those of resource extraction…or visual spectacle… Finally, for those invested in both media analysis and environmental literacy, an ecological perspective on video games might cement games' place alongside more mature media like film and television, where maturity is defined not only by aesthetic development but also the capacity for sociopolitical relevance. (Chang 6-7)

I sympathize with Chang's aim to achieve for video games the status of a mature cultural form through which cultural theory can be formulated. Like other new media, games help to tell the story of the transition from a more analog digitality to one more liquid in nature, a transition which allows games to spread and become more apparent in culture. As Raymond Williams reminds us, "culture is ordinary: that is the first fact" (Williams 5). Games are important precisely because they are an almost omnipresent feature of common, everyday life in the early 21st century. They are, in other words, ordinary features of Western cultural life, and so must be understood in as many dimensions as possible. I also agree that thinking about games from an ecological perspective allows for scholars to think in more complex and nuanced ways about how environments are mediated in digital spaces. This is especially important because, as Chang notes, most games present players with either simplistic models of resource gathering or merely aesthetic environments. In this ecological paradigm, players either plunder digital environments for raw materials or walk through attractive landscapes, or sometimes both. This, too, is often where ecological criticism of games end. Therefore, more delicate and precise theoretical tools are needed to produce sturdier and more insightful analysis, which Chang provides in her monograph and which I turn here towards 90s strategy games.

The core argument that animates Chang's work is that "games straddle multiply real and imagined worlds and therefore can be uniquely illuminated by both scientific and literary

theories engaged with environmental questions" (Chang 11). Operating on the periphery of the real and the imaginary, video games can be understood as *edge effects*. In ecology, the term describes "life at the boundary zones between distinct ecosystems (say, between forest and meadow) as well as the unwanted experimental artifacts created by the presence of margins in mesocosm…and laboratory studies" (Chang 13). Edge effects can occur naturally, but in an age of anthropogenic climate change and massive geo- and bio-engineering projects undertaken by corporations and governments, humans create radically disturbed and fragmented environments wherein "some species may thrive…while others fade away" (Chang 13). Video games are edge effects because by the very constraints of the medium they can offer only limited fragments of environments. It is in this fragmentation, however, that they offer an intriguing reorientation of critiques against them. As noted, video games are embedded within a Western culture that sees a necessary dichotomy between nature and technology. Video game environments are often discussed as either a "debased copy" of nature ripe for exploitation or "artful imitations" that allow for nature to be understood as a simplified whole (Chang 15). These readings cannot be reconciled, but thinking of video games as edge effects allows new and generative questions to be asked of them:

> How virtual is the virtual when the ubiquity of digital technology is premised on globe-spanning resource extraction and waste? Are the integrity and joy of play sacrificed by exposing games to the real world, as argued in critiques of gamification, playbor, and even serious games? Would ecologically minded games represent mere slacktivism, or might they propel us past the confines of 'fun' to live and act differently? (Chang 15)

Playing Nature is dedicated to answering these questions using a wide spectrum of predominantly contemporary video games. As noted, Chang's gameography centers relatively newer video games. Of the approximately 175 games that she discusses in the book, only 31 were published before the turn of the millennium. Given the focus of Chang's work on the proliferation of video games as a dominant cultural medium after the year 2000—particularly as a result of the explosion in mobile games and the subsequent ability to experience video games away from the domestic sphere—it is understandable why older video games are less represented in her work. After all, she is not interested in "a cultural geography of games, but rather a foray into developing analytical frameworks for games that cull from the evolving fields of ecology and environmental science" (Chang 6).

Chang builds on Lawrence Buell's observation that

> environmental crisis involves a crisis of the imagination the amelioration of which depends on finding better ways of imaging nature and humanity's relation to it…To that end, it behooves us to look searchingly at the most searching works of environmental reflection that the world's biggest technological power has produced; for in these we may expect to find disclosed…both the pathologies that bedevil society at large and some of *the alternative paths that it might consider*. (Buell 2, emphasis mine)

Like Nixon, Buell here is calling for a reordering of imagination to better understand the emplacement of the human within unimaginably vast networks and histories of environmental relations. One of Buell's purposes in theorizing *The Environmental Imagination* is to analyze the reemergence of environmental writing after the end of World War II. To limit this analysis, he describes four criteria that environmentally-oriented texts must display:

1. *The nonhuman environment is present not merely as a framing device but as a presence that begins to suggest that human history is implicated in natural history*.
2. *The human interest is not understood to be the only legitimate interest*.
3. *Human accountability to the environment is part of the text's ethical orientation*.
4. *Some sense of the environment as a process rather than as a constant or a given is at least implicit in the text*. (Buell 7-8)

These criteria emphasize the relationships between the natural world and humans rather than the presentation of nature as such. That is, Buell takes an expansive understanding of what counts as environments, even as he limits his engagement to literary texts: novels, short stories, travel writing, and so on. Video games do not enter into his understanding of what counts as an even minimally environmentally-oriented text.

Yet unlike Nixon, Buell expects that cultural texts created in America are inherently anticipatory, focused as they are on the many alternative environmental paths that the nation might embark upon. As Chang suggests, for their procedural nature and emergent properties, video games represent an ideal medium to apply Buell's criteria to. As a medium, games allow for modelling different understandings of "responsiveness and responsibility" to nature that players can be enmeshed in. The games I study in this chapter do not always outline a strictly ethical relationship with nature as Chang and Buell would have it, but they are, all of them, ecologically-oriented to varying degrees. What's more, they grapple with the emergent "alternative paths" that society might consider in the face of environmental crisis. They also represent a quickening of anticipatory affect in mass culture by directly representing the

contingent consequences of these choices, which are often grim, sometimes liberatory, but always consequential for the fate of planetary systems.

My purpose in this chapter is two-fold: to historicize how 90s video games represented and theorized complex ecological issues and futures, and to do so using analytical and ecological frameworks that Chang and Buell developed for contemporary video games and literary texts respectively. The three games I study in this chapter—Maxis' *SimEarth* (1990), Westwood Studios *Dune II: The Building of a Dynasty* (1992), and MicroProse's *Sid Meier's Civilization II* (1996)—all present then-awakening ecological concerns in varying manners. Though united in their core gameplay loops by the usage and exploitation of energy to achieve player goals, the context of that energy usage, the means by which energy is harvested, and the ends of that harvesting are all vastly different, evincing a more varied engagement with ecological concerns than the traditional resource exploitation/aesthetic backdrop split in ecological discussions of video games that Chang identifies and works against. The central claim I am making is that these games invite players to collaborate with their digital, globe-spanning systems to write futures of ecological salvation and disaster. Although the purpose of this collaboration differs from game to game, their emphasis on anticipating the futural consequences is compelling. More importantly for the purposes of this dissertation, this collaboration imbricates players within an anticipatory regime, wherein the player becomes a conductor of massive planetary systems. No, the digital worlds these games present are not real; they are fictive pieces of code spelled out in primitive GUIs. However—and this is the key point—"*even entirely fictional game environments are experienced as real*" (Chang 20, emphasis mine). The reason that games have such strong affective pulls is because their virtual environments are not experienced as virtual environments. And so, when a player sees that a world can be managed—or more crucially, when they are put

in the role of managing a world—this role feels real. This is how games build anticipatory affect, or more accurately, how they were a constituent part of the crucial turn in the late 20th century towards the dominance of anticipation as a cultural feeling.

I also wish to emphasize the historicity of these digital environments and their efforts at making the player a willing collaborator in ecological futures. As noted in the section of this dissertation on finance, video games developed out of the same digital contexts that saw the emergence of companies like Apple and Microsoft, which is to say, companies that were suffused with the California Ideology. Computer video games in particular (as all of the games studied in this chapter) bear the user-interface of the tools which created them. They have drop-down menus, computer cursors, and are made up of automatically-calculated numbers laid out in spreadsheets. And so, when I say that the collaborative solutions they offer to environmental problems are inherently optimistic about the role that digital technology might play in those solutions, understand that it is from this particular cultural context—Silicon Valley and the California Ideology in the 80s and 90s—that this feeling emerges.

My analysis of these games will follow, at least in part, the organizational framework of Chang's book, which is separated into five chapters, each built around a specific ecological term: Mesocosm, Scale, Nonhuman, Entropy, and Collapse. The three games I explore in this chapter will each correspond to one of these terms as well: Mesocosm and Scale for *SimEarth*, Entropy for *Dune II*, and Collapse for *Civilization II*. *SimEarth* centers its gameplay around the management of large-scale earth systems, including atmospheric temperature, sea flow, and magma. The game takes place over a deep time-span, beginning in the earliest days of a planet's development and ending when a sufficiently developed species leaves that planet for the stars. It is this focus on understanding and manipulating planetary systems that underlines *SimEarth*'s

dual affects “of mastery and its converse, awe” (Chang 71). *Dune II* focuses its attention away from such large-scale systems to ones far more local. The player is tasked with conquering pieces of land for various galactic powers through the brutal mastery of economic power. Questions of planetary ecological systems are shoved firmly to the background, while “the relationship between economics and ecology” and “the smooth functioning of industry” are given precedence (Chang 145). *Civilization II* balances the focus on planetary systems of *SimEarth* and the brute economic exploitation of *Dune II* by modeling civilizational development and its effects on global weather systems. Despite the best intentions of players, the advent of nuclear weaponry and the choice to utilize such destructive weaponry in the game can melt the polar ice caps, rendering all the players actions moot. This sort of failure is “certainly more apropos for the kinds of environmental challenges we are facing in the present, which are crises of our own making” (Chang 189).

Taken together, these games represent both a complex understanding of how the virtual environments of video games and natural environments reflect back upon one another and a moment in cultural history where the recognition of oncoming planetary-scale ecological crises was developing among a mass consumer audience. Supplementing a steady diet of worsening news reports of climate catastrophe and its basis in the economic exploitation of a planetary human and nonhuman underclass, these games serve as a cultural archive of late 20th-century feeling regarding the prospects of oncoming environmental collapse and its ramifications. Using more recent critical tools allows for more nuanced readings of games in this cultural archive, which lets us see how their circulation was important in the development of anticipatory affect regarding environmental degradation.

6.2 SimEarth: Mesocosm and Scale

Popular accounts of video games tend to anticipate the new, the exciting, and the more technologically advanced. This has the effect of unmooring games from their deeper developmental contexts. Consider, for instance, the build-up to the release of 2008 computer game *Spore*, a Will Wright-designed venture that promised nothing less than the granular simulation of evolutionary science itself. A *New Yorker* profile noted that the game "is anticipated with something like the interest with which writers in Paris in the early twenties awaited Joyce's 'Ulysses,'" and that it sought nothing less than the simulation of life itself: "The game draws on the theory of natural selection. It seeks to replicate algorithmically the conditions by which evolution works, and render the process as a game" (Seabrook). Steven Johnson, a famed author of such new media-focused works as *Interface Culture* (1997) and *Emergence* (2001), noted in the *New York Times* that the game operated according to the logic of the "long zoom," a way of seeing the world similar to the operation of "the satellites tracking in on license-plate numbers in the spy movies; the google maps in which a few clicks take you from a view of an entire region to the roof of your house; the opening shot in 'Fight Club' that pulls you from Edward Norton's synapses all the way to his quivering face as she stares into the muzzle of a revolver," all of which was not merely a new mode of seeing but of thinking, allowing players to move "from the scale of DNA to the scale of personality all the way up to social movements and politics" (Johnson). The hype surrounding the game seemed to reach a different level and tenor than that typically afforded to other games. In the wake of a performance of the game's soundtrack with Brian Eno, Johnson breathlessly noted that "the game perhaps deserves to be seen as a work of art first and foremost, a way of seeing and making sense of the world" (Johnson).

The game failed to live up to this pre-release hype, even being judged "one of the industry's most notorious misses" (Totilo). Less than a year after its release, it had only sold 2.8 million copies, far below its publisher's expectations. Much of the criticism focused on its perceived lack of gameplay depth. The game is separated into five distinct gameplay stages. In the Cell Stage, the player designs a microscopic organism and sets about evolving it through the collection of "DNA points." In the Creature Stage, the player evolves their microscopic organism into a land creature that can befriend or destroy other land creatures. The Tribal Stage sees neural developments in the players evolved creature that allows for the emergence of tribal societies; crucially, the player is now in control of these burgeoning societies rather than a single organism like in earlier stages. This progresses to the Civilization Stage, where the player is tasked with seizing control of an entire planet through either military or diplomatic means. Finally, in the Space Stage, the player is free to explore, settle, and eventually gain dominion over the entire galaxy. At every stage, the scale of the game shifts dramatically, both in the viewpoint of the player and in the tasks asked of them. In doing so, the game makes an argument that even with all the contingent factors involved in evolution, there is a certain teleological purpose in every stage of evolution, whether biological or social. To succeed, players must anticipate how what they do in the Cell Stage will ultimately impact how they perform in the Space Stage. Yet despite the *range* of things to do, "most of the basic core play dynamics in *Spore* are unfortunately rather thin" (Schiesel). Even Will Wright acknowledged the game's failure as a game in and of itself, likening it to "much more of a toy than a game" better for 10-year-olds than its core audience of dedicated gaming enthusiasts (Totilo).

What both pre-release hagiography and post-release reviews missed was acknowledgment of the most direct Will Wright-designed ancestor of *Spore*, 1990's *SimEarth:*

The Living Planet. It merits only a single mention in Johnson's article, a short section where Will Wright is quoted as saying that it took inspiration from James Lovelock's Gaia hypothesis (Johnson). In the rush to hail *Spore* as something new, *SimEarth*'s groundbreaking attempts to capture the full scale of geological and evolutionary history was eliminated. Eliminated as well was its placement of the player in the role of a sort of geoengineering manager. The player must anticipate the results of actions that take place over massive timespans, very often over hundreds of millions of years of simulated geological history. In placing the players in this role, the game makes players take on the mindsets and aims of such a manager, squeezing efficiency out of every decision and cursing every setback while searching for advantages such setbacks might offer. Its more limited focus allows for a depth that the later, more technologically advanced *Spore* could never match.

Yet the still-developing video game market was not ready for such a game, and *SimEarth* had a muted reception when it first came out. Unlike *SimCity*—Wright's first hit strategy game, which sold upwards of 3.18 million copies in the late 80s and early 90s—*SimEarth* was only modestly successful. Reviews at the time praised the game's depth of simulation and globe-spanning sandbox but criticized the complexity and unreadability of the user interface. In a review for *Computer Gaming World*, one

Figure 6. A typical gameplay scene from SimEarth. Not the abundance of menus, each with their own complicated submenus.

critic noted that “there doesn’t seem to be the same amount of pleasant feedback that *SimCity* had to offer…many of the *SimEarth* screens change subtly enough that one must constantly study the screen for each update or constantly be calling down the reports” (Wilson 62). In contemporary terms, the game is seemingly unconcerned with the principles of user experience: ease of use, efficiency of commands, and readability of information.

But before booting up the game to be overwhelmed by menus, the thing a player who bought *SimEarth* in 1990 might note first is the absurdly long manual that the game came with. Coming in at 228 pages, the manual includes everything you need to play and understand the game: a 30 page tutorial covering gameplay basics, a 104 page reference section that includes notes on how to run the game and how the simulation works, a 51 page primer on earth sciences including geology, climatology, biology, and sociology with full scholarly references, and a 20 page collection of appendices that includes troubleshooting tips for specific challenges players might face, a glossary of both scientific and play-specific terms used in the game, an index, and various facts and statistics of the measurements and climates of other planets in the solar system. Of particular note to the player might be the section entitled “What is SimEarth?”, which lets them know that “SimEarth is a planet simulator—a model of a planet. It is a game, an enjoyable educational tool. With SimEarth you can take over many included planets, or design and create your own” (Bremer 2). This was an ambitious mission statement. To this point in time, video games across platforms had been far more limited in their imagined scale. To use examples from chapter 3, *Pac-Man* had been limited in its play area to one maze, with the only gameplay variable coming in the form of the speed and aggression of its ghostly enemies. *TradeWars* had a deep economic simulation of open markets powering its core loops, but its other systems—warfare and planetary simulation, in particular—were quite simple and did not interact with each

other in emergent ways. *The Oregon Trail* had a similar educational purpose as *SimEarth*, but it was rooted in contested narratives of American settler history as opposed to hard earth sciences and gave no sense of the broader social context in which the conquest of western America by white settlers occurred.

The second section that might help a player understand what is happening in the game is entitled "What is Gaia?", written by James Lovelock, identified in the text as the "originator of the Gaia theory" (Bremer 3). "Gaia," Lovelock notes in this section,

> is a theory about the evolution of the Earth. A theory that sees the evolution of the species of organisms by natural selection and the evolution of the rocks, air and oceans as a single tightly coupled process. In Gaia the organisms and their material environment together constitute a system which is able to self-regulate climate and atmospheric composition…Gaia is a top-down view of the Earth as a single system and is essentially physiological. It is about the working of the whole system, not with the separated parts of a planet divided arbitrarily into the biosphere, the atmosphere, the lithosphere and the hydrosphere. These are not real divisions of the Earth; they are spheres of influence inhabited by academic scientists.

SimEarth models this "tightly coupled process" of Gaian self-regulation—the interplay and interpenetration of seemingly discrete earth systems into one massive, life-sustaining process.. Because of the complexity of the Gaian system, the game necessarily presents itself as overstuffed with menus, buttons, and ultimately choices that the player must make. Indeed, on first glance at a play screen, it is difficult to parse what is happening. When booting up the game, the player is deposited onto a screen with no fewer than four separate open windows. The first

window shown is a title screen, where a jaunty tune playing over a depiction of the game's cover art. After a few moments, the cover art disappears and reveals a second window labelled "Help," which describes how to start the game, how to access the tutorials (split into a short written "Quick-Start" tutorial in the game addendum, a more extensive written tutorial in the 228-page game manual, and an on-line explainer of various game systems), and a primer on how to access in-game tips and hints. The third window is labelled "Terrain Map" and shows a game in progress, a sort of PC-based attract mode that displays an abstract pixelated landmasses' altitude. Below this landmass is a ribbon that shows five different views a player might have of the game: Geosphere, Hydrosphere, Atmosphere, Bio, and Civ. The fourth window is placed underneath the terrain map and offers a more detailed view of a specific section of the terrain map. The information available to the player in this screen is far more granular, where the player has access to information on local patterns of heat, rainfall, wind, sea flow and sea heat, and magma flow. Without reading the extensive manual, it is not immediately clear to the player how they might interact with these maps, or indeed what their goal is. They are given a satellite view of a world, abstracted charts and graphs representing climate and geological patterns, and not much else.

Figure 7. The first thing a player sees when booting up SimEarth is a massive collection of screens and tabs. Speaking from my own experience playing the game for research, it is quite an unfriendly way to be introduced to it.

The most useful information delivered to the player is in the third window. By going to "File" and picking "New Planet," a player will be able to start the game. The player is then taken

to a black menu window where they can select from four different modes: Experimental, easy, average, and hard. The difference between these game modes seems to be in the level of "Energy" afforded to the player with which to change the game world. The true decision point, however, comes in the lower section of this window, where the player can choose the planet and subsequent goal they wish to pursue. There are eight options: 1) Random Planet, where the player can sculpt their own world and generally seek to create the perfect conditions for the rise of intelligent life, which in SimEarth can take most any form, from mammals to insects to dinosaurs and everything in between; 2) Aquarium, where a player can build continents and create life for a world that is otherwise entirely oceanic; 3) Stag Nation, where a player must create a land bridge between an isolated island with a low population of intelligent mammals who are technologically frozen in the stone age[44] and a larger landmass where they will be able to spread out and expand, thus initiating a technological boom; 4) Earth during the Cambrian Era, about 550 million years before the modern day, where the player must direct the evolution of earth systems and life; 5) Earth 1990, where the player must prevent both nuclear war and global warming while providing enough food for everyone on the planet; 6) Mars, where the player must terraform the dead planet and make it suitable for life; 7) Venus, which functions much the same way as the Mars challenge but is much harder) and finally 8) Daisyworld, wherein the player is challenged to grow and destroy black and white daisies on a planet to test how this effects the temperature of a planet.

The player is overwhelmed by the massive *scale* of simulation on display, and to say that the game strives for granularity in its simulated environmental models is an understatement.

[44] Hence the name "Stag Nation", a pun on the stagnant social and technological bottleneck that these mammals find themselves in.

Chang describes scale as "a major yet neglected factor underlying a game's ability to provoke player feelings of mastery and its converse, awe":

> In the first case, one often remarked in critical writing about gamers as cybernetic systems, the illusion of control stems from not only games' "interactive" responsiveness but also interfaces and abilities that mimic the cartographer and surveyor in bestowing an information-laden satellite vision, one in which the game environment exists to be mapped and measured. But at the same time, in the place of action, speed, and god's-eye surveillance, games may also invite you to feel small, do little, and take your time doing so [which generates feelings of awe]. (Chang 71)

The satellite, god's-eye view offered by *SimEarth* allows players to more easily feel that they are in control of their simulated world, even if they are not at first comfortable with all its complexities. The cartographer and the surveyor measure the world, taking in the overwhelming world in front of them and taming it with image and math. There is much to measure in *SimEarth*. The simulation accounts for a range of ecological and anthropogenic events that impact both the climate and population of its simulated worlds, including hurricanes, tidal waves, volcanic eruptions, plagues, nuclear attacks, wars, and more, all of which trigger in response to either direct player inputs or from simulated conditions of the world. Every earth system is represented in the game. For instance, the planetary formation processes of the geosphere—cooling, core heat, continental drift, the formation of oceans, volcanic activity, and erosion—are accounted for and have continual effects on both the geologic formation of the world and the geopolitics of the technologically advanced populations of the world. This granularity is extended to other earth systems: atmosphere, climate, evolution, civilizations, and energy are all

interactable and emergent properties of the system, each impacting the other in ways both obvious and obscured.

The interplay of these systems is all more or less under the direct control of the player, who has at every moment seemingly a million different levers to pull to modify the world as they see fit. Want an ocean? Throw a meteor or two at your world so that it will seed the atmosphere with water, which will lead to rain, which will eventually lead to an ocean. Want that ocean to bear life? Cool the temperature using ice packs, lower your world's solar input, and simply wait for eukaryotic creatures to emerge from the primordial soup. What if you want to shepherd this eukaryote into a dinosaur race that eventually forms planetary civilization and leaves the planet for interstellar migration? They need food, energy, and continents to live on, and investment in philosophy to realize that war is counterproductive, and so on, but eventually it will happen. Each decision a player makes has a ripple effect through the simulated world's geo-ecological history. There is no meaningless or non-impactful button push in *SimEarth*.

SimEarth is also a compelling experiment in the efficacy of anticipation in managing earth systems, serving as what Chang calls a *mesocosm*, an "experimental [enclosure] intermediate in size and complexity between small, highly controlled lab experiments and large, often unpredictable real-world environments" (Chang 17). It allows players to set up the parameters of geological and sociological experiments, to anticipate outcomes and see how their anticipations hold up to the results. As a programmed and bounded video game, *SimEarth* lets players control the ecological and environmental inputs that a real world might experience. This is not the mere appearance of complexity. The flowchart included in the back of the game manual that walks players through some of the interactions of earth systems they must perform makes clear the intricate interplay between systems that allow for the creation and flourishing of

life. However, the very fact that a path from raw geological material to an advanced star-faring civilization can be charted at all draws attention to the predetermined nature of the game. This is how the game submerges players within anticipatory regimes, making them *feel* like a manager.

Chang is not making a mere rhetorical move in dubbing games mesocosms or in speaking of games as being ecological. In using these terms, she opens games up to analysis that provides "an ideal way to characterize the subtle negotiations that take place between human and nonhuman actors and technological assemblages during play" (Chang 20). This is important because, since the fictional game world is experienced as real, the way that the player interacts with that world becomes an important training ground for reinforcing these managerial tendencies. It inculcates a fantasy wherein the best way to manage the world is through primarily digital means; a tweak of a knob here, a turn of the dial here, a few clicks, and through the magic of computation, the world is changed. This fantasy is, in some sense, true. Computers and other digital technologies have an outsized impact on the world's environment.[45] And though this level of fine control over the natural world is itself an illusion, with every button press it can feel more and more real. It pays to understand just what is being made to feel real for the player in *SimEarth*.

Each play option presented to the player is a compelling analytical subject. However, I will focus the following section on three of these worlds: Daisyworld, Mars, and 1990 Earth. Daisyworld is the most direct engagement on the game's part with the Gaia hypothesis, the notion advanced in the 1970s by Lovelock and Lynn Margulis, that living organisms on Earth form a co-developed, self-sustaining matrix amenable to life—named Gaia—through

[45] Consider, for instance, the global reach of internet infrastructure. As noted in Nicole Starosielski's *The Undersea Network*, the majority of the world's internet infrastructure is hidden on the ocean floor. Above all else, the digital is always material.

partnerships with their inorganic environments. Daisyworld is a purely hypothetical thought experiment meant to demonstrate how the Gaian principle of a regulated environment might operate. Along with Venus, Mars represents one of the more fanciful options available to the player: the thrill of engineering an environment hostile human life into an environment friendly to humans. Though the specific timing of when this terraforming is happening isn't clear to the player, it represents a science fictional yearning for other worlds. Earth 1990 also represents a science fictional yearning, as the player is instructed by the game to achieve utopian standards of living for Earth's inhabitants through the end of war and the reversal of climate change. Of course, it is just as likely that these efforts will lead to disaster and catastrophe as well. Taken together, these three scenarios speak to the anticipatory and managerial impulse at the heart of 90s computer gaming. The natural environment will keep the world habitable, the solar system will be amenable to colonization, and human civilization need not fall to climate change, but can in fact thrive in the face of worsening technological and social crises with the proper management.

6.3 Managing a World from the Comfort of your Chair: Daisyworld, Mars/Venus, and Earth 1990

6.3.1 Daisyworld

Daisyworld is a science fictional hypothetical insofar as it is a thought experiment, a means of demonstrating how Lovelock's "Gaia" regulates temperature to ensure the continued propagation of life. Formulated by James Lovelock as a means of defending his controversial claim that Earth is a self-regulating environmental system (the Gaia hypothesis, in a nutshell), the Daisyworld computer simulation is meant to show that this regulation does not have to be

imposed by some transcendent outside actor or planetary-wide consciousness but is, rather, an emergent property of biological environments. The earliest critiques of the Gaia hypothesis were mainly along these teleological lines, arguing that the hypothesis implied some more-than-human force controlling planetary systems. Daisyworld was designed to address these critiques head on. At its most basic, the Daisyworld model runs as follows, more a "parable" than anything else: "Daisyworld is an imaginary grey world orbiting, at a similar distance to the Earth, a star like our Sun that gets brighter with time. The environment of Daisyworld is reduced to one variable, temperature, and the biota consists of two types of life, black and white daisies, which share the same optimum temperature for growth and limits to growth" (Wood et. al para. 2). For the purposes of the original thought experiment,[46] the planet has no or minimal atmosphere, and no other life is present on the planet. As the variables for Daisyworld's biome have been simplified to the level of temperature, the daisies play a critical role in regulating the temperature of the imagined world. As white daisies reflect light and cool the planet and black daisies absorb it and warm the planet, and the sun's temperature is increasing as it is brightening, Lovelock's model shows that the two types of daisies will almost always maintain a balanced population. This means that the surface temperature of the planet will never (save for the very end of the sun's life cycle when it unleashes hellish temperatures on the defenseless planet) become unsuitable for life. The daisies are an important check on what would otherwise be a steadily more hostile environment.

[46] In later versions of Daisyworld, grazing animals and predators were introduced to the biome, but the results of the experiment remained consistent: homeostasis and the regulation of conditions suitable for life.

I cannot make an argument, one way or another, for the efficacy or accuracy of the Daisyworld model in particular, or of the Gaia hypothesis in general.[47] Suffice it to say, the hypothesis has attracted its share of scientific support and skepticism, and it is seen by many as a useful, if perhaps flawed, means of understanding the explosion of biological diversity that the planet has seen.[48] What I am most interested in is how *SimEarth* makes the Daisyworld simulation not only accessible to the public—or at least, the technologically advanced American public of 1990—but transforms it into an active experiment that can be modified, tweaked, and above all, managed. This dual purpose is detectable in the game's manual, which sprinkles descriptions of the main problem players face in the scenario—"The heat from the sun is steadily increasing. If it isn't somehow regulated, the oceans will boil off and all life on this planet will die"—with mentions of tools that players can use to solve this problem (Bremer 119). Namely, the player must "Keep an eye on the Temperature Map and the Air Temperature graph in the HISTORY WINDOW to observe the regulation cycles," while the "REPORT WINDOW gives you special feedback on your Daisy-raising process" (Bremer 119). What's more, the manual encourages players to "Try testing the stability of the system by killing off many of the Daisies" that the player grows throughout the simulation in order to see "how many can be killed before the system collapses" (Bremer 119).

Something that I find intriguing in this manual is how it discusses the self-regulating biome. For his part, Lovelock always specified that Gaia is not a planetary-spanning organism

[47] That said, there is something aesthetically and even ideologically pleasing about a scientific hypothesis that insists upon the necessity of biodiversity to maintain amenable environments. It is perhaps unsurprising that the Gaia hypothesis was developed during a period of increasing ecological awareness in the 70s.

[48] For his part, Bruno Latour has relied heavily on the Gaia hypothesis in his recent work on the "new climatic regime" of the Anthropocene. See *Facing Gaia: Eight Lectures on the New Climatic Regime* (2017), the basic argument of which is that "Gaia" renders unstable traditional notions of monolithic nature, a point which Lovelock's critics misunderstood when they imagined Gaia to be a unitary organism; see my later discussion of James Cameron's *Avatar*.

but rather a carefully balanced interaction between living organisms and their non-organic surroundings, even as the former understanding is the one that has matriculated through popular culture. For instance, in the 2009 film *Avatar*, the native population of the planet Pandora speak of the existence of a planetary consciousness called "Eywa," a clear derivation of the earthy Gaia whose natural wrath can be called upon to crush the human colonizers of the planet. This point is further confused by popular retellings of the Gaia hypothesis, which often either confuse or overindulge the metaphor of Gaia that Lovelock used to frame the hypothesis to hide the mechanisms of the hard science underneath the metaphor. In a profile for *Nature*, for example, Tim Radford notes that Lovelock's work in determining the atmospheric markers of life helped lay the groundwork in developing the argument that Earth is, "in effect, a superorganism" (Radford). Likewise, *The New York Times* noted in their obituary of Lovelock in 2022 that his work "[portrayed] the Earth as a living creature," something that it most certainly does not do. Even the full name of *SimEarth*—*SimEarth: The Living Planet*—helps to promulgate this false understanding of the hypothesis, which is especially egregious considering that Maxis consulted Lovelock for the game. The manual describes in the "Notes" section for the Daisyworld scenario, for example, that "There will eventually be a breakdown point where the heat from the Sun is too great for Gaia to regulate" (Bremer 119). This serves to show that for all the game's desire to gamify the latest in earth and biological sciences, how it mediates this information to the players is still hamstrung by the public's ability to comprehend these developments. It is scientifically inaccurate to say that there is a "Gaia" that is doing the regulation of the earth's environment, yet it serves as useful shorthand all the same.

The ludic effect of this orientation of Gaia as the initiator of environmental balance is that the player *becomes* Gaia. It is the player who seeds Daisyworld with daisies, who attempts to

regulate the temperature of the world to ensure the oceans are not boiled off by the slowly rising solar temperatures. The manual's encouragement to the player to experiment with Daisyworld's balance becomes a call for the player to exercise God-like authority over the world. In this sense, though the manual's description of the Gaia hypothesis is, at its most fundamental, inaccurate, it is true to the anticipatory feeling that it is trying to create within the player. The player must become proficient at managing earth systems and will in turn be able to anticipate what each turn of the games dials will yield in the fictive world. It is, in fact, through the mediation of the computer screen that such changes will be made available and their impacts made legible. The mesocosm of the computer screen becomes a way of abstracting the scale of global Gaia, with an expansive suite of tools available to bend climate to the players will.

6.3.2 Mars/Venus

When the player turns to the section on the "Mars" scenario in the game's user manual, they are met with a small sampling of added story to contextualize the mission in front of them. "For this scenario," it begins, "you are a citizen in a nanotech level society. Your home planet is overcrowded, and the population is increasing":

> You show up for work, and find a memo from the boss that informs you that you've been put in charge of a new project. The promotion involves a small raise, but you'll have to move—to Mars. Your new job is to turn Mars into a planet capable of supporting human life. If you fail to complete this project within 500 years you'll be fired. (Bremer 115)

This delightful science fictional scenario raises several questions about the nature of the nanotechnological society that the player comes from. For one, how long do humans live in this

society such that the player has 500 years to complete their task? What is the nature of industry in this world, such that a critical job for a rapidly overcrowding and overpopulating planet can be entrusted to one person? What is the value of currency, given that the assignment of such an outrageously complex job only yields a small raise? These questions are left unanswered, both in the manual and in the game itself. Indeed, the game has no in-text mention of this framing, or at least none beyond the fact that the game's "Time Scale" is Technology, which means that the player is a member of a society so technologically advanced that the player's society "can reproduce itself through interstellar 'genetic' seeding—the ability to colonize other planets" (Bremer 107). As such, the game's time progression has slowed down to the point that individual technological advancements can have massive effects on a planet's climate. This massive technological disruption of a planet's natural environment is what allows for the terraforming of both Mars and Venus in the game.

The problem of terraforming Mars and Venus is two sides of the same geoengineering coin. The atmosphere of Mars is thin, and as a result the surface temperature is far too cold to sustain life, or, as the manual puts it, "no water, almost no atmospheric pressure, no oxygen, no plants, no animals, no nothing—except rock. The average temperature is -53 degrees C" (Bremer 115). On the flip side, Venus is far too hot for life to flourish, with a thick atmosphere serving as a grim portrait of what a runaway greenhouse effect looks like. In both scenarios, "Gaian regulation has been disabled—no life will spontaneously generate," and all life must be placed by the player (Bremer 115). There is no one golden path that the player will have to follow in order to make the planets habitable for human life, and in fact, small random variations that

occur throughout the scenarios will ensure that no two playthroughs are exactly the same.[49] That is to say, the terraforming history of both Mars and Venus that the player is responsible for authoring is an entirely contingent experience, and certainly one of the game's most extreme managerial tasks. That the player is, in fact, placed in a corporate managerial role in the game's fiction is telling of the shift in player agency that the game is indicative of. Video games, throughout the 70s and 80s, had been primarily—not exclusively, of course, as seen in Chapter 3—designed as virtual obstacle courses. As computer technology became more advanced, and as players became more immersed in digital systems, it perhaps follows that digital games would become more and more about the management of digital resources. Put another way, the games of this era come to resemble the digital work that those who had access to computers in the workplace would be familiar with.

It is curious to see, embedded deep within an extravagantly long manual for a near-forgotten and almost absurdly complex strategy game, some of the cultural roots of what is today a contemporary ideological fantasy. Before he became known most prominently as a far-right provocateur, one of Elon Musk's most passionately expounded upon visions was the colonization and eventual terraforming of Mars. For years, Musk has spoken of the necessity for humanity to become a spacefaring civilization, an idea that he has freely admitted comes from his boyhood reading of Isaac Asimov and Douglas Adams. Musk's most direct and sustained engagement with this idea is a short paper he authored called "Making Humans a Multi-Planetary Species." While he does not mention science fiction per se throughout the article—most of it is dedicated to describing in detail the rocket system that will ferry colonizers from Earth to Mars—the opening

[49] So far as I can tell, unlike other video games, *SimEarth* has no speedrunning community to speak of; there is, in fact, precisely one speedrunner for the game, a streamer who goes by Aurilliux. Even then, Aurilliux playes the Super Nintendo version of the game.

leaves little doubt about the science fictional bent of his world view. The opening section of the paper, "Why Go Anywhere?", lays out the basics of Musk's world historical view:

> I think there are really two fundamental paths. History is going to bifurcate along two directions. One path is we stay on Earth forever, and then there will be some eventual extinction event. I do not have an immediate doomsday prophecy, but eventually, history suggests, there will be some doomsday event. The alternative is to become a space-bearing civilization and a multi-planetary species, which I hope you would agree is the right way to go. So how do we figure out how to take you to Mars and create a self-sustaining city—a city that is not merely an outpost but which can become a planet in its own right, allowing us to become a truly multi-planetary species? (Musk 46)

Musk posits two science fictional scenarios for humanity's future. The first is, to hearken back to the previous chapter, a "Dying Earth" scenario, where humanity eventually decays and finally collapses and dies over a long time span. Rhetorically, this is presented as less a prediction than a historical certainty. It is not Musk himself delivering the dire news, but the cold and objective judgment of history. The alternative reads like something from Frank Herbert's *Dune* (1965) or Asimov's *Foundation* (1951), wherein to avoid the dead end of history, humanity must spread itself out into the stars, becoming essentially unkillable, or at least not subject to the freakish whims of extinction events. The document is replete with other seemingly science fictional scenarios, including a proposed series of propellant depots for reusable spaceships tucked away in various corners of the solar system. Throughout the paper, Musk shows several pictures of proposed sites at Enceladus, Europa, Titan, and Pluto. With enough depots spread throughout the solar system, one could conceivably have "the freedom to go anywhere you want in the greater

solar system" (Musk 61). Taken together, this document is nothing less than a futurist manifesto, one that is fed by a sense of extreme capitalism.

The futurist moves that Musk utilizes in "Making humans a multi-planetary species" are the same moves that *SimEarth* utilizes to keep the player's eyes on the future. And though the game ultimately must force players into a predetermined end state—the creation of habitable blue and green environments on Mars and Venus—what ultimately matters for the purposes of this argument is how the game does so through keeping the player's eyes fixed on the future. The future is not only large-scale but centered on manipulable environments. This futural gaze is especially prominent in one of the last scenarios available to the player: Earth 1990.

6.3.3 Earth 1990

Where the manual's description for *SimEarth*'s "Mars" is cheeky and fun, centering a whimsical (even workplace sitcom-y) approach to the science fictional nature of the player's task, the scenario description for "Earth 1990" is a much more dire read. "This scenario," it notes, "takes place on the Earth of today. We live in a world with pollution, war, famine, greenhouse warming, energy shortages, and the possibility of nuclear winter" (Bremer 114). Already the manual is priming the player to meditate upon the radically large scale of problems facing humanity on the cusp of the new millennium. Any one of these problems can seem overwhelming, but combined in their totality they represent a daunting challenge. Or, to use the manual's language when describing the problems which the player must face: "Too many to list here. Read your newspaper" (Bremer 114). The player must "solve all the world's problems and lead us into a future of peace, abundant food, clean air, and plentiful energy" (Bremer 114). The methods the player must use are beyond the author of the manual, who notes that "If I knew how

to solve all these problems, I'd be running the U.N. instead of making computer games" (Bremer 114). In terms of context, this is nowhere close to the way the game frames the science fictional managerial task of "Mars". Rhetorically, however, the manual is still positioning the player as a manager, and even as a savior of sorts. The implication in the manual's description of the scenario seems to be that, without the guiding influence of the player, the world will slowly slip into chaos, eventually leading to the extinction of the human race.

Given that the scenario takes place on the "Technology" time scale, the player's influence on the geology of the planet is minimal. Rather, the player is left to tinker with the civilizational and cultural interests of the simulated planet. This is where the granularity of the simulation starts to fall apart. While the player has a whole suite of options to build a planet, each of which can lead to remarkably different outcomes for the geological history of that planet, "Earth 1990" is comparatively restricted. Consider here how the manual describes the manner in which a player should promote peace: "The best way to prevent war in SimEarth is to allocate energy to philosophy" (Bremer 114). The argument being made here is that war is not so much a matter of material conditions on the ground, but rather a failure of mindset, that the problems that make up war—resource shortage, geopolitical jockeying, ideological antagonism, to say nothing of the various economic and political incentives that leads to the outbreak of nation-on-nation violence (which is the only kind modeled by the game)—are ultimately quite simple to overcome. Raising the standard of living is also as simple as "allocating [energy] to Art/Media," a gross oversimplification of the material conditions that go into raising quality of life (Bremer 114).[50]

[50] Still, this oversimplification is not inherently negative. After all, it is quite remarkable in this contemporary moment of Large Language Models and the ceding of artistic creation to algorithms to see a game that emerges from the bowels of Silicon Valley advocate spending money on philosophy, art, and media.

The purpose of these simplifications is two-fold. The first is strictly ludic: to provide players a recognizable challenge, one rooted in their everyday experience, even as it deflects from the pain of that experience. In the "Notes" to this scenario, the manual states that while "this scenario can be difficult, [it is] still more fun than the real thing" (Bremer 114). This is because the "real thing" is of a scale vastly larger than the simulation can hope to represent. This is a scenario that a player can recognize as being real, or at least inspired by reality, but there remains, at the edge, almost out of sight, the haunting presence of the real. Given the difficulty of the scenario—it is, as the manual notes, an exceedingly difficult scenario, given the limited energy the player has to pull the civilizational levers on offer like "Philosophy" and "Art/Media"—it is highly likely that the player will fail to prevent the collapse of human civilization before they finally succeed in turning humanity into a starfaring race, the ultimate goal of the scenario. Scale can be mastered, as Chang notes, but it can also be overwhelming; certainly, as a ludic challenge, "Earth 1990" is as overwhelming as any in the game, even with its necessary simplifications and abstractions.

The second reason for simplification is ideological. Again, strategy games tend to put the player in the position of a manager, presenting players with mesocosms and asking them to make them efficient, productive spaces. Whatever problems they have must be addressed, whatever shortcomings ameliorated. "Earth 1990" is perhaps the ultimate distillation of this managerial impulse: fix this broken world, prevent collapse, and lead humanity into a glorious, utopian future of abundance and space travel. This is a noble impulse, ultimately, and it reflects well on the ability of video games to "dramatize and make actionable a variety of ecological entities, processes, and framings, from mesocosmic experimentation to scalar toggling to empathy for nonhuman animals and matter" (Chang 145). But what happens when a player is asked, not to

prevent collapse, but to become the lord of the junk pile? Put another way, what if the world has already collapsed, and all that's left to fight over is supremacy over the ruins? Westwood Studio's *Dune II*, the subject of the next section, asks this question as well.

6.4 Dune II: Entropy

The opening cinematic of *Dune II: The Building of a Dynasty* quickly lays out the game's setting and its central purpose: "The planet Arrakis, known as Dune. Land of sand, home of the spice mélange. The spice controls the empire. Whoever controls Dune controls the spice." From there, the emperor of the known universe, Frederick Corrino, challenges the player: "The house that produces the most spice will control Dune. There are no set territories and no rules of engagement." With such a tempting prize on offer, this challenge sparks an immediate war for control of the planet between the three most powerful political factions in the universe—the houses Atreides, Harkonnen, and Ordos—each of whom send overwhelming military forces to the desert planet to establish control over it. Arrakis is presented to the player as a dead world fit only for extraction, a site of bloody warfare with no history and no future beyond the brutality of technologically-advanced colonialism. It is a grim portrait of a potential future, one where the better angels of our nature grease the skids of tanks. The politics of *Dune II* is that of a zero-sum game: there can be only one victor. All others are lined up against the wall and shot. Whereas most games tend towards images and environments that imagine a world of unending abundance, *Dune II* operates on the logic of "entropy, or the thermodynamic principle that the universe tends toward increased disorder or degradation of matter and energy" (Chang 146). Arrakis is barren and blasted, and spice extraction props up a political system that is seemingly in its death throes.

It is the player's job to further disintegrate this social order and send it tumbling to the dustbin of history through the application of overwhelming military force. To do this, players must anticipate both the movements of forces arrayed against them, as well as the most beneficial strategic points to hold on the map. Only then can the player become the order-extinguishing villain they need to be to win.

The primary reason the game is remembered today is its formalization of the "real-time strategy" (RTS) genre. Writing for *Ars Technica*, Richard Moss defines RTS games as those that "involves base building and/or management, resource gathering, unit production, and semi-autonomous combat, all conducted in real time (rather than being turn-based), for the purpose of gaining/maintaining control over strategic points on a map (such as resources and command centers)" (Moss). Put another way, the basic gameplay loop is as follows: "Build, gather, brawl, repeat" (Ross). Per Ross, the earliest example of a game to include all these elements in this sequence is the 1982 Intellivision game *Utopia*. *Utopia* is a two-player game which takes place over anywhere from one to fifty rounds, each of which can last from 30-120 seconds. The goal of the game is simple: build up an island civilization and score more points than your opponent. Points are awarded for the stockpiling of food, the construction of buildings, housing and keeping the island's population happy, and generating income. Random weather events like rain can improve a score as it will increase crop yield, while catastrophic

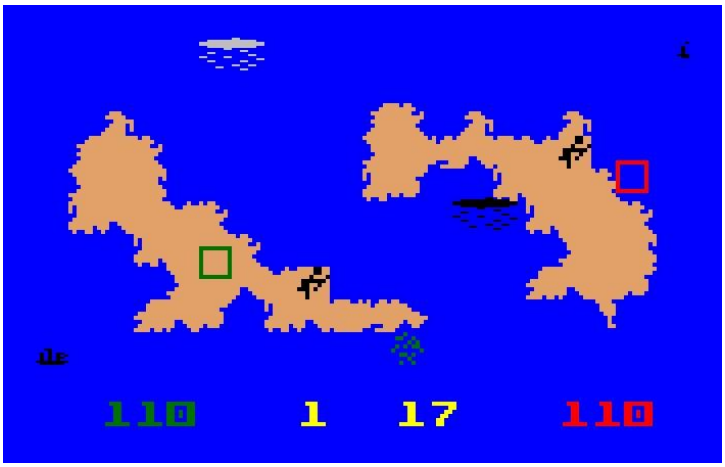

Figure 8. A screenshot from the game Utopia. Not the clouds in the upper left hand corner of the map, signifying poor weather that both players must deal with. Image credit to Richard Moss.

weather like hurricanes will decrease a score. Pirates can also spawn and attack coastal and ocean buildings, which also drains a player's score. However, the main innovation the game offered was the competition between players. At the same time that players could build up their own civilizations, they could attack the opposing civilization, including destroying opposing fishing boats to decrease income or spending money to foment unrest and resistance in the island's populace. In short, players synchronously affect the playing condition of their opponent in real-time rounds. The best *Utopia* players deftly manage the balancing act of building up their island's economic and agricultural infrastructure while undercutting their opponent's ability to do the same. RTS is synonymous with abstracted representations of mass warfare. It combines the overarching decision-making inherent to strategy games—what to build when, what resources to dominate, how to make war against enemies and what the primary targets will be in that war—with the moment-to-moment manual dexterity required of action games.

By today's standards, *Utopia* is rudimentary, but the balance of responsibilities and direct competition with another player in real time represented a profound paradigm shift in strategy game design. To this point, strategy games tended to be turn-based, with players making moves and countermoves against each other one turn at a time, much like a game of chess. Each move the player makes both opens and constrains a new potential set of moves that can be made, and the play state shifts accordingly. It is possible to anticipate what strategies an opponent might deploy and to anticipate how certain strategies might force them into an unfavorable position. RTS games speed these anticipatory shifts considerably, rapidly accelerating the move-countermove design of strategy games. Competition is no longer a perfectly symmetrical series of repartees, but rather a high-dexterity physical challenge. At the absolute height of RTS gameplay, play requires an almost absurd level of micro-decision-making skills and finger speed.

Consider, for example, the most notable measure of RTS player skill, actions per minute (APM). An RTS "action" can include anything from selecting units to delivering move and attack orders to constructing buildings and is typically measured by the rate of mouse clicks and button presses to achieve these goals. To give an idea of the gulf between a casual and professional player, consider that a casual player averages an APM of 50. A more experienced player might see a bump of their effective APM to upwards of 75. Professional players, on the other hand, routinely achieve APM rates of 450 during particularly strenuous moments, and the record for APM is 818, held by *StarCraft* player Park Sung-Joon. To master an RTS is to master time itself. A player must understand both the direct impact of their immediate choices on the playing field and the future implications that their decisions will have on their opponent.

Dune II was released ten years after this early example of the genre, and it represented both a technological and ludic leap forward in several ways. The first leap was the fact that it was the first game to be labelled an RTS. It was, in fact, *Dune II*'s producer Brett Sperry who coined the term, a marketing slogan meant to streamline the publisher's attempts to explain what the game was to press outlets (Maher). Second, it refined RTS design elements into one slickly produced package. Many of the elements first seen in *Utopia* were kept in *Dune II*, most notably the need to acquire currency to construct buildings and units. What changed, however, was the primary gameplay loop. Setting aside scoring points as the primary goal, *Dune II* tasks players with a comparatively straightforward goal: eliminate enemies. Rather than having a static and totally visible play map, players must balance their infrastructural projects with exploration. They must find the enemy base, set up perimeter defenses, and send out units to find enemy weaknesses before massing units into a large army to attack that enemy base, all the while anticipating where and how their enemy will do the same so that these attempts can be foiled

(Moss). In simplifying the player's goal and giving them more tools to achieve that goal, *Dune II* standardized what would become the RTS playbook, a style of gameplay that places anticipation at the center of its design philosophy.

To complicate and enrich this anticipatory experience, one important innovation that *Dune II* offered was the diversification of factions. Up to this point, early examples of RTS games like *Utopia* put players on an entirely equal footing, able to do and build everything that their opponent could do and build. In *Dune II*, however, the houses offer slightly different experiences for the player, beginning with the coloration and selection of buildable units. The houses are color-coded for easy identification on the battlefield: the Atreides are blue, the Harkonnen are red, and the Ordos are green, each color popping against the largely tan, brown, and grey backgrounds of the maps. The buildable units for each faction also differ slightly, representing the ethos of each faction. The Atreides prioritize so-called desert power, with their heavy infantry unit replaced instead by the Fremen natives of Dune. They can also build a special "sonic tank," which fires deadly high-pitched sound waves at opponents. The Harkonnen, meanwhile, are coded as cruel and aggressive, caring nothing for violating the taboo against nuclear weapons that pervades the *Dune* narrative.[51] Reflecting this cruelty, they can build a special "devastator" nuclear-powered tank, as well as employ a nuclear missile called the "death hand" that can eradicate large portions of enemy base and instantly kill swathes of troops provided it lands accurately. The Ordos are cold and calculating merchants, skilled in the arts of subterfuge and misdirection. They can train special infantry units called "saboteurs" that can destroy or capture single buildings, as well as a mobile missile launcher called the "deviator,"

[51] The use of nuclear weapons is strictly prohibited in the *Dune* universe by the Great Convention. Any house caught violating this prohibition faces planetary annihilation by imperial forces. This does not, of course, stop the hoarding of nuclear weapons by the great houses.

which can temporarily turn units of a different faction into an Ordos unit. Taken together, these unit differences point to a profound difference of military philosophy between the factions. The Atreides, typecast as the most noble of the three houses, value advanced weaponry and relationships with the natives of Dune as edges in combat. The Harkonnen are interested primarily in overwhelming (though imprecise) displays of violence to achieve their ends. The Ordos are cunning, preferring to achieve victory through guile and spy craft.

The houses also differ in narrative texture from one another. This is seen most primarily in the different advisors, or "mentats," that acts as a between-mission and in-mission guide for the player: Cyril for Atreides, Radnor for Harkonnen, and Ammon for Ordos. In keeping with the "noble" stylings of the Atreides, Cyril is a dignified, blue-eyed, blonde diplomat clothed in blue robes. Radnor is, to be frank, verging on Jewish stereotype, with a long, hooked nose and blood-red lips, the overall effect being that of a brutish rat. Ammon—a name whose demonic overtones is hard to miss—appears to the player clad in green robes with an equally ostentations green ring, hunched slightly to the left, with a long brown ponytail and cunning glance. Cyril constantly implores the player to win for the glory and honor of the Atreides. Radnor will command players to annihilate the enemies of the Harkonnen, who he often calls "foolish" or "weak." Ammon will appeal to the player's desire for a place within the Ordos "cartel," promising in essence corporate promotions for adequate performance. Though there is little practical difference in how a computer opponent will perform against the player—a discussion of *Dune II*'s rather weak AI follows—the collective weight of these presented differences is enough to encourage the player to consider how their engagements with these noble, brutal, and sneaky factions respectively might play out in their missions.

Regardless of which house the player selects at the beginning, the first mission is the same. To prove their initial worth to the houses, they must mine 1000 credits of spice and fend off attacks from a rival house. Here, in this first mission, the basic gameplay loop of *Dune II* is revealed to the player. To attain currency, the player must first build a wind generator, which provides enough energy to power a spice refinery, which will send out a harvester to collect spice, which will then return and deposit spice into the player's bank account. The player may then purchase military buildings (which consume energy, necessitating the building of more wind generators) to build up an army, which can then sally forth to destroy the enemies on the map. The player is graded in a post-mission screen, where they are shown their overall score, the time it took to complete the mission, the rank they have attained, and a breakdown of how much spice they were able to harvest, units they killed, and buildings they destroyed. The rest of the game, no matter the variations to the individual missions—more enemies, fewer enemies, more spice, less spice, capturing or destroying a particular building in an enemy base—follows this basic building pathway and structure.

To play the game is to learn how to manage spice production, how to efficiently develop a military, and how to play against the computer. I will handle each of these three facets of the game in turn. First, spice production. A spice refinery deploys a special unit onto the map: a harvester. A harvester is utterly defenseless; it has no means of protecting itself against either enemy attacks or the intrusion of massive sandworms, which will eat them if not paid attention to. Their only purpose in the game is to refine spice and deliver the player credits which can be used to buy more buildings and units. However, there is a catch: the refineries can only hold 1000 credits worth of spice. This means that the player is incentivized to spend these credits in order to keep the spice flowing through their economy. In other words, there is no reason to

hoard spice. The ideal game of *Dune II* is a constant push/pull of the number of credits going up and then down quite quickly as the player builds up more buildings and units. In the later game, it is not uncommon for the player to mine far in upwards of 30,000 credits of spice to fuel their war machine. Stasis means death on the harsh sands of Arrakis.

The second facet of the game is the efficient building up of a solid military. The player will always start with at least several units for base defense and forward scouting; ideally, the player will use these units to find the location of the enemy faction's base so that they know where to send future forces and from where attacks will arrive. From there, the player can strategize what forces to build up for their attacks on the enemy base. Generally speaking, players will have to build heavy units like tanks to destroy opposing buildings. This relates to the third skill the game expects you to master, which is how to play against the computer opponent. The AI of *Dune II* is quite easily manipulated, in part because much of the seemingly emergent complexity of the AI's movement is an illusion. Per the *Dune II* wiki, the AI "will only attack the side of the player's base facing its base," and will only attack a single building until it is destroyed, thus rendering sneak attacks against unexpected targets impossible. It is also "generally incapable of flanking or ambush maneuvers," and will "[send] attacking units as soon as they are built from their base instead of assembling an attack force," which means that players will face a steady trickle of easily destroyed units rather than an overwhelming invasion. The AI has no understanding of positioning on a battlefield as well because it will fire on its own buildings to eliminate player troops in its sightlines and will become trapped by walls if surrounded. Perhaps most embarrassingly, "if you attack an enemy harvester with an infantry unit and let it retaliate (by squashing it), it'll remain stopped and halt their spice production" (*Dune II* Wiki). The upshot of all this easily abusable AI under the game's hood is that it

becomes, in the hands of a skilled player, quite easy to anticipate what the AI will do at any given time and to plan ahead accordingly. This means that factional differences are largely illusory beyond basic unit options. The Atreides do not fight nobly, the Harkonnen are not any more brutal than their opponents, and the game engine literally disallows Ordos from executing tricky sneak attacks. This does not mean that players cannot feel anticipation in reference to these perceived differences, and indeed, there is no way for casual players to know these abusable secrets without a keen sense of observation. What this does mean, however, is that more seasoned players can predict, with a precise level of certainty, how their movements effect their computer opponents.

The player in *Dune II* is responsible for creating an economic engine that can destroy their opponent. But importantly, this economic engine is bounded within the limited and linear framework of the game engine. There is, after all, only so much spice available to harvest, introducing a sort of "natural time limit" to the player's attempts at conquest: "run out of spice before you gained the upper hand, and there was no way you'd win" (Moss). Players must carefully plan out and anticipate the minimum amount of spice needed for victory, even while the optimal conditions for victory rapidly deteriorate over the course of the round. Chang notes that many games tend toward visions of infinite energy and the eradication of waste, including contemporary mobile games like *FarmVille* and farming simulators like *Harvest Moon*. These games imagine virtual realms where there is always more to accumulate and build and where there are no meaningful limits aside from the time required to gather materials. What's more, these farm games offer worlds "void of workers but replete with labor-saving technology…thus inadvertently repress[ing] the capitalist drama of modern agricultural history and economics" (Chang 169). *Dune II*, on the other hand, is a game of increasing entropy. The human cost of

resource extraction is always on the screen, from the mechanized labor of the harvester, the infantry that guard the harvester from attacks, the armies created from the harvested spice, and the ever-shrinking natural stores of spice that are slowly eroded and erased from the map as the player feeds their war machine. Indeed, the game revels in the destruction on display, with heavy weaponry scarring and cratering the land and mechanized units exploding into piles of debris upon death. More than anything, the player learns to anticipate through play the destructive consequences of their warmongering. This is certainly a more malicious form of ecological and economic management than *SimEarth*, which seemingly assumes that players will have the best interests of their world at heart. It is perhaps sufficient to say that this extreme competition better reflects the internal market politics of the technology sector that *Dune II* emerged from. For as much as the California Ideology and its countercultural overtures suffused technology companies, nothing can paper over the capitalist impulses that underline it. *Dune II* is perhaps one of the purest expressions of that anticipatory impulse.

6.5: Dune II, Environmental Awe, and the Certainty of Collapse

Like the other games analyzed in this chapter, *Dune II* possesses a certain sense of large scale. There are several factors that demonstrate this sense. First, the player has three more or less different factions to play, an innovation during an age where many of the most popular video games center the acrobatic movements of a recognizable "mascot" protagonist like Mario, Sonic, or Donkey Kong. Rather than controlling one character, the *Dune II* player is tasked with moving an entire army across the map and coordinating attacks on enemy positions, all in one continuous, real-time moment. This sense of temporal immediacy lends the game urgency.

This sense of immediacy lends the game a sense of urgency, as to get the armies where they need to go requires a mastery of the basic gameplay loop. To destroy an enemy base and win a mission, a player must build a spice harvesting infrastructure, accumulate enough spice to build buildings that can build units, build units, coordinate unit movements, and order a coordinated attack to ensure the proper application of overwhelming force against an opponent. At the highest levels of the game, even the longest mission can be completed in around 15 minutes, a time that, in my own playthrough of the game, was more than doubled. This is to say that there is a high skill ceiling for the game, a level of individual mastery that can be achieved that leads the truly excellent players to positively tower above their opponents. And though this is true for many games—speed-running communities are a testament to the absurd heights individual players can reach in the mastery of a game's systems—*Dune II* stands as one of the first games where the sheer number of choices a player can make at a given moment is truly overwhelming. To put it another way: even the most novice player of a game like *Super Mario Bros.* can tell what it takes to win the game. Just move to the right and find the flagpole, dodging all or most of the obstacles between you and the goal. *Dune II* offers no such luxuries. The primary feeling the game is attempting to impart to players is one of mastery.

Absent from the game, however, is a sense of awe. Though the player does get a sense that they are conquering an entire planet—consider here the *Risk*-like board the player slowly fills in with the primary color of their faction—the planet they are conquering is, to be frank, quite boring looking. The ground the players fight on is separated into three colors: a sort of reddish orange to signify sand, an even redder orange to signify spice, and a pebbly gray to signify stone that the player can build buildings upon. If there is awe to be found, it is in the

machinery of war that the player creates and assembles and ultimately exercises upon their opponents; but there is no awe to be found in the artificial environments of *Dune II*'s Arrakis.

Indeed, there is little in the game that would indicate it is environmentally oriented at all, as Buell would imagine it. In its depiction of the blood and treasure cost of imperial warfare, the human interest is certainly the only legitimate interest considered. There is no discernible human accountability to the game's environment, given that spice exists only as a means of fueling the various factions' war economies. And given the static nature of the game's depicted environments—the way in which most every map looks identical to all the others—then the environment is certainly taken as a given rather than understood as a process. What there is, however, is a sense of the nonhuman environment as "a presence that begins to suggest that human history is implicated in natural history." Consider again the words of *Dune II*'s opening cinematic: "The spice controls the empire. Whoever controls Dune controls the spice." This imperialist, colonial chiasmus lends the enterprise of conquering Arrakis a sense of historical inevitability. The planet is the center of imperial power because of the presence of spice, which must be extracted for its own sake. Paradoxically, this inevitability only strengthens the game's sense of anticipation. If there are only two binary outcomes of a given match of *Dune II*—ultimate victory or total defeat—the player must carefully weigh any decision they make against these poles. If there is a constricted range of outcomes, anticipation only seems to accelerate.

This inevitable, binary outcome is also reflected in the game's story. Throughout the campaign, it becomes clear to the player that the Corrino empire—the stable political pillar upon which *Dune II*'s political reality hinges—is dying. Regardless of which faction a player selects, eventually it is revealed that the contest the Padishah Emperor has inaugurated—wherein the house who produces the most spice will be given control of Arrakis—is secretly a way for the

emperor to weaken and eventually destroy the player's faction. The player is presented with a strict binary: if they fail in their military conquests, their faction will be destroyed; if they succeed, then they will have crushed all possible checks on their faction's authority and ascend as the preeminent stellar civilization, causing other civilizations to collapse. The extent that the player's success represents failure is dependent on one's political leanings, but either way, one might be reasonably skeptical of a unipolar world, whether it comes in red, blue, or green. The result is the same: either the retrenchment of one unipolar galactic order, or the ascent of another. The empire and the faction are locked in a zero-sum game that permits no concept of cooperation or multiple winners. There is merely *a* winner; all others are lined up against the wall and shot. This is literally spectacular violence that signifies the collapse of moral and political boundaries. There is no war crime too heinous for the factions to commit, whatever their professed sense of honor. This sense of violence is also present in the final game I analyze, Sid Meier's *Civilization II*. This anticipation of violence is found, however, not only in systems of state-on-state warfare, but in the violence the player can enact against the natural environment. In *Civilization II*, however, nature has the tools to fight back against this violence.

6.6 Civilization II: Collapse

The year is 4000 BC. Rome has just been founded with a population of 10,000 people and Julius Caesar as its leader. It is situated on a broad plain next to a river, with bountiful wheat fields nearby, as well as several small forests. This is good, as that means the immediate needs of Rome are taken care of. There is a surplus of food from the flood plains and enough raw materials to enable large construction projects. To the north is a small barbarian village that will attack the city if defenses are not built up. As the leader of Rome, Caesar must decide several

things immediately at the outset of a civilization that will stand the test of time. First, he must decide what Rome will produce. His options at this early juncture are limited. He can either build settlers to found another city, warriors to defend his fledgling empire, or a barracks that will improve the quality of all military units to be produced in the city. He must also decide what the city's wise men will research. After all, technological advancements will give a decided edge over any other civilizations the Romans meet. Like the choices in production, research options are limited at the dawn of history. Researching Alphabet will lead to critical civic advances including Code of Laws and Writing, both of which would spur further legal and scholarly development. Of course, if the nearby barbarians prove a larger threat than initially supposed, Bronze Working would allow for the creation of higher-quality soldiers. This would also have the benefit of leading to Currency, as bronze weapons spur the early development of coinage and the birth of formal economics.

Decisions made in these early moments of *Civilization II*—what to research, where to found cities, what units to build, and so on—eventually come to shape the direction a player's civilization will take. Focusing on military research and constructing an army positions the player for a more warlike campaign, while focusing on increasing scientific production will give the player a more or less permanent edge in technological prowess. Or perhaps the player is merely interested in survival, wanting to reach the end of the game's timeline in 2020 AD. There are three ways to win a match of *Civilization II*: conquering all other players, launching a starship capable of reaching Alpha Centauri and forming an interstellar human colony, or having the highest score at the end of the game. These victory conditions are carried over from the first game, and future games would expand the variety of conditions players might strive for. These wins include: a cultural victory, wherein a player can develop a culture so overwhelmingly

dominant that they become the *de facto* most influential civilization in the world (often rendered humorously as "My people are now buying your blue jeans and listening to your pop music!"); a diplomatic victory, where a player is elected world leader at the United Nations; and a religious victory, where a religion of the player's creation becomes the most powerful global religion in the game. These victory conditions imply a level of possible cooperation between the various peoples of the world, a certain sense of unity that can overcome the violent cycles of earlier times.

Civilization II allows for no such unity. To win, you either eliminate all other threats, ensure that your civilization will be the one to colonize the stars, or merely survive and become the most powerful nation in history. There can ultimately be only one winner in this world. And yet, it is also a game of failure. Like the other strategy games covered in this chapter, it is complicated enough that the player will likely fail many, many times before they finally win. That is to say, it is likely that the player will not lead their civilization to victory, but rather to an ignominious end, a historical collapse the likes of which history is littered with. More specifically for the purposes of this chapter, however, the simulated environment can collapse under the weight of industrial pollution and nuclear detonations, melting the polar ice caps and flooding the world. Chang notes that "collapse means to slip or fall together," and in ecology in particular, it "refers to system breakdown, or failure, and thus is often associated with a rhetoric of 'the point of no return'—push a habitat or a species too far past its carrying capacity or abilities to adapt, and we may lose it entirely" (Chang 188). Outside of game breaking errors or hardware failures, a games system cannot collapse. However, in theming, texture, and mechanics, it can simulate what collapse might look like, allowing players to "'stay with the trouble' in a time of unprecedented environmental crisis" (Chang 189). Failure is a necessary

model through which to analyze *Civilization II* because the environmental crisis is "of our own making, [whereas] apocalypse implies a fate visited upon us by some higher power beyond our control" (Chang 189). Where, when, and how failure happens in *Civilization II* depends on several factors, which will be discussed at length here. This simulated history of failure can often be traced back to the decisions players make in the early game and the relative aggression of their neighbors, and poor play or bad luck can ensure collapse. The possibility, or even the inevitability of failure, must then be included in the calculations that players run when playing the game. This is to say that, in keeping with Chang's observation that environmental crisis is the result of human intervention, *Civilization II* allows players to anticipate the effects their industrialization and nuclear warmongering can have on the environment.

Failure and collapse are necessarily connected with extreme violence, particularly in video games. But unlike the more spectacular instances of violence in games like *Grand Theft Auto* and *Call of Duty*, violence in a strategy game like *Civilization II* is almost always obscured through multiple layers of abstraction. On a basic level, the game is simply not graphically detailed enough to depict the kind of violence that critics often fret about games having. A graphically detailed player avatar running over a sex worker, as in *Grand Theft Auto*, is sure to draw headlines; pillaging and annihilating a graphically distorted empire in *Civilization II* hardly rises to the same level of visceral violence. Chang notes, however, that this "limiting" of perspective—that is, of what counts as violence in a video game—"ignores the reality that a different and more pervasive violence is constantly being perpetrated in today's world, what Rob Nixon has called the 'slow violence' of environmental destruction and cumulative toxic effects" (Chang 194). I have detailed Nixon's slow violence framework earlier; suffice it to say, given the broad swath of playable history that *Civilization II* allows for, the player is absolutely put in the

driver's seat of slow violence, becoming themselves a historical driving force of its proliferation, even as the relative speed of the game renders the slowness of its violence invisible. That is to say, the environmental milieux of *Civilization II*—taking place in a supposedly global context, with access to all of a planet's landmasses and with the ability to affect millions of simulated lives through the exploitation of all of the planet's resources—serves as a canvas upon which the player can paint a terrifyingly rapid history of violence. This is an impersonal, almost rational form of violence, and indeed, political, economic, and cultural struggle in the game—war, in other words—can often resemble nothing so much as a bureaucrat balancing double-entry account books.

If this sounds hyperbolic, consider the most famous game of *Civilization II*. Beginning in 2002, it emerged from a sense of curiosity: what would happen to the simulated world and its civilizations if the game were allowed to continue past its imposed in-game end date of 2020? And so the player, a person known under the screenname Lycerius who posted a thread on Reddit in 2012 detailing the experiment, allowed the game to run for nearly 10 years, to 3991 A.D. in game time. The result of this temporal stretching was almost comically grim, a "hellish nightmare of suffering and devastation," in Lycerius's words. Stretched far past the programmed boundaries that MicroProse had designed, the world had fallen into a devastating holding pattern of constant nuclear war between the remaining three superpowers of America, the Celts, and the Vikings. Over the span of the 1,700 year long war, over 90% of the simulated world's population had been killed either by direct nuclear strike or through famine caused by the subsequent lack of arable land. Compounding this nuclear devastation was the repeated melting of the ice caps that Lycerius reported, with "over 20" melting events turning much of the world into irradiated and flooded "swamp land." All hopes for peace between the three superpowers was frustrated both

by nuclear sneak attacks launched after any peace treaty the nations signed and intense ideological struggle between the nations. For example, the Celts, Lycerius's nation, are autocratic communists. Likewise, there seemed to be little hope for improving the lives of any of the citizens of the remaining cities. The intense warfare between the three nations had led to a constant stream of military production, where units would go to the unchanging front lines only to be vaporized by nuclear weapons within a couple of turns. Lycerius ended his post by noting that his ultimate goal in posting about this was to "end the war and…clear swamps and fallout so that farming may resume. *I want to rebuild the world. But I'm not sure how*" (Emphasis mine).

This story made the rounds on various gaming and technology websites, including *Kotaku*, *Ars Technica*, and *Wired*. Its seeming similarities to the world of George Orwell's *1984* was noted by several commenters in both the original Reddit thread and the various news reports about the 10-year-old game. This story represents yet another example of people reaching for science fiction to explain and ground their experiences. Indeed, it is difficult to read through the account of Lycerius's original post and not see how, even in the earliest phases of its presentation to the public, it was being constructed as a sort of science fiction.[52] Of particular interest to me is Lycerius's final plea to the Reddit community to help him rebuild the broken world he had a hand in creating. This plea attracted a wide array of responses from the posters. The responses ranged widely in terms of immediate usefulness, but the most upvoted response, by Reddit user DonutEF, seemed to be the most actionable response: "Forget ending the war," they started. Instead, DonutEF advised attempting to force a military stalemate, changing the government of his civilization from communism to fundamentalism to build up happiness and money, improving cities by cleaning up the fallout around them and enabling the resumption of

[52] It would, in fact, serve as the basis for a Reddit community of dedicated fanfiction writers and theorizers called r/theeternalwar.

agriculture, and—this was the crucial part—building up enough spies in every enemy city to nuke them, and then send in a strong ground force to "mop up the mess." "Diplomacy's [sic] failed in this world," DonutEF said. Because of this, "you've got to hit em hard and take over the world for the greater good" (DonutEF). For his part, Lycerius noted that the primary problem with this place was "making enough engineers to outpace the ice caps melting, which happens every century or so"; still, "I think you're correct and this is the leading theory at the moment."

This proposed solution, though it makes sense from a ludic perspective, is of course horrifying. It asks Lycerius—or any player willing to play through the scenario, as Lycerius made the save he was working from publicly available for download and play by others—to become a monster. Fundamentalism is *Civilization II*'s ideological equivalent to conservative theocracy. Rather than attempting to build up a diplomatic solution to an environmental and military crisis, it involves snuffing out the last embers of democracy, trading lasting, sustainable peace between nations for what is essentially fascism.[53] And there is, as Lycerius noted, no real way to know if such a sacrifice would even lead to a better world. After all, the continued threat of global warming lurks ominously in the background of the world. Lycerius's world is one where both humanity and the natural world are under constant threat, not only by the nuclear capabilities of humans, but by unceasing and destructive cycles of the natural world itself. The problem that Lycerius posed for the Reddit community—how to end the war and rebuild the world—is part and parcel of the project of gaming writ large. Chang notes that "all games arguably derive their exigency from the initial posing of a problem that needs fixing, as well as the threat of failure without player action" (Yang 188). She conflates this need for problems and problem solving in games with the concept of collapse. Although this conflation might seem a

[53] Or, as another Reddit user put it in a response to Lycerius, "Listen to this guy, he's a real-life dictator."

"touch dramatic" to apply to games, "as anyone who has ever played a children's game of pick-up sticks or the wooden tower game Jenga could attest, gravity is one of the very first constraints we encounter in elementary play. In other words, things fall, be they blocks or civilizations" (Chang 188). What I am most interested in analyzing is how *Civilization II* anticipates the failure of human civilization through a primarily ecological understanding.

6.7 Civilization II and Player Choice

In thinking through failure, Chang is primarily drawn to the work of queer theorist Jack Halberstam and games scholar Jesper Juul, who both emphasize how failure "preserves some of the wondrous anarchy of childhood." By focusing on failure, Chang reminds her readers that "collapse has an internal logic, one that does not allow us conveniently to displace responsibility onto external forces. Collapse happens from within, even if at times it is inevitable"; it is more helpful to think of "failure and collapse as two points on a continuous spectrum" rather than as discrete simple or complex events (Chang 189). To focus on failure is to think through how environmental collapse "links collective action or inaction to the types of cascading organizational faults at work in the worst natural and human-made disasters. Together, failure and collapse encourage trans-scalar examination…and reinforce the idea that games are both economic and ecological systems" (Chang 190). Games are privileged media for understanding the role of humans in ecological failures because they both model such failures in a more or less safe environment and emphasize the structural and organizational factors that determine failure in economic and ecological systems. Part of this is due to the bounded nature of games. As essentially programmed models that show cascading examples of cause and effect, games are

intensely structural. What's more, however, is that "unlike the realist novel," which developed in a markedly different social and technological context,

> digital games developed in tandem with some of the worst excesses of late capitalist economies as well as growing concern over human environmental impact. In a reversal of highbrow novelistic convention, games routinely indulge in the counterfactual and the cataclysmic, and players not only bear witness but are also encouraged to tinker with, jury-rig, exploit, expend, and intervene in game environments. Close cousins to the thought experiments of science fiction, contemporary digital and analog games are similarly overlooked by critics despite being generically suited to Anthropocenic storytelling. (Chang 191)

With the possible exception of *SimEarth*, focused as it is on simulating real earth science and the consequences of anthropogenic climate change in its Earth 1994 scenario, it is difficult to find a game in the 90s that so clearly allows for the ecological(?) modeling of human failure that Yang describes than *Civilization II*. Indeed, *Civilization II* is a game made up of small, moment-to-moment failures. Setting aside moments of true player error—say, a mis-click that moves a unit away from a desired tile, or forgetting to settle a city in an advantageous spot, or worst of all, accidentally deleting a unit stack—the game consists of a series of game-altering decisions that a player must make. Sid Meier—the developer of *Civilization II*—has noted before that video games are ultimately centered on presenting the player with "a series of interesting decisions" (Meier). Video games must challenge players in the moment-to-moment situations they encounter in a game with mutually exclusive decisions that dictate how the rest of the game scenario will develop. In this sense, the player becomes a collaborator with both the game developer and the game itself in the progression of a given scenario. Game developers might

present a scenario to a player, but it is ultimately up to the player how they respond to that scenario. As one of the primary agential forces in this simulated world, the player anticipates that their actions will have an outsized effect on the history of this world. In short, they go into the game expecting that the world will shift in response to their actions, including upon the state of the natural environment itself.

In the case of *Civilization II*, these "interesting decisions" include where to settle new cities, what resources to exploit first, whether to make war or pursue peace, and how to allocate the resources a player gains. In practice, all these decisions weigh on each other. Take, for example, the settling of new cities. Settling a city in *Civilization II* is one of the most consequential decisions a player can make. In the most basic sense, when a city is founded, the player is essentially making a territorial claim, establishing a semi-permeable zone of influence over its resources and territory. This zone can only be challenged through warfare. However, the settling of a city is also an expression of the player's larger strategic vision. Cities are, ultimately, an offensive tool in the player's toolkit, one that denies an opponent's access to a clearly delineated space. They can also be placed as a sort of forward operating base from which further military action can be planned and staged against opponents or serve as the production centers of a given civilization. All the goods, services, and military might of a civilization is ultimately operant in cities, and they are, in many ways, the primary unit of power in *Civilization II*. The more cities one has, and the larger and more developed these cities are, the more resources can be extracted and exploited, the larger one's military can be, and the richer a civilization can become. In short, the larger the *scale* of a player's civilization, the more forcefully they can exert their will on their opponents.

There is only one limit on the desirability of city scale in the game: pollution. Per the game's "Civilopedia" entry, pollution "is most commonly caused by the excessive production of [industrial capacity] in a city; however, it may also be caused by large city populations (after the discovery of the Automobile), nuclear attacks, or the meltdown of a Nuclear Plant." In *Civ II*, pollution radiates outward from cities: "the more [pollution] a city generates, the higher the city's chance of polluting a terrain square within the city radius each turn" (Civilization Wiki). The domain of a city can be quite extensive. In the late game, "cities" are areas of vast territorial control, with all the outlying resources and lands supporting the city at the center of its radius. There are several observations we can make of *Civilization II*'s pollution. First, it is strictly human-caused. Industrial technologies and buildings are the main culprits of this despoiling effect, which leads irrevocably to the runaway effects of climate change. The modifiers for pollution go up with the discover of the technologies "Industrialization," "Automobile," "Mass Production," "Plastics," and "Sanitation," and go down go down the discovery of "Environmentalism" and the building of "Solar Plants." In this sense, the pollution mechanics that Civ II offers are in line with three of the four criteria for an environmentalist text that Buell lays out in *The Environmental Imaginary*: the simulated human history of the game is certainly "implicated in natural history" within the game; the potentially catastrophic effects of climate change within the game means that "human accountability to the environment is art of the text's ethical orientation"; and there is a sense of the environment "as a process rather than as a constant" (Buell 7-8). This is, after all, a systems-oriented game, which is ultimately what Buell is emphasizing in his four criteria.

The criterion that the game does not quite cover, however, is the second, that "the human interest is not understood to be the only legitimate interest." That is to say, the game takes as

given that the player is motivated strictly according to their own selfish needs. Animal and plant life, inasmuch as they are rendered by the game, are important only as natural resources to be exploited. Farmlands, meat, furs, timber--the natural world in Civ II is important, but only insofar as it fuels the further expansion and conquests of the human civilizations at the center of the game. The game is best understood as operating on a sliding scale of ecological orientation, cognizant of the embeddedness of the human within the natural world, understanding that nature is a process rather than a total state, and aware of the responsibility the human holds for the natural world, but failing to place the concerns of the natural world on an even playing field with the human. This is because the ultimate purpose of the game is to impart upon the player a sense of how environmental and economic systems can break down irreparably.

Chang notes in *Playing Nature* that most games seek to omit "waste, disorder, and unspectacular forms of excess" (Chang 147). This is in part due to the cybernetic nature of games, which arose out of an extended history of computer and cybernetic science, disciplines that abhor waste and greatly value efficiency and cleanliness. It makes sense that the management games that have come out in more recent times—think here of management sims like *Farmville* and *Stardew Valley*—came out of academic disciplines that seek to elide even the specter of waste. These games seek to ensure that there is no waste, that everything the player collects, does, and manages can be put to some useful end: building a farm, forging satisfying interpersonal relationships, wealth, and ultimately, happiness. The end-goal for many modern management simulation games is an idealized sense of self-actualization. Players are not tasked with staying with the trouble because in these hypercapitalist fantasies, there is no trouble to begin with. Endless consumption means that players can imagine endless self-actualized futures.

The anticipation of grim futures is replaced with a sustained present moment that never has to change.

Civilization II, on the other hand, revels in the portrayal of waste and the inevitable application of excess to ecologically destructive ends. Like its cousins in the strategy genre before it, it ultimately sees the competition between states as one of nearly unconstrained warfare. It is about the exploitation of resources, often in the service of overtly violent ends. It is ecological first and foremost, presenting the corrosive elements of industrialization and the unceasing demand for new fuel sources that, in the late 20th century, became so associated with neoliberal globalization. Rationalism and efficiency are the ideological underpinning of neoliberalism. Infinite growth and the easy excess of resources and energy is a necessity for its operations. And as can be seen in the gameplay of *Civilization II*—consider here again the misery underpinning Lycerius's famous match—the ease and excess of production means that the wasteful expenditures of a player's attempts to industrialize and build up their military to eclipse their neighbors will almost always result in the declaration of war by computer players. Such is certainly the case at higher levels of difficulty. Hidden behind the GUI is an elaborate series of algorithmic if/then decisions that a computer opponent can make on any given turn, represented by an axis of personality traits that a civilization has. An opponent's aggressiveness is measured as being "aggressive," "neutral," or "rationalist"; their technological priorities are measured as being either "militaristic," "neutral," or "civilized"; and their willingness to expand their territory is measured as being "expansionist," "neutral," or "perfectionist." Taken together, these personality traits—which are consistent through the entire simulated time span of a given game, so an enemy civilization's orientation will remain static throughout the entirety of history—dictate what actions they take on any given turn. Like *Pac-Man*'s ghosts, this means that the

actions that other civilizations can take can be anticipated, and even manipulated. These actions do not reflect an organic decision-making process, but rather the simulated illusion of decision making. The idea behind this personality axis is that players can reasonably intuit what an opponent will focus on and what their attitude toward the player will be.

This simulated personality orientation, however, is a façade. The most efficient way for a human to play the game is to remember that "AI civs are prey, not threats. Their entire existence should be an unbroken string of humiliations, blunders, and defeats" (Melth). This unbroken string of humiliations, blunders, and defeats is possible because "*their personality basically doesn't matter*":

> Aggressive vs Rational means absolutely nothing in practical terms because 95% of AI behavior is dictated by your reputation and your relative power. Even people who *have not met you* will sign alliances with people *they have not met* to team up and attack you if you're doing too well…If you're moderately stronger than people, they'll tend to like you and not start fights with you. If you're much stronger than a civ, they'll suicidally attack you. If you break a treaty, the victim will hate you (and so will most other civs to a lesser extent). If you give a civ free stuff, they will like you for 1 turn and then rapidly revert to whatever your relative power says their friendliess [sic] should be. Basically no one ever sneak attacks you before their attitude drops to neutral or below. And so on. (Melth)

To emphasize the point, the representation of AI personality is designed to lead the player to react to the computer as if it were a person, to anticipate their moves based on what they can glean from their stated worldview when in fact, the whole framework of personalities serves only

to obfuscate the ruthless realpolitik the computer is actually perpetrating.[54] The AIs are programmed to harass and bully a player who is performing too well. The excess energy that a player can create for their civilization triggers within the computer a compulsive need to perpetuate endless war.

This programmed drive to "suicidally attack" a strong human player, by the by, is the root cause of Lycerius's seemingly never-ending struggle. In truth, neither computer opponent was stronger than Lycerius's Celtic nation. Rather, the reason they were constantly attacking him was because they were, in fact, in a much weaker position than the human player and were programmed to attack him in order to weaken him. The fastest way for Lycerius to end the war, it turns out, was to intentionally weaken himself down to their level, which would have ended their repeated attacks. This kind of self-imposed handicap, however, flies in the face of the stated goal of the game. No one on the original Reddit thread suggested such a course of action. Who could have ever anticipated that the path to peace was in removing the very capacity for such destructive conflict in the first place?

6.8 Conclusion

We return at last to N30, to the famed Battle of Seattle and the protests against the World Trade Organization that prompted Mayor Paul Schell calling in the national guard. As noted before, the N30 protests were animated in part by an ecological imaginary that was primed to

[54] This attempt to create AI that seems human is essentially the driving force behind the development of Large Language Model's like ChatGPT. In much the same way that *Civilization II* seeks to simulate strategic decisions by computer players, the basic goal of a language model like ChatGPT is to generate text that looks and reads like it was written by a human. Also much like *Civilization II*, ChatGPT requires a vast array of shortcuts to achieve even the most minimal version of this goal, including outsourcing language moderation tasks to precariously employed Kenyan laborers tasked with feeding the algorithm examples of text that includes descriptions of "child sexual abuse, bestiality, murder, suicide, torture, self harm, and incest" (Perrigo).

anticipate the very worst ecological disasters imaginable: rising waters, heating atmospheres, droughts, famines, pollution, nuclear decay, and more. And though it is unlikely that many in the crowds that protested and eventually played a part in shutting down the third ministerial conference were avid strategy game players, there is something to be said for how these games contributed to the anticipatory climate that exploded in such spectacular fashion that day. Even at the height of their popularity, the strategy games that I have analyzed here were niche consumer products, more associated with elite computer technology than even more populist video game forms like arcades and home consoles. However, the ecological imagination that they represent—that of a bureaucratic manager fiddling with knobs and levers, trying to manage unruly environments and squeeze every last bit of efficiency out of them through the crass exploitation of resources—was certainly an imaginary that the protestors explicitly fought against. Inherent in these games is the sense that the player is undertaking some kind of business venture, either literally in the case of the Mars scenario of *SimEarth* or more metaphorically in the warfare sense of *Dune II* and *Civilization II*.

In the final estimation, what can be said about anticipation, ecology, and video games? As has been noted before, video games are machines that immerse players in alternative modes of existence. More than feeling immersive, however, they are machines that cannot do anything other than make players feel. After all, the feelings players feel during a game are real: the frustration, elation, defeat, joy, and all the other things that the games analyzed in this chapter make players feel. More than this, however, they make players feel anticipation. What will the results of geological engineering be? What will AI opponents do to counter their movements? How will industrialization and pollution affect the world? Is peace possible in a world racked by climate change? These games provide only limited answers, but that emotional and affective

feed-forward—that insistent gaze at the future—transformed the more specific phenomenon of forecasting and anticipation inherent to neoliberal markets into a more general, cultural phenomenon.

In tandem with 90s science fiction, 90s strategy games are indispensable in the broader cultural turn towards anticipation. Dire ecological concerns of the 90s, intimately bound up in questions of financial speculation and newly-automated economic practices of the 80s, were the most dominant structures through which these anticipatory energies were marshalled. By analyzing anticipation and their most dominant structures in these time periods, scholars can better understand the affective development and progression of accelerating digital technologies in the late 20th century, which provides a solid platform to understand further affective development in the early 21st century. In addition to this sense of cultural and affective history, the turn towards anticipation also allows for the further justification of multidisciplinary and cross-media analyses of seemingly unlike texts. Far from representing oppositional, static, and closed networks of thought and discourse, literature and video games are in profound dialogue with one another, with developments and strains in one influencing and illuminating the other, though at times in ways that aren't immediately apparent to the authors and programmers at the time.

Conclusion: Anticipatory Futures

"We shall escape to the future…to a future unknown."—The Controller, Invasion of Astro Monster

7.1 What Have I Done?

Anticipation never concludes. It stretches on and on, into the uncertain futures of the social, economic, and natural world. I set out to answer three central questions in this dissertation: How do anticipatory energies mediate in mass culture? What was the anticipatory structure of late 20th century America? And just what were Americans so concerned about in the late 20th century? Here, at the end of my project and at the culmination of now half a decade of research and reading and thinking, I can say only that I am humbled in the face of the unknown. There is no one answer to any of these questions. Raymond Williams once noted that the basic error of most social analysis is "the reduction of the social to fixed forms," analyzing the social as if there really is a single, immutable world-view, ideology, or class outlook operant at any given time rather than multiple forms that "exist and are lived specifically and definitively, in singular and developing forms" across a plurality of social contexts (Williams 129). In this dissertation, I have claimed that anticipation developed into a dominant cultural affect in late-20th century America; in other words, that America of the 80s and 90s was saturated with a sense of forward-looking that contributed to a generally anxious mood. I focused in particular on economic and climatic concerns, including the financialization and datafication of everyday life and the threat of global climate change. Along the way, I hope I have made clear that anticipation is a feeling in flux during this time period, shifting in register and mood across media forms and generic contexts. The financialized cyberpunk world that *Neuromancer* presents to readers is of an entirely different character than the one players enter into in *TradeWars* and *The Oregon Trail*,

and the climate catastrophes of *Civilization II* are of an altogether different mood than the race-inflected tragedies of *Parable of the Sower* and *Tropic of Orange*. Anticipation is a mood that authors and programmers deploy for various purposes; at times it is anxiety-ridden, at times managerial, here optimistic, there pessimistic. But whatever their purposes, their work always reflects a greater cultural fascination with the future and what it might hold.

In keeping with Williams, here are my answers to the questions I set out with. Anticipation is vast and mutable, a feeling that cannot be fixed to any static object, product, or social relation, and in fact, such seemingly stable things are always themselves in flux. It circulates along and through mass culture across multiple media channels, including televisual, print, and computerized. As I hope I have proven throughout this dissertation, the anticipatory structure of late 20th century America seems to be one centered on this circulation. Anticipation is a lived experience, and its concerns are manifold. I have discussed financial and climatic concerns most extensively, but there are others running through my corpus of literature: the effects of drugs on human and social bodies, the emergence of the information economy, pedagogical strategies for an increasingly electronic student population, the violence that marginalized communities face, political and social upheaval before and after the imagined "end of history," and many others. Above them all hangs the specter of the millennium and the possibility of the end of civilization. Anticipation in the late-20th century is multi-faceted and complex, an assemblage of fears, anxieties, practices, and peoples that make up a rich tapestry of affective life at the end of the millennium.

But I am not interested here in simply recounting my argument, long as you have sat with it, nor in thinking about what might have been. Instead, I wish to turn here to potential future directions of research based on my framework of anticipatory affect and its various cultural

corpuses. The first of these suggestions is an extension of this current project into future eras, and some are expansions on particular clusters of interest, whether its specific moments or technologies. Some stay with anticipation closely, while others diverge either slightly or radically in focus. All of them, however, take seriously the notion that the development of anticipatory affect has a specific history and emplacement within late-century American culture.

7.2 Odds & Ends: Directions for Future Research

What follows is an overview of potential directions for future research based on the anticipatory affect framework and its focus on science fiction and video games as the privileged media of anticipatory moods. This is a purely speculative endeavor on my part, and each aligns closely with my own personal research interests. However, they represent promising threads of inquiry that could be beneficial to future explorations of the late 20th/early 21st century anticipatory mood.

I have consistently noted that this current project traces the development of anticipatory affect in the late-20th century. It can also be understood, however, as a late prehistory of widespread digitality. A potential future project might extend the historical timeline of this dissertation into the 21st century, which saw the development of a truly worldwide digital network. In contemporary media theory, networks are defined as interconnected media technologies that allow for the distribution of data. "Network" also describes the new social relations that these technologies create (Jagoda 9). Maintaining contact over noncontiguous time and space, networks produce "presence at a distance" (Virilio 16, emphasis original). As a result, networks amplify experience, enabling us "above all to see, to hear, to perceive, and thus to conceive the present world more intensely" (Virilio 12). Networks allow intense exchanges of

affect between spatial and temporal distances. The heterogeneity of networks necessitates a transdisciplinary study of their affects, one that draws from network science, media studies, and literary and cultural theory. Common to many of these disciplines is the assertion that cultural artifacts—books, films, television shows, and games among others—offer peripheral glances at networks, flashes of what they look like and how actors move within them. In other words, cultural artifacts are one of our most important tools for tracing the affective experience of networked living. The fraught relationship between the human and the nonhuman, the dissolution of the human subject, the rising awareness of the instability of cultural norms and institutions; these are central concerns in the media environment of the early 21st century. Networked digital technology, which allows for the rapid dispersal of information, connectivity, and feeling across vast distances causes an intensification of negative anticipatory affect across a broad array of actors.

Much like this dissertation, this future project could be divided into two sections: the 00s and Surveillance, and the 10s and Data. I could seek to represent a broad cross-section of cultural forms and media throughout. My goal would be to continue to illustrate that anticipation is a widespread cultural affect, a feeling and mood that permeates the daily lived realities of diverse Americans. I would also attempt to show that in the post-9/11 world, there is a deeper and renewed engagement across media with the possibility of affecting the future, particularly—following Grusin's work in premediation—to protect against traumatic experiences like terrorist attacks. If this dissertation is a prehistory of the networked world, this proposed project would act in part as a modern history of the anticipatory feelings generated by networked connectivity. It would, at least in part, drop science fiction as a dominant literary lens in favor of a broader and

more general field of cultural production, which would illustrate how anticipation became a normalized and naturalized feeling in the post-9/11 world.

Moving on, any of the sections in my proposed continuation of this current project would be an interesting expansion. There is much more to be said for how surveillance is hashed out, theorized, understood, and mediated in a broad array of cultural artifacts, and the same is true for the emergence of so-called Big Data. Literature, movies, video games, and more could feature in these more focused expansions. Such single-minded analyses would allow scholars to achieve a greater degree of theoretical depth than is perhaps achieved here, and to explore how these structures of feeling develop over time rather than merely confining them to a single decade. These proposed could also be extended to include analysis of non-literary print works as well. Graphic novels in particular would be a fascinating corpus to explore. Works like Daniel Clowes' *Ghost World* (1997), Alison Bechdel's *Fun Home: A Family Tragicomic* (2006), and Alan Moore and Eddie Campbell's *From Hell* (1989-1998) all feature extended engagements with literary and pop cultural allusions to present their narratives as preordained. In this sense, they are anticipatory engines in and of themselves, though of a slightly different character than the works explored in this dissertation.

Another direction for future research would be a scholarly examination of the history and far-reaching influence of the Minnesota Educational Computing Consortium (MECC) on the widespread acceptance and adoption of computer technology in non-office contexts. Though they gained greater widespread fame as the developers of *The Oregon Trail*, MECC was emblematic of the early history of microprocessor development, embedded as it was within the "Midwestern Silicon Valley" of Minnesota. Through early games such as 1973's *Lemonade Stand*, which was ported to the Apple II in 1978 and included by Apple in their various home

computer products throughout the 80s, MECC proved essential in the earliest attempts to naturalize and make familiar and fun the computer medium for consumers. In so doing, MECC centered anticipation as one of the fundamental principles of consumer-focused computer design, helping turn the computer from a career-oriented counting machine into a product that allowed for the infiltration of anticipatory logics into several generations of children.

I would also find intriguing a project on the place of Los Angeles in the anticipatory imagination. In one potential version of this project's chapter 5, I would have focused my discussion on Los Angeles in particular, beginning with a discussion of its status as a poster child for the 1963 Clean Air Act. There have been extensive studies into the environmental impacts of the Clean Air Act, but to the best of my knowledge none of these studies have considered how Los Angeles figures as a site of anticipatory energies. As a location often described as "the city of the future," science fictional images and ideas have often been deployed to understand the city. Often, when authors, directors, producers, and musicians need a futuristic cityscape to anticipate potential futures, Los Angeles has played host. Such a project might trace both the vast speculative economies that have animated the city and its sociopolitical development, its long history as a haven of science fictional thought and production, and its representations in films, television shows, literature, video games, and music.

The previously proposed directions are centered mostly in the latter decades of the twentieth century, through the 70s and 90s. However, given that anticipation is, as often noted, not a new affect, I would also be interested in explorations of the longer histories of the feeling. In the American context, this would perhaps take the shape of an analysis of nuclear anxieties as inherently speculative and anticipatory. Deeper and earlier American histories of anticipation could also run back through the expressions of Millenarian dread that animated much of the

various Great Awakenings, or even to the initial settling of the American colonies by Puritans, who cast their attempts with the understanding that they would be a "city upon a hill," and be made a story of if they should fail. I believe, in fact, that the longer history of settled America is one of anticipation and futurity, a dimension of deep-rooted culture that is always in negotiation with the various pressures and social contexts that such culture finds itself within.

On the topic of Millenarian dread, one potential future direction could also be a further examination of the role anticipation played in the mediation and frenzy surrounding Y2K. I began this dissertation with both a brief personal and general overview of the Y2K story, but the time is now ripe for a consideration of how the media regimes that accelerated the panic surrounding Y2K have shifted and changed in the intervening years. Brian Becker and Marley Mcdonald's *Time Bomb Y2K* (2023) is one such documentary that starts this important conversation, and with the nostalgic eye of culture turning back to this mass cultural event, the time is also ripe for a scholarly analysis. This analysis could potentially develop several promising corpuses of study. Science fictional texts represent one promising body, or perhaps works that deal with computers more generally. A multimedia analysis of various objects—computers, programs, government reports, and more fringe documents like survivalist pamphlets and VHS tapes—could also lead to an intriguing and timely project.

I also recommend that someone pick up the research I started into BBS and early online communities. BBSs allowed for the development of play spaces free from the influence of vast informatic corporations, play spaces which would eventually be remediated and absorbed by large gaming companies seeking to build their own online multiplayer platforms. There is also a vast array of archival sources of play-by-mail games that served as critical forerunners to BBS systems, and which BBS systems themselves seemed to remediate in some ways.

Finally, I would be remiss if I did not provide space to note here that, as this has been a largely American-focused project, and these proposals largely American-focused as well, that I would welcome and encourage analysis on the development of anticipatory affect in other national, cultural, and political contexts across the world. I wonder, for instance, how the development of anticipation changes in the Global South, which is (as noted in chapter 5) very often at the economic and political mercy of Western powers. I wonder too how anticipation illuminates the (potential and much-debated) oncoming Chinese Century, when the economic power of China overtakes the United States, and the unipolar world of the last thirty years is replaced with renewed bi- or multipolar great power competition. As I noted in my introduction, affect is situated, and large-scale moods embedded within particular times and places. As many social contexts there are in the world, so too must there be at least an equal number of anticipatory histories.

Again, these are only ideas, and I will not pretend that I have thought through the implications of all of them equally. Taking them all into consideration, however, I am most personally interested in two ideas in particular. First, I would be interested in exploring the history of MECC further, as I find myself more and more interested in the question of how individuals and cultures learn to use new and disruptive technologies. This reflects my own interest in the lived affective realities of earlier times and places, as well as my burgeoning interest in the history of computing, which I believe is the most profound technological and social shift in the last hundred or so years. It is likely that such an undertaking would shift, of course. For instance, perhaps an account of MECC would gradually become only part of a larger piece of the puzzle, merely one part of the larger story of how computers came to be adopted by a mass audience. The second idea I would want to explore further is the history of play-by-mail

games and their relationship to BBS systems. These early histories of non-synchronous play are fascinating to me because they represent in part the anticipatory yearning for play over distance that becomes so prominent in later video game developments. These ideas are embryonic, neither fully formed nor even thoroughly dreamed. But here, at the end of my work, they are the threads that seem to me most personally promising.

7.3 The End…?

I know I have left gaps in this project. It is perhaps too baggy, too wide-ranging in focus, and it at times shambles and stutters and staggers into areas about which I know far less than I should. I hope, as you reach the end, that you take it simply for what it is: a provocation and a wager, the beginning of a thought rather than a perfect expression. I present it as part of a larger conversation on the affective environments of late 20th century American culture, a place where I can begin to stake my own territory within that conversation. At the very least, I hope that it gives you something to think about, an idea to hold onto and turn over, and perhaps even respond to. I hope—or rather, I anticipate—that I will return to these themes in the future, but I am also relieved to put them aside for the time being.

Yet relieved as I am, I know that there is no relief from such a vast cultural mood as anticipation. It is the very ambient substance of contemporary American life. Already, as I write these words, I am receiving several breaking news reports from *The New York Times*. Fears of a new coastal brain drain as housing prices creep ever upward, the reality of educational gaps as the result of Covid, reports of congressional staffers beaten with a baseball bat by a political extremist, and even an account of a Nigerian preacher proselytizing the presence of the end

times, all flicker on my screen. Just as surely as we cannot escape the future, we cannot escape our feelings toward the future. This duality is the heart of anticipatory affect.

Works Cited and Consulted

"Action Packet." Direct Action Network, 1999. Web.

"Civilization II." *Civilization Wiki*, n.d., https://civilization.fandom.com/wiki/Civilization_II.

"Dune II." *Dune Wiki*, n.d., https://dune.fandom.com/wiki/Dune_II.

"Dying Earth." *The Encyclopedia of Science Fiction*, 17 Sept. 2013, https://sf-encyclopedia.com/entry/dying_earth.

"Rapid Climate Change." *AIP*, 2022. Web. https://history.aip.org/climate/rapid.htm

Anable, Aubrey. *Playing with Feelings: Video Games and Affect*. University of Minnesota Press, 2018.

Atack, Jeremy and Larry Neal. *The Origin and Development of Financial Markets and Institutions: From the Seventeenth Century to the Present*. Cambridge University Press, 2009.

Barbrook, Richard and Andy Cameron. "The Californian Ideology." *Mute*, vol. 1, no. 3, 1 Spt. 1995, https://www.metamute.org/editorial/articles/californian-ideology.

Barrios, Roberto E. *Governing Affect: Neoliberalism and Disaster Reconstruction*. University of Nebraska Press, 2017.

Bence, Susan. "Pokémon Go Triggers Resolution: 'We Want Lake Park to be Used, But in a Proper Way'". *WUWM*, 2 Feb. 2017, https://www.wuwm.com/environment/2017-02-02/pokemon-go-triggers-resolution-we-want-lake-park-to-be-used-but-in-a-proper-way.

Bernhardt, Donald and Marshall Eckblad. "Stock Market Crash of 1987." *Federal Reserve History*, Nov. 22, 2013. Web.

Bianchi, Jim (Iago). "Iago's War Manual For TradeWars 2022." Web.

Bloom, Steve. “The Absolutely, Positively Last Word on Pac-Man.” *Video Games Magazine* 1, 1982. Web.

Bloom, Steve. *Video Invaders*. Arco Publishing Inc., New York. 1982. PDF.

Bolter, Jay David and Richard Grusin. *Remediation: Understanding New Media*. The MIT Press, Cambridge. 1999. Web.

Boluk, Stephanie and Patrick Lemieux. *Metagaming: Playing, Competing, Spectating, Cheating, Trading, Making, and Breaking Videogames*.

Boston, Rob. “False Prophets, Real Profits.” *Church & State*, 1 Feb. 2000, www.thefreelibrary.com/FALSE PROPHETS, REAL PROFITS.-a059585405. Accessed 2 May 2023.

Boyer, M. Christine. *CyberCities: Visual Perception in an Age of Electronic Communication*. Princeton Architectural Press, 1996.

Bremer, Michael. *SimEarth: The Living Planet User Manual*. Maxis, 1990.

Buell, Lawrence. *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture*. Harvard University Press, 1996.

Bukatman, Scott. *Terminal Identity*. Duke University Press, Durham. 1993. Print.

Butler, Octavia. *Bloodchild and Other Stories*. Four Walls Eight Windows, 1995.

Butler, Octavia. *Parable of the Sower*. Four Walls Eight Windows, 1993.

Cadigan, Pat. *Patterns*. Ursus Imprints, 1989.

Campbell-Kelly, Martin et. al. *Computer: A History of the Information Machine, Third Edition.* Westview Press, Boulder: 2014. Print.

Carson, Rachel. *Silent Spring*. Boston, MA: Houghton Mifflin Harcourt. 1962. Print.

CBS. “Video Arcade ‘Addiction’: When Pac-Man was King – CBS Evening News – January 29, 1982.” YouTube video, *Shatner Method*.

CenSAMM. 2021. "Millenarianism." In James Crossley and Alastair Lockhart (eds.) Critical Dictionary of Apocalyptic and Millenarian Movements, 15 Jan. 2021, https://www.cdamm.org/articles/millenarianism.

Chang, Alenda Y. *Playing Nature: Ecology in Video Games*. University of Minnesota Press, 2019.

Chernaik, Laura. “Pat Cadigan’s *Synners*: Refiguring Nature, Science and Technology.” *Feminist Review*, vol. 56, no. 1, 1997. https://doi.org/10.1057/fr.1997.15

Chun, Wendy Hui Kyong. *Updating to Remain the Same: Habitual New Media*. The MIT Press, 2017.

Civilization II. MicroProse, 1996.

Cohn, Elisha. “Affect.” *Victorian Literature and Culture*, vol. 46, no. 3-4, 2018, pp. 563–567, doi:10.1017/S1060150318000244.

Colman, Aaron W. (Singularity). “Dnyarri’s Macro Tutorial.” Web.

Comer, Krista. “Western Literature at Century's End: Sketches in Generation X, Los Angeles, and the Post-Civil Rights Novel.” *Pacific Historical Review*, vol. 72, no. 3, pp. 405-413, August 2003, https://doi.org/10.1525/phr.2003.72.3.405.

Cowan, Alison. “Market Turmoil; Bitter Lessons Seen in Plunge.” *The New York Times*, Oct. 22, 1987. Web.

Crichton, Michael. *Jurassic Park*. Alfred A. Knopf, 1990.

Crownshaw, Richard, Jane Kilby, and Antony Rowland. *The Future of Memory*. Berghahn Books, 2010.

Csicsery-Ronay, Jr., Istvan. “The SF of Theory: Baudrillard and Haraway.” *Science Fiction Studies* 18.3, 1991. Web.

Csicsery-Ronay, Jr., Istvan. *The Seven Beauties of Science Fiction*. Middletown, CT: Wesleyan University Press. 2008. Print.

Daansgard, W., et al. “Evidence for general instability of past climate from a 250-kyr ice-core record.” *Nature* 364, 1993, pp. 218-220. Web.

Dahlberg, Lincoln. “Capitalism as a Discursive System? Interrogating Discourse Theory’s Contribution to Critical Political Economy.” *Critical Discourse Studies* 11.3, pp. 257-271. Web.

Davies, William. *Economic Science Fictions*. Goldsmiths Press, 2019.

DeLillo, Don. *White Noise*. Penguin 25th Anniversary Edition, 1985.

Den Tandt, Christophe. “Cyberpunk as Naturalist Science Fiction.” *Studies in American Naturalism*, vol. 8, no. 1, pp. 93-108, 2013.

Dewey, Richard. “The Crash of ’87, From the Wall Street Players Who Lived It.” *Bloomberg*, Oct. 16, 2017. Web.

Dunaway, Finis. “Dr. Spock Is Worried: Visual Media and the Emotional History of American Environmentalism.” *Rendering Nature: Animals, Bodies, Places, Politics*, ed. Marguerite S. Shaffer and Phoebe S.K. Young, Philadelphia, PA: University of Pennsylvania Press, 2015, pp. 138-161. Web.

Dundon, Rian. “Photos: Black Monday, the 1987 market crash that made us rethink greed’s good.” *Timeline*, Feb. 13, 2018. Web.

Dune II: The Building of a Dynasty. Westwood Studios, 1992.

Dyer-Witheford, Nick and Greig De Peuter. *Games of Empire: Global Capitalism and Video Games*. University of Minnesota Press, Minneapolis. 2009. *ProQuest*. Web.

Eagleton-Pierce, Matthew. "The Internet and the Seattle WTO Protests." *Peace Review* 13.3, 2001, pp. 331-337. Web.

Edwards, Benj. "The Forgotten World of BBS Door Games." *PC Magazine*, Jan. 14, 2016. Web.

Edwards, Elisa. *Race, Aliens, and the U.S. Government in African American Science Fiction*. LIT Verlag Münster, 2011.

Edwards, Paul N. *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*. The MIT Press, 2010.

Fishman, Robert. *Bourgeois Utopias: The Rise and Fall of Suburbia*. Basic Books, 1987.

Fitting, Peter. "The Modern Anglo-American SF Novel: Utopian Longing and Capitalist Cooptation." *Science Fiction Studies* 6.1, March 1979. Web.

Flatley, Jonathan. *Affective Mapping: Melancholia and the Politics of Modernism*. Harvard University Press, 2008.

Foxman, Matthew. "How to Win Foursquare: Body and Space in a Gamified World." *Rethinking Gamification*, edited by Mathias Fuchs, Sonia Fizek, Paolo Ruffino, and Niklas Schrape, Meson Press, 2014, 71-90.

Freedman, Carl. *Critical Theory and Science Fiction*. Wesleyan University Press, 2000.

Friedrich, Otto. "The Computer Moves In." *TIME Magazine*, Jan. 3, 1983. Web.

Gamber, John Blair. *Positive Pollutions and Cultural Toxins: Waste and Contamination in Contemporary U.S. Ethnic Literatures*. University of Nebraska Press, 2012.

Garcia, Derek. “A Neuromancer Cyberpunk Video Game Was Almost Made by Timothy Leary.” *Screen Rant*, 18 Feb. 2023. https://screenrant.com/cyberpunk-neuromancer-video-game-timothy-leary/

Gardiner, Beth. “Unequal Impact: The Deep Links Between Racism and Climate Change.” *Yale Environment 360*, 9 June 2020, https://e360.yale.edu/features/unequal-impact-the-deep-links-between-inequality-and-climate-change.

Gastineau, Gary L. “A Short History of Program Trading.” *Financial Analysis Journal*, 1991. Web.

Gentile, Douglas A. “The Multiple Dimensions of Video Game Effects.” *Child Development Perspectives* 5.2, 2011, pp. 75-81. Web.

Gibson, William. *Burning Chrome*. Arbor House, 1986.

Gibson, William. *Neuromancer*. Ace, 1984.

Gorton, Kristyn. *Media Audiences: Television, Meaning and Emotion*. Edinburgh University Press, 2009.

Hansen, Mark B. N. *Feed-Forward: On the Future of Twenty-First-Century Media*. The University of Chicago Press, 2014.

Harack, Katrina. “Embedded and Embodied Memories: Body, Space, and Time in Don DeLillo’s *White Noise* and *Falling Man*.” *Contemporary Literature*, vol. 54, no. 2, pp. 303-336, 2013. doi: 10.1353/cli.2013.0016

Herbert, Frank. *Dune*. Chilton Books, 1965.

Heuser, Sabine. *Virtual Geographies: Cyberpunk at the Intersection of the Postmodern and Science Fiction*. Rodopi, 2003.

Higgins, David M. and Hugh C. O'Connell. "Introduction: Speculative Finance/Speculative Fiction." *CR: The New Centennial Reivew*, 19.1, Spring 2019: 1-9. Web.

Hopkinson, Nalo and Uppinder Mehan. *So Long Been Dreaming: Postcolonial Science Fiction & Fantasy*. Arsenal Pulp Press, 2004.

Huron, David. *Sweet Anticipation: Music and the Psychology of Expectation*. The MIT Press, 2008.

Jackson, Roland. "Eunice Foote, John Tyndall and a question of priority." *The Royal Society*, 2019. Web.

Jagoda, Patrick. *Network Aesthetics*. University of Chicago Press, Chicago. 2016. Print.

Jameson, Frederic. "Fear and Loathing in Globalization." *New Left Review*, 23.23, Sept/Oct 2003. Web.

Jameson, Frederic. *Postmodernism, or, The Cultural Logic of Late Capitalism*. Duke University Press, 1992.

Jandl, Nathan. "Sustainable Affect: The Social Dimensions of Environmental Attachment in DeLillo's *White Noise*." *Modern Philology*, vol. 114, no. 2, pp. 433-455, 2018.

Janofsky, Michael. "Bush's Chat with Novelist Alarms Environmentalists." *The New York Times*, 19 Feb. 2006, https://www.nytimes.com/2006/02/19/us/bushs-chat-with-novelist-alarms-environmentalists.html.

Johnson, Steven. "The Long Zoom." *The New York Times*, 8 Oct. 2006, https://www.nytimes.com/2006/10/08/magazine/08games.html.

Kim, Jina B. "Toward an Infrastructural Sublime: Narrating Interdependency in Karen Tei Yamashita's Los Angeles." *MELUS*, vol. 45, no. 2, Summer 2020, 10.1093/melus/mlaa015.

Kline, Benjamin. *First Along the River: A Brief History of the U.S. Environmental Movement*. Rowman & Littlefield Publishing, 2011.

Knutson, Brian, and Stephanie M Greer. "Anticipatory affect: neural correlates and consequences for choice." Philosophical transactions of the Royal Society of London. Series B, Biological sciences vol. 363,1511 (2008): 3771-86. doi:10.1098/rstb.2008.0155

Kocurek, Carly. *Coin-Operated Americans: Rebooting Boyhood at the Video Game Arcade*. University of Minnesota Press, Minneapolis. 2015. Print.

Lammers, Susan M. "Programmers at Work: Toru Iwatani." *Programmers at Work*, 1986. Web.

Lavender III, Isiah. *Race in American Science Fiction*. Indiana University Press, 2011.

Layzell, P.J. "The History of Macro Processors in Programming Language Extensibility." *The Computer Journal* 28.1, 1985, pp. 29-33. Web.

LeClair, Tom. *In the Loop: Don DeLillo and the Systems Novel*. University of Illinois Press, 1988.

Lee, Benjamin. "Introduction." *Derivatives and the Wealth of Societies*. University of Chicago Press, Chicago. 2016. Web.

Lin, Tom. "The New Investor." *UCLA Law Review*, 678: 2013. Web.

Lipinski, Jed. "The Legend of the Oregon Trail." *Mental_floss*, July 29th, 2013. Web.

Livingstone, Sonia. *Making Sense of Television: The Psychology of Audience Interpretation*. Routledge, 1998.

Lussenhop, Jessica. "Forging the Oregon Trail." *City Pages*, Jan. 2011. Web.

Lycerius. "I've been playing the same game of Civilization II for almost 10 years. This is the result." *Reddit*,

https://www.reddit.com/r/gaming/comments/uxpil/ive_been_playing_the_same_game_of_civilization_ii/.

Maher, Jimmy. "Controlling the Spice, Part 3: Westwood's Dune." *The Digital Antiquarian*, 7 Dec. 2018, https://www.filfre.net/2018/12/controlling-the-spice-part-3-westwoods-dune/.

Masters, Nathan, William Deverell, David L. Ulin, and Christopher Hawthorne. "What Makes L.A. the 'Capital of Science Fiction'?" *KCET*, 26 Oct. 2016, https://www.kcet.org/shows/lost-la/what-makes-l-a-the-capital-of-science-fiction.

McClanahan, Annie. *Dead Pledges: Debt, Crisis, and Twenty-First-Century Culture*. Stanford University Press, Stanford. 2017. Print.

McLuhan, Marshall. *Understanding Media*. Gingko Press, Berkeley. 1964. Kindle.

Mead, Rick. "Gypsy's Big Dummy's Guide to TradeWars." Web.

Meier, Sid. "Interesting Decisions." *Game Developers Conference*, 2012, San Francisco, California. https://www.gdcvault.com/play/1015756/Interesting

Melth. "Civilization 2." *Let's Play Archive*, 31 Jan. 2016, https://lparchive.org/Civilization-2/.

Miller, Riel. "Futures Literacy: transforming the future." *Transforming the Future: Anticipation in the 21st Century*, edited by Riel Miller, Routledge, 2018, 1-12.

Mooney, Annabelle. "Games that people play: Capitalism as a game." *Meaning, Life and Culture: In Conversation with Anna Wierzbicka*, pp. 303-318. Web.

Moss, Richard. "Build, gather, brawl, repeat: The history of real-time strategy games." *Ars Technica*, 15 Sept. 2017, https://arstechnica.com/gaming/2017/09/build-gather-brawl-repeat-the-history-of-real-time-strategy-games/.

Musk, Elon. "Making Humans a Multi-Planetary Species." *New Space*, vol. 5, no. 2, June 2017, pp. 46-61, 10.1089/space.2017.29009.emu.

Newman, Michael. *Atari Age: The Emergence of Video Games in America*. MIT Press, Cambridge. 2017. Print.

Ngai, Sian. "Our Aesthetic Categories." *PMLA: Publications of the Modern Language Association of America*, vol. 125, Oct. 2010. 948-958. Web.

Nixon, Rob. "All Tomorrow's Warnings." *Sydney Review of Books*, 18 Sept. 2020, https://sydneyreviewofbooks.com/review/the-future-we-choose/.

Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*. Harvard University Press, 2013.

Northfield, Rebecca. "Gaming's Golden Age." *E&T: Engineering and Technology*, Jul. 17, 2018. Web.

Pac-Man. Arcade version, Namco, 1980.

Parsons, Patrick R. *Blue Skies: A History of Cable Television*. Temple University Press, 2008.

Phillips, Jerry. "The Intuition of the Future: Utopia and Catastrophe in Octavia Butler's "Parable of the Sower"". *Novel*, vol. 35, no. 2/3, Spring-Summer 2002, pp. 299-311, https://doi.org/10.2307/1346188.

Poli, Roberto. "Anticipation: A New Thread for the Human and Social Sciences?" *Cadmus*, vol. 2, no. 3, 2014, www.cadmusjournal.org/article/volume-2/issue-3-part-1/anticipation-new-thread-human-and-social-sciences. Accessed 2 May 2023.

Pordzik, Ralph. "The Posthuman Future of Man: Anthropocentrism and the Other of Technology in Anglo-American Science Fiction." *Utopian Studies*, vol. 23, no. 1, pp. 142-161, 2012. https://doi.org/10.5325/utopianstudies.23.1.0142

Powell, Corey S. “Cyborgs will replace humans and remake the world, James Lovelock says.” *NBC News*, 25 Aug. 2019. https://www.nbcnews.com/mach/science/cyborgs-will-replace-humans-remake-world-james-lovelock-says-ncna1041616

Radford, Tim. “James Lovelock at 100: The Gaia saga continues.” *Nature*, 25 June 2019, https://www.nature.com/articles/d41586-019-01969-y.

Reed, Aaron A. “1991: Trade Wars 2002.” *Substack*, May 27th, 2021. Web.

Rieder, John. *Colonialism and the Emergence of Science Fiction*. Wesleyan University Press, 2008.

Rieder, John. *Science Fiction and the Mass Cultural Genre System*. Wesleyan University Press, 2017.

Rivera, John. “Apocalypse now? Y2K spurs fears; Alarm: Some evangelical Christians are predicting doom and gloom for year's end.” *The Baltimore Sun*, 17 Feb. 1999, https://www.baltimoresun.com/news/bs-xpm-1999-02-17-9902170152-story.html. Accessed 2 May 2023.

Robinson, Sally. “Shopping for the Real: Gender and Consumption in the Critical Reception of DeLillo’s *White Noise*.” *Postmodern Culture*, vol. 23, no. 2, 2015. https://www.pomoculture.org/2015/07/08/shopping-for-the-real-gender-and-consumption-in-the-critical-reception-of-delillos-white-noise/

Rose, Amanda M. “The ‘Reasonable Investor’ of Federal Securities Law: Insights from Tort Law’s ‘Reasonable Person’ & Suggest Reforms.” *The Journal of Corporation Law*, 43.1: 2017. Web.

Schell, Paul. “World Trade Organization’s (WTO’s) Third Ministerial Conference (letter from Mayor Schell and Chief Sewell to David DeCourcy).” Email.

Schiesel, Seth. “Playing God, the Home Game.” *The New York Times*, 4 Sept. 2008, https://www.nytimes.com/2008/09/05/arts/television/05spor.html.

Schneider, Keith. “James Lovelock, Whose Gaia Theory Saw the Earth as Alive, Dies at 103.” *The New York Times*, 27 July 2022, https://www.nytimes.com/2022/07/27/climate/james-lovelock-dead.html.

Seabrook, John. “Game Master.” *The New Yorker*, 29 Oct. 2006, https://www.newyorker.com/magazine/2006/11/06/game-master.

Shaviro, Steven. *Discognition*. Repeater, 2016.

Shaviro, Steven. *No Speed Limit: Three Essays on Accelerationism*. University of Minnesota Press, 2015. Kindle.

Shiller, Robert. “Investor Behavior in the October 1987 Stock Market Crash: Survey Evidence.” National Bureau of Economic Research, Cambridge. 1987. Web.

Shiller, Robert. *Irrational Exuberance*. Princeton University Press, Princeton. 2000. Web.

Shippey, Tom. *Hard Reading: Learning from Science Fiction*. Liverpool University Press, 2016.

Shleifer, Andrei and Robert W. Vishny. “The Takeover Wave of the 1980s.” *Science* 249.4970, Aug. 17, 1990, pp. 745-749. Web.

SimEarth: The Living Planet. Maxis, 1990.

Slater, Katharine. “Who Gets to Die of Dysentary?: Ideology, Geography, and the Oregon Trail.” *Children’s Literature Association Quarterly* 42.4. Web.

Spielberg, Steven. *Jurassic Park*. Universal Pictures, 1993.

Starosielski, Nicole. *The Undersea Network*. Duke University Press, 2015.

Sterling, Bruce. “Cyberpunk in the Nineties.” *Interzone*, n.d. http://vadeker.net/articles/sterling/interzone_six.txt.

Stewart, Kathleen. *Ordinary Affects*. Duke University Press, 2007.

Stokes, Claudia. *Old Style: Unoriginality and Its Uses in Nineteenth-Century U.S. Literature*. University of Pennsylvania Press, 2022.

Sullivan, Patrica. "Computer Pioneer Bob Bemer, 84." *The Washington Post*, 25 June 2004.

Suvin, Darko. *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre*. Yale University Press, 1979.

Suvin, Darko. *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre*. Yale University Press, 1979.

The Oregon Trail. PC, MECC. 1985.

Totilo, Stephen. "Will Wright: Spore should have been multiple games." *Axios*, 1 Nov. 2022, https://www.axios.com/2022/11/01/will-wright-spore-video-games.

TradeWars Museum. Web.

TradeWars. PC, Chris Sherrick. 1984.

Uenuma, Francine. "20 Years Later, the Y2K Bug Seems Like a Joke—Because Those Behind the Scenes Took It Seriously." *Time*, 30 Dec. 2019, time.com/5752129/y2k-bug-history/.

Vint, Sherryl. "Orange County: Global Networks in *Tropic of Orange*." *Science Fiction Studies*, vol. 39, no. 3, 2012, pp. 401-414, https://doi.org/10.5621/sciefictstud.39.3.0401.

Virilio, Paul. *Open Sky*. Verso, 2008.

Wark, McKenzie. *Gamer Theory*. Harvard University Press, 2007.

Watt, Ian. *The Rise of the Novel; Studies in Defoe, Richardson, and Fielding*. University of California Press, 1964.

Weart, Spencer R. *The Discovery of Global Warming*. Harvard University Press, 2008. Web.

Wiese, Annjeanette. “Rethinking Postmodern Narrativity: Narrative Construction and Identity Formation in Don DeLillo's *White Noise*.” *College Literature*, vol. 39, no. 3, pp. 1-25, 2012. https://www.jstor.org/stable/23266054

Williams, Raymond. *Marxism and Literature*. Oxford University Press, 1977.

Williams, Raymond. *Resources of Hope: Culture, Democracy, Socialism*. Verso, 1989.

Wilson, Johnny L. “The Ten-Billion-Year Afternoon.” *Computer Gaming World*, no. 78, January 1991, pp. 11, 60, 62. https://www.cgwmuseum.org/galleries/issues/cgw_78.pdf.

Wolf, Mark J.P. *The Medium of the Video Game*. University of Texas Press, 2002.

Wood, Andrew J., Graeme J. Ackland, James G. Dyke, Hywel T.P. Williams, and Timothy M. Lenton. “Daisyworld: A review.” *Reviews of Geophysics*, vol. 46, no. 1, January 2008. doi.org/10.1029/2006RG000217

Yamashita, Karen Tei. *Tropic of Orange*. Coffee House Press, 1997.

Zapf, Hubert. *Handbook of Ecocriticism and Cultural Ecology*. Walter de Gruyter GmbH & Co, 2016. Web.