THE UNIVERSITY OF CHICAGO

SEED MEDIA: EMERGENT FORMS FOR THE ENVIRONMENTAL HUMANITIES

A DISSERTATION SUBMITTED TO

THE FACULTY OF THE DIVISION OF THE HUMANITIES

IN CANDIDACY FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

DEPARTMENT OF ENGLISH LANGUAGE AND LITERATURE

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CHICAGO, ILLINOIS

AUGUST 2025

ABSTRACT

At the intersection of media studies and the environmental humanities, "Seed Media" articulates a theory of seeds as texts, mobilizes this framework to assess seeds in both real-world and fictional contexts, and showcases the urgent relevance of humanistic research in the ongoing climate crisis. Especially since the global implementation of American agronomic agendas in the latter half of the 20th century, the agroindustrial complex has prioritized the biological and genetic commodification of seeds over the complex and culturally rich relationships between human, food, and land. Seeds constitute cultural and historical artifacts—stories and lifeworlds in their own right—as evinced in the perspectives and beliefs of Indigenous and non-Western traditions and cosmologies, sustainable farmers and horticulturalists, and land-defenders and activists. This dissertation makes the case for a humanistic approach that harnesses the tools of literary criticism and media theory to consider seeds as media.

The first two chapters deploy humanistic theories of archive to position seeds in their historical, cultural, and political contexts. Current archival practices preserve the past to the detriment of the future, as exemplified in the world's largest seed bank, the Svalbard Global Seed Vault. Rather than stockpiling seeds *in* archives, understanding them *as* archives resists this paradox and animates seeds' mediative capacities and dynamic chronologies: the recovered seeds of Emily Dickinson both complement and invoke the canonical poet's oeuvre. Attending to seeds in literary and media contexts supplements incomplete seed archives in a time of climate crisis. The last three chapters take up a constellation of case studies across media forms to demonstrate how representations of seeds come to resemble the media in which they are embedded: seeds are screened, read, and played. George Miller's Hollywood full-length feature *Mad Max: Fury Road* (2015) and Wanuri Kahiu's independent short *Pumzi* (2009) deploy the

visual and narrative aspects of cinema to cement the formal and phenomenological alignment between media and seeds. Ruth Ozeki's *All Over Creation* (2003) and Diane Wilson's *The Seed Keeper* (2021) explore seeds in the context of food systems both modern and traditional, cultural legacies both colonial and inherited, and stories both personal and (supra-humanly) collective; these contemporary realist novels exemplify and perform the inextricable relationship between seeds and language. Considering seeds in Eric Barone's independent videogame *Stardew Valley* (2016) illuminates the game's status as more than just a farming simulator and showcases how *Stardew*'s sandbox affordances—its procedural rhetoric and metagame potentialities—find their parallel in seeds themselves. This dissertation is both critical intervention and engaged participation in the phenomenon by which, to borrow from W.J.T. Mitchell, our relationship to both seeds and "media is one of mutual and reciprocal constitution: we create them, and they create us."[1]

[1] W.J.T. Mitchell, *What Do Pictures Want?: The Lives and Loves of Images*. University of Chicago Press, 2005, 215.

TABLE OF CONTENTS

LIST OF FIGURES

ACKNOWLEDGEMENTS

First, I must thank the seeds—the alliums, the brassicas, the nightshades, all the flowers and all the trees. By some strange, convoluted, and serendipitous accident, my studies in literature and media led me to seeds and their endless syllabi of lessons; learning to recognize seeds as kin and mentors has been the greatest outcome of this project. Much of the teachings and knowledge in this dissertation are Indigenous in origin, and I am humbled to partake in and practice these philosophies and ways of being. At the same time, as a settler descendent living and studying on stolen land within colonial institutions, I recognize the harm that my work has been complicit in perpetuating; with knowledge of that responsibility, I commit myself to mitigation and repair in the face of ongoing neoliberal oppression and violence.

Though I hesitate to employ what now seems like an unoriginal and rather simplistic analogy, I cannot help but to conceive of this dissertation as the very large and very prolific outgrowth of a seed that has been germinated and nurtured, supported and trellised, guided and celebrated throughout this process (and even long before) by friends, family, colleagues, scholars, artists, and countless others for whom I could never properly account. I am grateful to you all.

I would not be a scholar today without the astonishing force that is Carolyn Ownbey. If the seed of this endeavor was once dormant, it was Carolyn who first watered it, coaxed it from the earth, and tended its fragile (imposter-syndrome-ridden, USA-transplanted, grad-school-green) sprout. You have been my constant teacher, my uncompromising critic, my best friend, my intellectual comrade, my partner in life—you continue to inspire me every day, and I simply do not have words to do you justice.

An enriched soil from my years in Montréal and my studies at Dawson College and McGill University made for a strong start. I owe thanks to Tonia DeBellis who modeled an infectious and genuine scholarly passion and who showed me the importance of field work; to Monique Morgan who taught my first undergraduate English class and who blew my mind with the possible pursuit of such scholarship; to Monica Popescu who compelled me to ask the unobvious questions and to look for the bigger picture; to Allan Hepburn who kept me on my toes and challenged my writing; to Ned Schantz who supervised my apocalyptic penchant and who made me care about form. Among my friends and colleagues in Montréal, I am grateful to Catherine Quirk for her wicked witticism and academic companionship; to Paulina Nowicka for her lifelong friendship, belly-laughter-inducing absurdities, and emphatic reassurances; to Clara Legault for her steadfast belief in my abilities and attentive curiosity; to Jess Legault for her stimulating conversation and clever commiseration; and to Julia Clark-Combot for her exquisite aesthetics and dazzling imagination.

At the University of Chicago I found the academic garden par excellence, with a PhD committee of horti/culturists boasting unparalleled care, skill, and dedication. Without their constant and patient support, unwavering and captivated encouragement, and meticulous and invigorating feedback, this dissertation would have withered long ago. Joe Masco, thank you for taking on this strange project and for welcoming me into your particular anthropological worldview. Sianne Ngai, thank you for thinking with me on so many critical levels and for introducing me to levels I had never even imagined. Patrick Jagoda—what a wild ride! You, to whom I first gingerly proposed the argument that seeds are media—and who responded, “I buy it!”—have been the stake in the ground that has maintained the integrity of this dissertation—and my sanity—over the past too-many years. Alongside my committee I have been blessed with a

significant list of friends, students, faculty, interlocutors, and a superb cohort of colleagues who pruned and energized my work. I am grateful in particular for Edgar Garcia, Géronimo Sarmiento-Cruz, Clara Nizard, and Heather Glenny for their keen conversation and staunch solidarity.

The seed keepers, small scale farmers, and avid horticulturists with whom I have had the great privilege of working over the past three years have had an indelible influence on my research and thinking. This project ripened immeasurably under their tutelage and guidance. My summer internship at Seed Savers Exchange in Decorah, Iowa, was nothing short of life-changing; endless appreciation to Sara Straate, Eduardo Fernandez, and Diane Ott Whealy for telling me seed stories and showing me how to get my hands dirty, and huge thanks in particular to Jeanine Scheffert for all your wisdom and for teaching me that you can eat raw asparagus. To the hard-working and brilliant land stewards at Humble Hands Harvest, Sweet Season Farm, and ReRooted Connections, I am in awe of everything you do. Among these seed mentors, David Cavagnaro deserves particular commendation—he is the elder guide for this project's ethos. Infinite thanks also to botanist Mama Yoj who, across the continent and yet no less present, enthusiastically engaged all my plant-related enquiries.

My community here in Decorah has sustained and nourished me intellectually, physically, and spiritually. To the aforementioned David as well as to Mark Smeby, Joanie and Ann Sheahan, Bruce and Pam Butters, Piper Wood and Mackenzie Miller, and Jess Zottola, I am deeply moved by the love, kindness, and support you showed me from the very first. A quick nod to the furry friends who complemented my ecosystem these past years: Kitty, Muriel, Woolf, Pebbles, Frog, Toad, and now Moose—you made it all better, cuter, and certainly more interesting. And to Carina Cavagnaro and Scott Butters—my sticks, my darlings—you have fed

me, held me, challenged me, and healed me in every way possible. This dissertation has come to fruition thanks to you.

This seed was planted long ago, and its roots run deep in a plot both earthen and narrative. I come from a crop of unparalleled storytellers: my grandfather, Dick Wisdom, with his tales of adventure and mischief, gifted me the most beautiful collection of literary works; my grandmother, Estelle Bachand, brought her childhood on the farm to life with woven words so potent I could smell the barn, and fed me the most perfect garden tomatoes long before I planted my own; my sister, Andie Wisdom Dawson, regularly enthralls us with anecdotes and experiences for hours on end, and has been my companion in worlds both real and imagined from the beginning. My mother, Karen Wisdom, spins her yarns until the spiders are two feet across, and my father, John Dawson, soothed us to sleep with the fantastical intrigues of Lester and Arthur. For these stories, gratitude is an insufficient sentiment; I give all my love. I credit my mother for my unexpected, heretofore latent passion for growing things: at my earliest age she toted me through the flower beds and surrounded us with a thriving and abundant garden—merci, maman, for these experiences that live on in me bodily and sacredly. And to my father, John Dawson, who first encouraged me to read and—especially—to write and write well, who never once blinked when I left the sciences to pursue an English degree, who instilled in me an unyielding passion for story, art, and meaning, and who fostered my imagination and curiosity at every turn… Dad, more than anyone, this is for you.

INTRODUCTION | HOW TO READ A SEED

"OKRA 151" is not a search term found in any database, library, or archive under the wide disciplinary umbrellas of literary and media studies, nor in those extensive catalogues which buttress the humanities broadly. And yet OKRA 151 is as socio-historically significant a text as any cultural object considered in humanistic scholarship. This seed (for it is a seed—minute and spherical, pockmarked and chalky green) is one of many crops grown at the Louisiana State Penitentiary, the largest maximum-security prison in the US. Known colloquially as "Angola Prison," the facility counts 8,000 acres of farmland tended by incarcerated people without fair compensation and under coercive and brutal conditions. The "Angola" nickname derives from the former plantation on which the prison was established, a plantation named in turn for the many enslaved Angolans who worked it. As a species, okra was likely introduced to the Americas in the 1500s during the transatlantic slave trade—one of a handful of crop types covertly carried and carefully stewarded by enslaved people. Present-day OKRA 151 is a perversion of this act of resistance: selected over time for its shorter-than-average stalk height, this crop affords penitentiary guards a clear, unobstructed view of inmates at work in the fields. Not only is OKRA 151 an animate index of biopolitical surveillance in the U.S. prison industrial complex, but also it embodies the fraught genealogical legacies of the transatlantic slave trade. In short, OKRA 151 exemplifies how seeds can mediate synergistically their cultural, historical, and political contexts.

There are many ways to read a seed: sequencing its DNA, assessing its formal and aesthetic characteristics, telling its stories, and of course, actually growing it—all of which occur on the spectrum between quantitative, scientific analysis and qualitative, cultural consideration. Why seeds? Western, neoliberal societies largely conceive seeds simply as agricultural

commodities and genetic resources, but seeds are not just edible; they are also sacred, medicinal, affective, artistic, and aesthetic. Seeds constitute cultural and historical artifacts, and stories and lifeworlds in their own right, as evinced in the perspectives and belief systems of Indigenous and non-Western traditions and cosmologies, sustainable farmers, gardeners, and horticulturalists, and land-defenders and activists. Scholars and artists are beginning to locate—or perhaps, newly to recognize—metaphor, meaning, and media in more-than-human registers. Seeds, I argue, are critically rich among such supra-human frameworks. Centuries of agricultural practices involving selective pressures—geographical, climatic, aesthetic, colonial, political, religious, dietary, etc.—have culminated in seeds that represent genetic and narrative indexes of history, culture, and the environment. Spanning and thus challenging the human/nonhuman binary, seeds offer novel sites for scholarly inquiry at a time when understanding humanity as both co-constitutive of and co-threatened with our surroundings and companion species is of crucial importance. Academic consideration of seeds in their more-than-bioagricultural registers has thus far been limited to the discipline of Anthropology; this dissertation makes the case for a humanistic approach that harnesses the tools of literary criticism and media theory to read seeds as texts.

In the contemporary moment of climate emergency, few questions unsettle humanities scholars more than their role in addressing climate change. Across disciplines, the matter of climate change representation—the adequate and urgent rendering of situations that affect both local farmer and global agroindustry, that concern the immediate present and the deep past, and that trouble the long-entrenched nature-culture binary—remains a great challenge.[1] This dilemma has been taken up repeatedly by critics, artists, and literary authors alike. Perhaps most famously, Amitav Ghosh has argued that the climate crisis is also a crisis of representation,

culture, and imagination: the vast timespans and planetary distances that inflect temperature fluctuations and weather patterns exceed the limits of human spatial and chronological understanding, thus rendering climate change unthinkable.[2] Though the fields of ecocriticism and the environmental humanities have ballooned in the half-decade since the publication of Ghosh's book, with many critics and scholars offering potent challenges and radical alternatives to his arguably defeatist diagnosis of "derangement," still the question remains: in the face of seemingly inevitable environmental collapse, how can the humanities grapple with climate change? More pressingly, how can humanist perspectives help to conceive urgently needed forms of environmental justice and food sovereignty under and against neoliberalism?

Especially since the global implementation of American agronomic agendas in the second half of the 20th century (a shift known as the Green Revolution), the world's agroindustrial complex has prioritized the biological and genetic commodification of seeds over the complex and culturally rich relationships between human, food, and land. Though well documented, this story of estrangement is scattered across disciplines. Marine biologist and conservationist Rachel Carson's groundbreaking publication *Silent Spring* (1962) calls attention to the deeply toxic and devastating effects of global agriculture, both for humans and the environment—an urgent cry that went unheard for decades, and is arguably still largely overlooked.[3] Ecofeminist and historian Carolyn Merchant traces the origins of the nature-culture binary to the Scientific Revolution, and locates the conception of such a division in the sanctioning of environmental exploitation and the subordination of women.[4] Sociologist Jason Moore contextualizes the ongoing history of this extractivism within capitalism, and proposes the term "Capitalocene" in lieu of Anthropocene to define our current era.[5] Humanities scholar Rob Nixon develops the concept of "slow violence" to articulate the attritional threats of

environmental devastation on marginalized and poor communities.[6] Our environments do not just surround us, but exist and metabolize within us: biotechnology sociologist Hannah Landecker tracks how nutritional epigenetics perpetuate health risks across generations.[7]

Seed Media attends to seeds alongside these interlocutors to bring into stark relief the political and cultural stakes of our alienation from the land as a product of colonial capitalism. Conceiving seeds as texts—which is to say, as readable, sociocultural objects—repositions them in registers more-than-bioagricultural and comprises a strategy for restoring humanity's relationship to the land by means of humanistic methodologies. In contrast to the enormity of the climate change question, seeds provide a granular, grounded focus for critical discussion. With this model, I offer a response to the question, "how can the humanities grapple with climate change?" In pairing environmental and media concepts and focalizing this comparative approach through seeds, I hope to open up new ways of reading, conceptualizing, and critiquing both our media objects and our environmental practices.

As Anna Lowenhaupt Tsing's ethnography of mushrooms and Gilles Deleuze and Felix Guattari's rhizomatic treatises demonstrate, yoking environmental concepts to political and philosophical concerns is by no means a novel strategy. Neither is locating media in the natural environment a new methodology: John Durham Peters' philosophy of elemental media envisions "a judicious synthesis, difficult though it may be, of media understood as both natural and cultural."[8] Though building on these conceptual predecessors, a formulation of seeds as texts is enhanced by the fact that seeds are historically co-constituted with humans: for millennia, seeds and people have existed in co-dependent, mutually transformational relationships. This is true for heirloom seeds that have been stewarded and grown for generations as well as for high-yielding hybrids that dominate the monocropped fields of contemporary agriculture. Seeds thus comprise

texts that straddle the human and more-than-human worlds and represent an entirely untapped media form for the Anthropocene.

Media studies and their constellating theoretical discourses offer particularly apposite methodologies for considering seeds. Why media? I will not attempt here to define the term "media," especially as so many, far more accomplished and critically learned scholars have yet to circumscribe the concept (which, I think, is part of the point). John Durham Peters writes that "people sometimes ask me if everything is a medium. I answer: Of course not—but everything could be."[9] It may seem that I have thus far used the terms "text" and "media" interchangeably. Certainly, conferring the status of "text" on a seed is a more intuitive critical exercise than jumping right to a media description: seeds are cultural objects deserving of humanistic consideration—texts. As per Roland Barthes' distinction between "text" and "work," I employ text here in the poststructuralist sense, in that a text is inextricable from and continuously reconstituted by its context: "The Text is plural. This does not mean only that it has several meanings but that it fulfills the very plurality of meaning: an *irreducible* (and not just acceptable) plurality. The Text is not coexistence of meaning, but passage, traversal; hence, it depends not on an interpretation, however liberal, but on an explosion, on dissemination."[10] Unsurprisingly, seed semantics are always already built into theories of text.

This framework provides the jumping off point for seed media. Where a text denotes a readable, critically discursive form, I conceive a medium to deploy an additional dialectic, in that media infer a process of exchange. Moreover, where media are protean in form, a text never quite shakes its literary, linguistic, and written connotations: the term "mediating text" is redundant: certainly, a text is a medium, and texts mediate their contents and contexts in myriad ways. But the term "textual media" implies a narrowing of the media under consideration to the

written form. Seeds are mediating texts, but they are not textual media. Media theorists Alexander Galloway, Eugene Thacker, and McKenzie Wark articulate this difference and its critical recalibrations:

> the text may be read backward into its mediatic status, just as it may be read forward into its hermeneutic status … [instead] media force us to think less about things like senders and receivers, and more about questions of channels and protocols. Less about encoding and decoding, and more about context and environment. Less about writing and reading, and more about structures of interaction.[11]

Like media, seeds resist definition: they proliferate in conceptual, semantic, symbolic, and figurative realms and flourish in technological, political, economic, and biological registers. So entrenched are they in our models and metaphors that they come to operate at the level of ideology. Perhaps most crucially, seeds and media share a material and theoretical continuity with the human, as posthumanists N. Katherine Hayles (via McLuhan) and Donna Haraway (via Margulis) express in their respective concepts of technogenesis and symbiogenesis. As Durham Peters declares, "Everything can be a medium! Yes! Few statements could be fraught with more epistemic, ethical, political and aesthetic weight. It can drive us mad with the infinitude of potential meaning or inspire us to care for things too often treated as middling and mean … Let's give that thought and discernment an old name: dialectic. Or maybe even better: responsibility."[12]

Seeds satisfy many—if not all—of the conditions and characteristics that we ascribe to media, and this remains true whether we approach from theoretical, historical, material, or figurative lenses. The Tumblr thread in figure 1, for instance, highlights how inextricable media are from seeds. Its witticism plays on a truth so taken for granted as to have been effectively dropped from public consciousness: the origin of media technology coincides with the origin of all technology—agriculture. The post not only acknowledges this historical foundation, but also

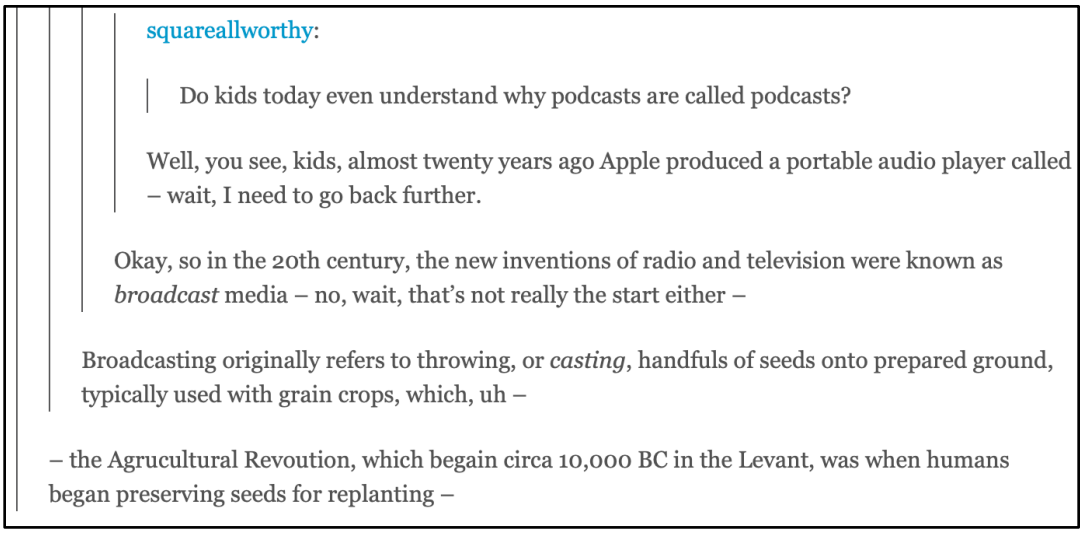

Figure 1: Screenshot of Tumblr Thread on the History of the Term "Podcast."
Opposite over Adjacent (@squareallworthy), "Do kids today even understand why podcasts are called podcasts?,"
(no longer accessible; original URL: https://rainaramsay.tumblr.com. Screenshot taken on August 25, 2020).

gestures at an inherent similarity—linguistic, formal, and ontological—between media and agriculture, and specifically, between media and seeds. Meanwhile the meme itself participates in and perpetuates precisely this seed-like tendency in media: shared widely across users and platforms, this Tumblr post is a well-disseminated object flourishing in a variety of relevant and tangential discussions. From their methods of distribution to their storage capacities to their metaphorical valences to their communicative capabilities, media exhibit innumerable seed-like qualities.

Seeds represent an iterative nexus of material and conceptual media forms, and offer an instance of what Mark Hansen calls the "ineliminable oscillation between the materiality and the phenomenality of media."[13] Contingent on their surroundings, seeds directly mediate their environments; as reproductive vectors, seeds mediate genetic information across generations, along with the agricultural traditions and technological advancements which have shaped and transformed them; as geographic and ethnic indices, seeds mediate historical and social knowledge; as patent and property, seeds mediate capitalist systems and political interests. Figuratively as well, seeds exceed their biological definition to resonate across genres and

disciplines: as symbols in art and fiction, seeds mediate cultural values; as metaphors and rhetorical expressions, seeds mediate ideology; as chemical agents, seeds mediate crystalline structures; as random number generators, seeds mediate informatic networks, generate online security systems, and populate game platforms. These forms of mediation interact with, enhance, complicate, and sometimes disrupt one another. Seed semantics are resonant, protean, and hermeneutically rich. Like media, seeds are "repositories of readable data and processes that sustain and enable existence."[14] Co-constituted with humans, seeds comprise a dialectic of material and figurative signifiers that is polyvalent rather than cumulative. Much scholarly and environmentalist work has pointed out the historical cache inherent in seeds—after all, seeds constitute "a deep time technology."[15] In their genetics, seeds encode knowledge that ranges from the environmental to the geographic to the cultural. Certainly, seeds represent precious repositories of genetic data, containing information about associated varietals, distantly related species, and ancestral strains—all of which are crucial to food security and food sovereignty in today's precarious climates. But beyond this purely scientific catalogue, seeds constitute genealogical archives as well: they retain evidence of major events, whether climatic or manmade; they are living records of natural selection, human cultivation, and agrochemical manipulation; they preserve maps of their dispersal, both by ecological and human means.

Individual seed profiles have proven incredibly generative for orienting sociocultural developments throughout history. Casting nutmeg as his "protagonist in history," Amitav Ghosh crafts a series of parables for the climate crisis to chart the geopolitical extractivism that engendered the colonial enterprise.[16] Elaine Gan tracks rice as "time travelers over 2000 years" as these varietals evolved from stable food crop to biotechnology across global regimes of power.[17] Michael Taussig traces the violent histories of palm oil to expose it as a "metamorphic

sublime"—a product so ubiquitous that it has infiltrated the boundaries of the human.[18] These interventions at the intersection of food and human offer potent critical vectors for understanding the complex evolution of the climate crisis under extractive capitalism. Even the term "carat," used for denoting purity in gold or weight in precious gems, derives from the carob seed, which was used by early traders around the Mediterranean as a standard measure of weight (~200mg).[19] Seed profiles such as these overlap heavily with the methodological Venn diagram of seed media, but though this dissertation deploys many similar strategies and rhetorical hinges, it can hardly claim a proper ethnographic status. While still reckoning with seeds as vectors of capital and individualized specimens, this project instead turns to theories of media and their critical frameworks to approach seeds in aesthetic, figurative, ideological, and reciprocal terms.

Proliferating across myriad registers, contexts, and timescales, seeds are champions of multiplicity and irreducibility. Thus, as subjects of study, they pose a methodological challenge: they resist definition, slip the collars of disciplines, regions, and periods, and frustrate any traditional or singular analytical approach. This dissertation therefore considers and mobilizes seed media via a transhistorical and transmedia strategy that seeks to activate connections across time and space, genre and form.

The first two chapters provide the major scaffolding for understanding seeds in their historical, cultural, and political contexts alongside humanistic theories of archive. Seeds are both archive and archived: they comprise genetic, historical, and cultural knowledge, and they are collected, catalogued, and stored in a variety of circumstances and ventures. Though these two chapters consider both definitions in turn in their critical approach to seed archives as texts, these two states are not mutually exclusive, but rather inflect one another according to context. "Archive" is a baggy concept in media studies and Western philosophy broadly. As Jacques

Derrida explores in *Archive Fever*, the impulse to preserve against threatening prospects and to anchor the human in the annals of history very much characterizes the archive as we know it. Though archives are typically conceived as projects for the past, their spirit is oriented toward and defined by the future. As such, they are also a pledge for that future: as Derrida explains, "the question of the archive is not … a question of the past … It is a question of the future, the question of the future itself, the question of a response, of a promise and of a responsibility for tomorrow."[20] The more uncertain the future, the more desperate the archival project—perhaps this is why apocalypse narratives love archives, and vice-versa (think the time capsule in *On the Beach*, the library in *I Am Legend*, the orbiting greenhouses of *Silent Running*, the last Christian Bible in *The Book of Eli*, the frozen embryos in *Interstellar*, the clandestine libraries in *Fahrenheit 451*, *Snowpiercer*'s train cars of soon-to-be-extinct materials and species, and, of course, Noah's Ark). Routing through Freudian psychoanalysis, Derrida also locates "a decisive paradox … which undoubtedly conditions" the archive:

> if there is no archive without consignation in an *external place* which assures the possibility of memorization, of repetition, of reproduction, or of reimpression, then we must also remember that repetition itself, the logic of repetition, indeed the repetition compulsion, remains, according to Freud, indissociable from the death drive. And thus from destruction. Consequence: right on that which permits and conditions archivization, we will never find anything other than that which exposes to destruction, and in truth menaces with destruction, introducing, *a priori*, forgetfulness and the archiviolithic into the heart of the monument … The archive always works, and a priori, against itself.[21]

At its core, the archive is a self-destructive project, fundamentally caught up in the death drive in its own contradictory ethos. Seed archives comprise a nexus of conditions that perhaps best mediate—and even induce—this paradox. The near-endless possible variations of seeds and the fact of their physical minuteness expedite the potential for obsessive and excessive accumulation, resulting in a homogenized superfluity that incurs the "structural breakdown" of memory that Derrida charts.[22] Meanwhile, the biological vitality of seed collections represents a

state of exception: unlike in zoo menageries or botanical gardens, the portability and longevity of seeds make them exceptionally suited to archival purposes—in fact, I would argue that seeds are the only live specimens that can be archived. The epitome of a living collection, the seed archive is bound up with concerns for death and destruction in far more literal ways than other, inanimate archives, rendering the death drive more tangible. Together, these attributes make the seed archive a prime locus for the uncanny compulsion inherent in "archive fever"—the "mal d'archive" that "burn[s] with passion," amassing to destructive excess.[23]

Beginning with a consideration of seeds preserved in archives, Chapter One assesses contemporary seedbanking initiatives with a focus on the world's largest seed bank, the Svalbard Global Seed Vault. Located on an isolated Norwegian archipelago well within the Arctic Circle, the otherworldly structure houses over a million seeds in its frozen chambers as a final backup for humanity's food security. Operating at a nexus of global industry and environmental conservation, the Vault embodies a radical contradiction: it is both a crucial cog in the agro-capitalist complex, and an ark that promises to outlast said complex. Situated a mere walking distance away from the Seed Vault is the Arctic World Archive, an off-grid facility designed to safeguard humanity's most precious data—digital artifacts that comprises everything from Edvard Munch's *The Scream* to McDonald's special sauce recipe. This initiative presents a potent foil against which to compare the Seed Vault, laying bare its political, economic, and isolationist machinations. This chapter charts the fraught histories behind and complex interests at play in the collection and storage of the planet's food crops at the top of the world and shows how current archival practices preserve the past to the detriment of the future.

Rather than stockpiling seeds *in* archives, understanding them *as* archives resists the destructive paradox and animates their mediative capacities and dynamic chronologies: Chapter

Two applies media and literary historicism alongside close reading to show how the recovered seeds of Emily Dickinson complement, redefine, and invoke the canonical poet's oeuvre. With careful attention to Dickinson's gardening and epistolary practices, her beautifully preserved *Herbarium*, and her singular poetics, this chapter raises the stakes of humanistic inquiry as our rapidly changing climate threatens such material histories. Together these chapters lay the groundwork for one of *Seed Media*'s central claims: attending to seeds in literary and media contexts supplements incomplete seed archives in a time of climate crisis.

Seed media is a capacious term: it describes a critical consideration of seeds as texts, both in real, material cases *and* in fictional, remediated configurations. In these latter circumstances, seed media also encompasses the synergistic dynamics that become activated at the nexus of seeds and media—that is, how mediated seeds take on, enhance, and transform the formal affordances of the media in which they are embedded, *as well as* how the media forms themselves are reframed, nuanced, and expanded through their treatment—figurative and formal—of seeds. In an approach that knits together media-specific formalism, cultural and historical criticism, and close reading, the final three chapters demonstrate how representations of seeds embedded *in* other media forms—film, literary prose, and videogames—and filtered through fictional imaginaries not only make visible but also exemplify their media paradigms. This section of the dissertation turns to contemporary fiction the better to parse the ways in which—for better or for worse—artists conceive, reconfigure, describe, and represent seeds in our current moment. As pioneer ecocritic Lawrence Buell suggests, "genres and texts are themselves arguably ecosystems, not only in the narrow sense of the text as a discursive environment, but also in the broader sense that texts help reproduce sociohistorical environments in stylized form."[24] Seeds operate according to this logic, both within such ecosystems and as

texts themselves. Buell elaborates, "an individual text must be thought of as environmentally embedded at every stage from its *germination* to its reception. At each stage, how environmentality gets encoded and expressed is always both partial and greater than one notices at first look" (emphasis mine).[25] Buell's conception of the synergistic potential of textual ecosystems describes the dynamic by which seeds, like and as media, index and produce their historical and cultural moment. As such, the works of 21st century fiction considered in these chapters offer diagnostic frameworks for the social, cultural, and political conditions at the heart of the climate crisis.

Chapter Three turns to seeds represented in film media, with a particular focus on case studies that depict post-arable contexts. Envisioning seeds in their future, potentially obsolete states both reinforces their symbolic valences and heightens the stakes for our climate changing present. George Miller's Hollywood full-length feature *Mad Max: Fury Road* (2015) and Wanuri Kahiu's independent short *Pumzi* (2009) deploy the visual and narrative aspects of cinema to cement the formal and phenomenological alignments between media and seeds; contrasting long and short form cinema exposes how seed media keep time. In *Fury Road,* seeds function as chronotopes: in a postapocalyptic landscape that has lost all direction (both literally and figuratively), seeds orient the plot, anchor time and space, and serve as bridges between human and machine. *Pumzi* stages a seed's media status even more directly: the Maitu seed at the heart of the narrative is played on a screening device, rendering visually the genealogical histories it embeds. As evinced in both films, the cinematic form reframes how we conceive seeds as processes: narrative retrospectives, potentialities, and dead ends alongside stylistic fast paces, fast-forwards, time lapses, and stills offer novel ways to articulate and access seed temporalities.

In Chapter Four, two contemporary novels exemplify and perform the inextricable relationship between seeds and language. Ruth Ozeki's *All Over Creation* (2003) and Diane Wilson's *The Seed Keeper* (2021) explore seed media in the context of food systems both modern and traditional, cultural legacies both colonial and inherited, and stories both personal and (supra-humanly) collective. Seeds refracted through the genre of realism curate the deliberate and engaged modes of attention—both in our reading practices and our land relationships—that are necessary for living in a time of climate crisis. As both novels show, the loss of seed biodiversity through monocropping, the suppression of local and Indigenous knowledge systems, and environmental extraction not only mirrors but is directly correlated with the impoverishment of language through censorship, xenophobia, and neocolonial violence.

The videogame is this dissertation's concluding media form: against adventure game *Mutazione* (2019) and aptly named simulator *Farming Simulator 25* (2024), Chapter Five considers seeds in Eric Barone's independent videogame *Stardew Valley* (2016) to illuminate how the game exceeds its farming simulator label: *Stardew*'s sandbox affordances—its narrative open-endedness, player-generated mods, condition-based runs, and random seed potentialities—comprise a procedural rhetoric that transcends the game itself and generates a game about and with the game. This metagame finds its parallel in real-world seeds, wherein human-seed relationships and engagements—along with the emergent ideologies and assemblages they produce—comprise the metaseed. This final chapter crystalizes the dissertation's culminating claim as both critical intervention and engaged participation in the phenomenon by which, to borrow from W.J.T. Mitchell, our relationship to both seeds and "media is one of mutual and reciprocal constitution: we create them, and they create us."[26]

A note on the selection—or rather the exclusion—of case studies: narratives concerned with issues of climate change (whether historical, realist, or speculative) often and unsurprisingly integrate the trope of plants. Innumerable films and novels incorporate endangered flora, protected ecosystems, agricultural crises, etc., but rarely do they feature seeds, specifically. The final three chapters engage imaginative works in which seeds play a central role, both materially and figuratively—conditions most conducive to their full mediative potential. These criteria rule out two texts that would otherwise seem like glaring omissions: Andrew Stanton's 2008 animated film *Wall-E*, and (sadly) Octavia Butler's renowned 1993 novel *Parable of the Sower*. Despite the iconic boot-cradled plant around which *Wall-E*'s plot revolves, the seedling is never represented or considered in its past/future seed state, negating the powerful signifying potential encompassed therein. Meanwhile, while Butler's novel repeatedly and generatively deploys the concept, symbolism, and imagery of the seed in the teachings of its Earthseed religion, actual seeds are mere accessories to the plot, mentioned offhandedly and belatedly in the narrative's development, and irrelevant to its broader scriptural disseminations. Materiality is crucial to mediation: "media are not just materials, but (as Raymond Williams once observed) material practices that involve technologies, skills, traditions, and habits."[27] Like media, seeds are both the product and producers of material culture and practices. As such, though a seed media approach can easily be applied to *Parable*'s figurative treatment of the seed, such a reading does less to expose and highlight the formal and substantive paradigms of seed media, which is the point of this project.

As this dissertation's title suggests, the concept of seed media represents more than just a research question or an analytic framework, though it encompasses those two things: seed media comprises a methodology, a dialectic, and an emergent form. I employ "emergent" here in

reference to Raymond Williams' well-established theory of cultural paradigms under late capitalism, which develops the three categories of "dominant," "residual," and "emergent":[28] the residual (structures formed in the past but enduring in the present) underlies and sometimes bleeds into the dominant, hegemonic grain, which itself is a network of interacting processes. Emergent cultural formulations, meanwhile, punctuate the dominant arrangement with knotty complexities arising from constituent parts, novel and unexpected relationships, radical processes, and mysterious configurations that defy current modes of understanding. In their book *Excommunication: Three Inquiries in Media and Mediation*, Galloway, Thacker, and Wark posit that "media theory requires not only a reconsideration of the object in question but also an upheaval at the level of method. In other words: not just a theory of the rhizome but a rhizomatic theory; not just a treatise on collaboration but a collaborative treatise. What would it mean to write theory that is itself algorithmic or procedural?"[29] *Seed Media* attempts to rise to such a challenge: this project both describes and actively participates in the relationship, process, and engagement that define seed media.

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[1] From Lawrence Buell's "Glossary of Selected Terms" in *The Future of Environmental Criticism: Environmental Crisis and Literary Imagination*, Blackwell, 2005, 143-4: "nature, naturalize: Raymond Williams rightly deems nature "perhaps the most complex word in the language" (Williams 1983: 219). He identifies three principal denotations: nature as essential character of something; nature as the"inherent force which directs the world," as in the capitalized Nature of classical mythology or eighteenth-century Deism; and nature as the material world, sometimes but not invariably including human beings … Distinctions between first, second, and third nature make best sense in language-cultures where there is a strong tradition, whatever the empirical facts, of dualistic thinking about nature as an autonomous domain. This is by no means universally the case, however. It is not true, for example, of many non-western traditions."

[2] Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable*, University of Chicago Press, 2016, 8.

[3] Rachel Carson. *Silent Spring*, Houghton Mifflin, 1962.

[4] Merchant, Carolyn. *The Death of Nature: Women, Ecology, and the Scientific Revolution*. Harper Collins, 1980.

[5] Jason Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*, Verso, 2015.

[6] Rob Nixon, *Slow Violence and the Environmentalism of the Poor*, Cambridge: Harvard UP, 2011.

[7] Hannah Landecker, "Food as exposure: Nutritional epigenetics and the new metabolism," *Biosocieties*, vol. 6, no. 2 (2011): 167-194.

[8] John Durham Peters, *The Marvelous Clouds: Toward a Philosophy of Elemental Media*, University of Chicago Press, 2015, 2.

[9] John Durham Peters, "What is not a medium?" *communication +1,* vol 9, no. 1 (2022).
[10] Roland Barthes, "From Work to Text," *The Rustle of Language*, Translated by Richard Howard, Hill and Wang, 1986, 59.
[11] Alexander R. Galloway, Eugene Thacker, and McKenzie Wark, "Introduction," *Excommunication: Three Inquiries in Media and Mediation*, University of Chicago Press, 2014, 2.
[12] Durham Peters, "What is not a medium?"
[13] Mark B.N. Hansen, "Media Theory," *Theory, Culture & Society*, vol. 23, no. 2-3 (2006), 297.
[14] Durham Peters, *The Marvelous Clouds*, 4.
[15] Courtney Fullilove, *The Profit of the Earth: The Global Seeds of American Agriculture.* University of Chicago Press, 2017, 195. See also Allison Carruth's *Global Appetites* (2013).
[16] Ghosh, Amitav, *The Nutmeg's Curse: Parables for a Planet in Crisis*, University of Chicago Press, 2021, 39.
[17] Gan, Elaine, *Rice Child (Stirrings)*, 2011-2014, https://elainegan.com/riceDarc.html
[18] Taussig, Michael, *Palma Africana*. University of Chicago Press, 2018, 14.
[19] "carat, n." *OED Online*. March 2025. Oxford University Press. https://www.oed.com/dictionary/carat_n?tab=meaning_and_use#10165842
[20] Jacques Derrida, *Archive Fever: A Freudian Impression*. Translated by Eric Prenowitz. University of Chicago Press, 1996, 27.
[21] Ibid., 11-12.
[22] Ibid., 11.
[23] Ibid., 91.
[24] Buell, 44.
[25] Ibid, 44.
[26] Mitchell, 215.
[27] Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. University of Chicago Press, 1999. and Mitchell, W.J.T. *What do Pictures Want?: The Lives and Loves of Images*, University of Chicago Press, 2004, 198.
[28] Raymond Williams, "Dominant, Residual and Emergent," *Marxism and Literature*, Oxford University Press, 1977, 121-127.
[29] Galloway, Thacker, and Wark, 4.

CHAPTER ONE | SEED ARKS

Though generally recognized for their humanitarian and scientific pursuits, seedbanks have long constituted significant political loci and military interests. Exemplifying this status is the famous Second World War story of the Vavilov Research Institute of Plant Industry, located in St. Petersburg: in the face of Hitler's siege of Leningrad, the facility's staff starved to death defending its seeds, which represented a substantial amount of edible, nutritious food.[1] Some accounts even describe Vavilov scientists fending off rats with metal rods. Though retaining such noble connotations, large-scale seedbanking initiatives today are deeply entrenched in neocolonial and capitalist interests. Case in point, the U.S. invasion of Iraq in 2003 involved the strategic destruction of the country's national seedbank in Abu Ghraib, which had sheltered ancient varieties of Mesopotamian crops.[2] The politics that underpin contemporary seedbanking ideologies grew out of the global implementation of American agronomic agendas in the second half of the 20th century, also known as the Green Revolution. Although farmers had earlier discovered the benefits of hybrid breeding (Henry A. Wallace founded Hi-Bred Corn Company, later industry giant Pioneer, in 1926), the real turning point in agro-technology occurred in 1946 when American plant breeder Norman Borlaug crossed Japanese semi-dwarf wheat strain Norin 10 (acquired during the Allied occupation) with Mexican varietals (sourced with funding from the Ford Foundation and the Rockefeller Foundation) to produce high-yielding, disease resistant hybrids that were exported first to Mexico and then to Pakistan and India in the 1960s.[3] Hybrid rice IR8 soon followed suit. With these seeds came the implementation of modernized agricultural practices that expanded mechanization and infrastructure and incorporated synthetic inputs—the catch-all term for fertilizers and pesticides. The Green Revolution is credited with a drastic reduction in world hunger and poverty, and a dramatic increase of food production in the

latter half of the 20th century. Borlaug allegedly prevented over a billion people from dying of starvation, an achievement for which he was awarded the Nobel Peace Prize in 1970. Though gilded in humanitarian fanfare, this technology transfer was animated by the geopolitical machinations of empire, wherein the replication of American large-scale agricultural systems in developing countries ensured the establishment of capitalist economies on the quieter front lines of the Cold War. Even the term "Green Revolution" was coined as an implicit challenge to the Red Revolution's communist agenda. These systematized agricultural schemas did not arrive in a vacuum, but rather supplanted traditional practices and transformed economic and power relations from local subsistence farming to global export networks.[4]

Even in light of the abundance brought about by this global agricultural transformation, many researchers and environmentalists questioned the long-term viability and safety factors of the model, claiming that it "ushered in an era of unsustainable practices that strip the soil, exhaust natural supplies of water, and expose workers to dangerous chemicals applied as pesticides and herbicides."[5] Hybrid corn has even been referred to as "the atom bomb of agriculture."[6] Moreover, what the Green Revolution gained in terms of production value, it lost—catastrophically—in crop biodiversity. Invested primarily in scale, these strategies hinge on homogenization, maximizing a small number of successful crops via the implementation of chemically fortified monocultures. Traditional and regional based farming practices, in contrast, promoted the proliferation of crop types as well as the variability within individual species according to fluctuating climates and localities; in many cases, the different varietals teased out of a single species numbered in the thousands. In the past fifty years, this abundance has effectively evaporated: according to the most recent FAO report, fewer than 200 species are cultivated to significant global production levels, with only nine crops accounting for two thirds

of production in weight.[7] Of these, three cereals (maize, wheat, and rice), have come to dominate the market "at the expense of local and often better adapted and more nutritious crops such as small-grain cereals and pulses."[8] The stakes of this agricultural crisis are firmly grounded in food security and environmental justice.

Loss of biodiversity in agriculture finds its root cause in the near-total suppression of seed saving practices. High-yielding hybrids seriously disincentivize farmers from saving seeds: cultivating landraces (ancient and traditional varietals) is hardly remunerative in comparison, and unfeasible at scale; meanwhile, recuperating viable seed from hybrid crops is all but impossible, since natural reproduction through open pollination radically dilutes "hybrid vigor." Today, farmers and agrobusinesses are effectively entirely dependent on seed companies in an increasingly concentrated market: the past decade has seen a consolidation of the world's seed companies, with just three corporations dominating the scene—ChemChina (purchased Syngenta for $43 billion in 2017), Bayer (acquired Monsanto for $66 billion in 2016), and DowDuPont (the $130 billion merger of Dow Chemical and Dupont in 2017). These three corporations now maintain control of 60% of the world's seeds and 70% of available chemicals and pesticides; it is no wonder that activist and food sovereignty advocate Dr. Vandana Shiva has dubbed them "The Poison Cartel."[9] Hybrid crosses of purebred lines, these super crops contain a narrower genetic blueprint than heirloom varietals, making them more susceptible to diseases, blights, and pests—hence their intensive reliance on inputs. Recent agricultural history is riddled with devastating occurrences of crop failure. In the face of this genetic erosion, seedbanks offer a safe haven for precarious varietals. Ranging in size and reach, seedbanks are generally established according to regional crop distribution. The contents of seedbanks include the big hybrids, but largely comprise heirlooms, endangered landraces, and wild relatives (the uncultivated cousins of

landraces that continue to evolve at the margins of fields and farmlands). The results of millennia of domestication through selection and care, landraces are genetically rich; most cannot survive untended, however, and are thus extremely vulnerable to extinction.

Agro-industrial systems were themselves forged in, and continue to perpetuate, violent histories: environmental historian Courtney Fullilove describes how, "as producers consolidated regional monocultures of wheat, corn, and cotton, competing visions and economies waned. Modes of resource control that originated in plantation agriculture persisted in capitalist forms of labor."[10] Ideologically inherent to the Green Revolution is the production model that arose from and powered the transatlantic slave trade. Meanwhile, the vast majority of the seeds being stockpiled and modified in the U.S. and other European countries was (and still is) sourced in the tropics. In 1990, agriculturalist Carey Fowler wrote that "U.S. seed industry figures indicate that one potentially useful gene from the Third World may contribute a billion dollars to the agricultural economy."[11] This extractive regime also manifests closer to home, as scientists and researchers purchase or collect seeds from Indigenous peoples without disclosing their intentions for genetic exploitation. As Christina Gish Hill explains, "seed banks with few or no connections to Native communities also hold seeds central to Native lifeways. Botanists have collected Indigenous varieties and stored them in seed banks which continue to preserve and maintain their genetic identity."[12] Though flying the impartial flag of science, contemporary seedbanks are rooted in these charged political and extractive legacies.

This contextual gloss hardly does justice to the rigorously researched and deeply thoughtful body of scholarship on the rise of modern agriculture.[13] These histories proliferate across geographies and time periods and imbricate complex discourses of race, gender, labor, and power. Though many of these issues will surface in subsequent chapters, I have hoped to lay

here the rudimentary groundwork to situate seedbanks as texts in their material, political, and historical frameworks. Mobilizing a comparative media approach, this chapter now turns to the world's most iconic seedbank, the Svalbard Global Seed Vault, to consider how seedbanks preserve the past to the detriment of the future.

On an isolated Norwegian archipelago well within the Arctic Circle, the Svalbard Global Seed Vault (hereafter abbreviated to SGSV) rises like an otherworldly fortress from the barren permafrost. Founded in 2008 by agriculturalist Cary Fowler, the SGSV is the world's largest seedbank, tallying over a million crop varietals in its collection. Seed samples are sealed in custom-made, four-ply foil packets, thoroughly identified and catalogued, and stacked in plastic crates on floor-to-ceiling industrial shelving in the Vault's halls. These chambers, embedded 100 meters into Platåberget mountain, maintain these seeds at optimum moisture levels and a temperature of negative 18ºC (minus 0.4°Fahrenheit), behind steel doors perpetually coated with frost. The project is dedicated to establishing a genetic safeguard for humanity's crops—an emergency reserve for the world's agrobiodiversity in case of natural disaster or human catastrophe. There are over 1700 major seedbanks located around the globe, not counting the many local, grassroots, and Indigenous efforts to steward and share seeds. Each of these seedbanks is vulnerable to possible threats—from mechanical shutdowns to weather events to violent conflicts—that could and sometimes do damage their crop stocks.[14] Svalbard's stable climates—both political and environmental—render such concerns irrelevant: the territory's demilitarized status fairly ensures that the SGSV will be out of the way of any direct nuclear fallout, while its tundra latitude provides natural refrigeration in case of system failure (for the time being). No matter the crisis, the Vault's precise and stable conditions ensure the extended lifetimes of its precious cargo, preserving it against harm and deterioration. With its mission to

assemble a complete collection of the planet's seed varietals, the SGSV offers what their website calls "the ultimate insurance policy."[15]

The SGSV represents the prime archival fantasy: a safety blanket in the face of increasingly worsening prospects for human surviving and thriving. It is no accident that the facility is better known by its nickname, the Doomsday Vault: more than any other seedbanking initiative, the SGSV exhibits a keen investment in the creation and promotion of its own mythology. Of all the world's basic infrastructural systems, the agricultural complex is perhaps the most vulnerable to unpredictable weather patterns and environmental shifts. It is no wonder, then, that the SGSV formulates its purpose in the context of apocalyptic probabilities. The Doomsday Vault's mythological status in the Western cultural imaginary arises primarily from its adoption of common dystopian tropes alongside futuristic aesthetics. The opening lines of its website read "Deep inside a mountain on a remote island…," while other alarmist histrionics such as "built to stand the test of time" and "the final backup" frequently embellish the page's descriptions and reinforce the facility's central role in the world's apocalyptic melodrama. This rhetoric is rooted in established economies of power. As Fullilove explains, "in the later twentieth century, national governments have invoked vocabularies of security and scarcity to administer food systems. These augment an older imperial lexicon of resources, stock, and treasury and its ethnocentric adjuncts of natives, exotics, and invasions. So captive are we to this imaginary that it's hard to conceive of a style of preservation that eludes specters of threat and endangerment."[16]

If the SGSV is a text, its genre is undoubtedly science fiction; as such, a closer reading of the Vault incurs a certain defamiliarization that causes its shiny façade to waver. Science fiction theorist Darko Suvin's philosophy of "cognitive estrangement" is a helpful lens here.[17] In his

seminal 1977 book *Metamorphoses of Science Fiction*, Suvin defines the genre of science fiction as deriving from its potential for producing a "strange newness" or "cognitive innovation" in its readers that engenders a challenge to and disruption of the reader's real-world views. For instance, a film like Neill Blomkamp's 2013 *Elysium*, in which healthcare is available only to the wealthy few aboard an orbiting space station while the majority of the earth's population lives in squalor is hardly science fiction, when you think about it. Science fiction as a genre therefore has politically subversive potential in that it can make the familiar seem strange, and thus cause readers to question their own realities—realities that might otherwise have been taken for granted or remained unscrutinized.

Given the Vault's inaccessibility (publicly and geographically), I ground my aesthetic and formal consideration of it as case study in its online presence at the time of writing (late 2021). Its website is sleek and inviting, featuring an interactive map of seedbanks around the world, punchy statistics alongside minimalist glyphs, an array of crisp photography and looping video clips, and most impressively, a virtual, 360º tour of the facility, complete with voice-over and informational bulletins, which tout such quirky tidbits as the Vault's unofficial polar bear security patrol.[18] The aesthetic design of the structure itself, meanwhile, inspires awe, celebrates technology, and embodies hope. Its shard-like architecture evokes visions of and a promise for the future: sharp angles and crystalline trimmings gesture toward an ultramodern, high-tech construction and a culture of innovation—the cutting-edge in trapezoidal form. But it is also a tad excessive. One informational bulletin featured in the now-unavailable virtual tour perhaps exemplifies this investment in appearances: "While the rock is naturally dark in color, the walls are coated with a mix of plastic fiber and concrete, giving the appearance of snow and ice." Given that the facility is closed to the public, one wonders at the purpose behind this decorative

flourish. Ghosh contends that "fiction that deals with climate change is almost by definition not of the kind that is taken seriously by serious literary journals: the mere mention of the subject is often enough to relegate a novel or a short story to the genre of science fiction. It is as though in the literary imagination climate change were somehow akin to extraterrestrials or interplanetary travel."[19] Ghosh's comment highlights the epistemological sleight-of-hand effected by the SGSV's aesthetics, wherein ostentation deflects from serious critical investigation. The striking piece of public art on the building's façade, called *Perpetual Repercussion*, quite literally diffracts perception. Created by Norwegian artist Dyveke Sanne, the piece consists of a lightbox containing triangles of highly reflective, acid-resistant steel alongside prisms and mirrors; it is designed to act as a mesmerizing beacon from many miles away. With an ethos that borrows from both utopian and dystopian registers, and a sci-fi aesthetic that troubles its practical function, the Doomsday Vault fosters an image invested in deflecting our attention from, and thus distorting our understanding of, the present climate crisis.

The Vault's mythology further perpetuates and is a symptom of widespread misunderstandings around agriculture: the majority of the world's population exists largely in ignorance of the complex dynamics—from infrastructure to politics to labor to technology—that undergird our food systems. This ignorance is both compounded and eclipsed by established ideas and common beliefs around farming that are either misleading or inaccurate; in other words, this general lack of awareness is itself a problem of which we are unaware. Approaching the Vault as a text lays bare its inconsistencies and contradictions, and thus offers a more accurate assessment of the current cultural, political, and economic conditions of agriculture. Frederic Jameson's concept of the "political unconscious" is a helpful model for this analysis. Harnessing Marxist principles, Jameson theorized the political unconscious in his 1981 book of

the same title to describe the phenomenon by which political concerns underwrite creative works which can be reconstructed as solutions to the problems they index.[20] Neil Lazarus focalized this concept in 2011 to articulate a "postcolonial unconscious" that addresses cases in the corpus of postcolonial literature specifically.[21] Adapting both Jameson's and Lazarus' theories, Pallavi Rastogi has recently developed the "disaster unconscious" to anchor narrative considerations of postcolonial disasters.[22] Iyko Day has likewise described a "nuclear unconscious" that stems from the Janus-faced nature of nuclear energy: both spectacularly apocalyptic and ubiquitously efficient.[23] The acceleration of these formulations is no accident, but rather an indication of and a response to the proliferation of neoliberal fallacies. I follow in the wake of these scholars to propose an "agricultural unconscious," one which pits an underlying cognizance of the situation's gravity against a staunch investment in ignorant relief. Inextricable from political, postcolonial, disaster, and even nuclear contexts, the "agricultural unconscious" is less an addition to the rolodex of unconsciouses than it is a subheading within these broader concerns—one determined to address the contradiction inherent in a world that subscribes to pastoral visions of agriculture while simultaneously subsisting on a colossal infrastructural complex. The agricultural unconscious is roused whenever we experience an empty shelf at the grocery store as a thwarted recipe rather than a sign of crop failures; it is brushed up against when we buy bananas predestined for overripening; it is tugged at when we read about palm oil plantations decimating orangutan populations in Borneo to appease Nutella devotees; it manifests in all the ways we fail to think about food while still purchasing and consuming food every single day. Media theorist John Durham Peters' model of infrastructuralism is relevant to this formulation: as Durham Peters explains, infrastructure is—and is meant to be—invisible, comprising all those "things not understood that stand under our worlds."[24] Following from this definition is the key

take-away that infrastructure only becomes noticeable when it breaks. Though keen to conceal this fact, the SGSV is a site at which infrastructure—in this case, agriculture—is "coming out of the woodwork," in Durham Peters' words.

The agricultural unconscious is epitomized in Rachel Carson's stunning narrative opening to her groundbreaking 1962 book *Silent Spring*, in which she constructs a "fable for tomorrow" from the very real consequences of pesticide use: "This town does not actually exist, but it might easily have a thousand counterparts in America or elsewhere in the world. I know of no community that has experienced all the misfortunes I describe. Yet every one of these disasters has actually happened somewhere, and many real communities have already suffered a substantial number of them. A grim specter has crept upon us almost unnoticed, and this imagined tragedy may easily become a stark reality we all shall know."[25] Hacking into already-prevalent nuclear anxieties, Carson was so successful in rousing (enough of) the public from placidity that her book essentially catalyzed the environmental movement and led to the founding of the EPA. In a sense, agriculture is a little bit like climate change—its vast geographies and historical complexities defy comprehension. But as Patrick Jagoda reminds us, "even if some things or totalities are 'unrepresentable,' they can still be encountered and experienced."[26] In the case of our food systems, the agricultural unconscious comprises this realm of encounter.

The Svalbard Global Seed Vault epitomizes the state of contradiction at the heart of the agricultural unconscious: the suspended stasis induced by its extreme artificial preservation methods threaten the very ontology of the seed as bound up in growth. Removed from circulation, the varietals stored in the Vault no longer participate in critical evolutionary cycles that allow for variation and adaptation. Though safely conserved against a climate changing

world, what happens when banked seeds no longer recognize their radically altered ecosystems? The living archive of the seedbank risks becoming a morgue rather than an ark—quite literally, in Derrida's words, "it keeps, it puts in reserve, it saves, but in an unnatural fashion."[27] In light of these concerns, the facility's nickname of Doomsday Vault takes on new meaning. These storage practices cleave seeds from their cultural contexts as well as their environmental ones, producing potentially disastrous discontinuities. Critical geographer Garrett Graddy-Lovelace hints at the contradiction inherent in these supposedly conservation-driven missions, noting how "agricultural biodiversity … is declining precipitously around the world—though seed and gene banks have grown in size, holdings, and funding concurrent with this decline."[28] Though comprising immense genetic potential, it would seem that the hundreds of thousands of seeds kept on ice in the arctic circle represent a utopian ideal, rather than a practical solution. These circumstances beg the question: is this archive for or against the apocalypse?

Parallel terminology across media studies and environmental sciences offers a helpful framework for this particular question, wherein it is more useful to understand the seeds housed in the Vault as tending toward obsolescence, in a media sense, than toward extinction in a scientific sense. In the world of media, innovation drives obsolescence—technological advances and developments in design leave in their wake accruing quantities of no-longer-compatible hardware and software. Obsolescence also derives from social preferences and cultural trends: much of our abandoned technology remains functional, and even optimal, if tragically sidelined by popular opinion. The revival of vintage sound systems and vinyl records testifies to the porous line between relevance and obsolescence. Often these two dynamics—cultural and technological—operate in tandem, but either way, obsolescence depends not on absolute teleological conditions or irreversible circumstances, but rather on context. The biological

sciences define "extinction" as the termination of a type of organism, wherein a species is declared extinct when its last individual dies.[29] When applied to spermatophytes (plants that produce seeds, commonly known as seed plants), however, this typically definitive designation slips into conditionals. Seed varietals may become extinct in one of two ways: the specimen is no longer locatable in either its natural or humanmade habitats, or the specimen is impossible to grow, even under artificial conditions. This second circumstance is unique to seeds. Whereas extinction generally denotes the complete eradication of a species from the globe, seeds may be deemed extinct even if still materially present—biologically alive, if no longer viable. Much like obsolescence in media studies, context, rather than teleology, determines a seed's status. In this case, the context is one in which obsolescence benefits the highest bidder. The market strategy known as planned obsolescence, in which the lifespan of a product is deliberately shortened to speed up the replacement cycle and drive long-term consumption, sits uncomfortably adjacent to the hybrid seed model at the heart of contemporary agriculture.

The political and economic interests that underwrite its mission cast even more doubt on whether the Doomsday Vault actually aims to prevent the doomsday. The SGSV was established chiefly with the support of the Norwegian government as well as two non-profit organizations: NordGen and Crop Trust. NordGen, or The Nordic Genetic Resource Center, is mainly financed by the Nordic Council of ministers which comprises a cooperative body for Denmark, Sweden, Finland, Norway, and Iceland. Crop Trust is an international organization dedicated to the preservation of seeds; its slogan reads, "Securing our food, forever." The motto's diabolical resonances perhaps make more sense when one notices that Crop Trust's donors include the Bill and Melinda Gates Foundation, the Rockefeller Foundation, and seed and chemical oligarchs Bayer Pharmaceuticals, Syngenta, and DuPont Pioneer.[30] Though the SGSV's mission trucks in

the language of conservation, humanitarianism, and activism, its practical motives align with neoliberal economics. Capitalist discourse is thoroughly grounded in seed metaphorics: not for nothing are these facilities labeled banks and vaults, and their contents dubbed deposits and investments. That seedbanks chiefly refer to seed samples as "accessions"—"something which is added or joined to another thing; an augmentation"[31]—exemplifies the practice's accretive archival impulse in line with capitalist profit. Far from being considered autonomous or sovereign entities, seeds in seedbanks are defined by cumulative logics. The SGSV's "Black Box System" likewise mimics financial models. Though their genetic information is considered freely available under the International Treaty on Plant Genetic Resources, seeds stored at the facility remain the exclusive property of their donor bodies: "the Black Box System entails that the depositor is the only one that can withdraw the seeds and open the boxes," explains the website. Ostensibly, this protocol protects the Vault's cargo from nefarious GMO prospecting, but this reasoning crumbles under any pressure: project donor Bayer absorbed Monsanto for $63 billion USD in 2018.[32] The Vault operates at a nexus of global industry and environmental conservation, and as such it embodies a radical contradiction: it is both a crucial cog in the agro-capitalist complex, and an ark that promises to outlast said complex.

The Black Box System also highlights the Vault's political inconsistencies. The now-dissipated voiceover of the website's former tour once reassured its virtual visitors that, despite bitterly cold temperatures, a walk down the Vault's aisles is "a heartwarming experience. There are no political boundaries inside the vault. Boxes from countries all over the world sit side by side, united in the common goal of conserving seeds."[33] But this statement about the Vault's apolitical status is misleading to say the least. "Each country or institution will still own and control access to the seeds they have deposited," the website assures. While the boxes may sit

amicably side by side, the strict policy behind seed access and withdrawal paints a different picture. Archives are inextricable from juridical and political power. Derrida parses the term's etymologies to establish that "the meaning of 'archive,' its only meaning, comes to it from the Greek *arkheion*: initially a house, a domicile, an address, the residence of the superior magistrates, the *archons*, those who commanded."[34] These authorities, Derrida explains, not only possess the right to defend the archive but also maintain control over its interpretation. The archival institution thus determines what belongs to history and how, as well as what gets omitted.

By limiting access to governments and certain institutions, the SGSV's policies reify dominant configurations of nationhood and reinforce the power structures that support financially and legally established organizations over smaller, independent initiatives—which are largely spearheaded by marginalized peoples. As per the guidelines listed in the Deposit Agreement, an application must propose "a collection of seeds of distinct plant genetic resources of importance to humanity";[35] though honorably worded, this ambiguous requirement is incommensurable with the myriad value judgements of "importance" across cultures and traditions, and ultimately allows the host organization—in this case, the Royal Norwegian Ministry of Agriculture and Food—to act as sole arbiter in such selections. Slightly elucidated in article 3.1, these "requirements to the deposited material" consist in "samples of plant genetic resources that are (i) of importance to food security and sustainable agriculture [and] (ii) samples of plant genetic resources that have not yet been deposited in the Svalbard Global Seed Vault." What is "of importance to humanity" is here reduced strictly to agricultural interests. These policies also give a distinct advantage to large-scale genebanks that, having deposited seed stock early and in sizeable quantities, essentially hold the monopoly over most varietals, since

duplicates are prohibited. Given the Vault's Black Box System, by which deposits are only available to their donor bodies, this particular condition seems counter to the Vault's advertised role as a back-up for seedbanks the world over: if a local seedbank's stock is damaged or destroyed, but its duplicates in the Vault comprise only a select number of its collection—those unique varietals to the Vault's catalogue—how is the local seedbank to recover its other lost specimens? Moreover, as indicated in the agreement, "costs pertaining to the packaging and shipping of the Deposited Materials shall be borne by the Depositor," as is the cost of return shipping in case of withdrawal. Considering the sensitivity of the material and the remoteness of the destination (Svalbard is home to the northernmost airport in the world), such an expense is bound to be prohibitive for many. Since its inception, the Vault has only recorded a handful of deposits from Indigenous nations, though its contents include countless heirloom seed varietals from Native heritages procured through recognized genebanks.[36] Despite its ostensibly benevolent intentions, the SGSV perpetuates neocolonial practices of extractive capitalism. "Even as chronic economic and environmental crises have revealed the corruption of these strategies," Fullilove explains, "environmental exploitation for profit has escalated. Inequality is persistent, species extinction possible. In the darkest estimation, the apocalypse has already happened: its effects are just unequally distributed."[37]

The overall argument that I hope emerges from this history and context is that the ethos behind seedbanking is widely misunderstood: contrary to popular belief, seedbanks are not a promise for a biodiverse and abundant future. The SGSV's holdings largely consist not of seeds that will ever actually be cultivated for food, but in varietals on hold *in case* standardized crops falter or fail. Not unlike the tragic clones in Kazuo Ishiguro's *Never Let Me Go*, these commodified seeds are essentially valued for parts—"genetic resources," "germplasm," precious

segments of DNA that, if spliced with mass-produced variants, might resist one more disease, or survive one more drought.[38] At their core, seedbanks are investments not in biological diversity, but in biocapital. Allison Carruth quite compellingly makes the comparison between the SGSV and massive informatics server farms, noting that their aesthetic similarities mirror the ideological overlap between the storage of digital data and biodata: "the [Vault's] infrastructure distinguishes it really markedly from small scale seed libraries and seed exchange projects … it's much more similar to the massive digital infrastructure of so-called server farms or data centers than to the infrastructure of farms, gardens, or agricultural research stations."[39] This alignment between informatics and genetics is spot on: both ventures are dedicated to the preservation of code. In reducing seeds to genetic resources, seedbanks do violence to the myriad meanings and contexts in which seeds signify, exemplifying Derrida's claim that "archivable meaning is also and in advance codetermined by the structure that archives."[40] The SGSV's online catalogue, hosted on the NordGen website, is free and open access to the public. But though its title, the "Seed Portal," would suggest a gateway unto discovery, the database itself is a wash of mundane species and procurement information—name, code, and acronym of donor institute, accession number, Latin denomination, country of collection—that is essentially useless to anyone but the genebanks whose records are kept on file.[41] Seeds are more than just edible: they are cultural, aesthetic, sacred, medicinal, symbolic, and animate in ways for which the SGSV's catalogue utterly fails to account. Ultimately, like all archives, the seedbank enables certain futures while foreclosing others.

Quite literally alongside SGSV, another archive offers a potent site for comparison: less than half a mile away from the Seed Vault lies the Arctic World Archive (AWA), a private-run facility for data preservation. Established in 2017, AWA boasts a substantial collection of

"valuable digital artefacts and irreplaceable information from around the world," including Edvard Munch's *The Scream*, manuscripts from the Vatican Library, classic Italian cinema, McDonald's special sauce recipe, and most staggeringly, Github's entire open-source code. In fact, AWA is also often referred to as the Github Arctic Code Vault. AWA provides a foil against which the subtler workings of SGSV's initiative become starkly distinct.

The taglines and idioms that pepper AWA's seductive website should read as more than familiar at this point: the facility is "a safe repository for world memory. Designed to withstand natural and man-made disasters, in the safest location on earth, data stored here will last for centuries. Much of our heritage is stored digitally and, despite best efforts to protect it for the future, it can be exposed to risks, either from the online environment or just from the limits of modern storage technology." The similarities between this verbiage and the language on SGSV's website are so obvious that one wonders whether the two initiatives hired the same PR agency. Once again, the dominant rhetoric pits everlasting security against looming anxiety, and eschews the more fundamental questions around what futures this project is interpellating, and for whom. Echoing SGSV's Donor Agreement, the website's "Contribute" page explains, "AWA accepts deposits that are globally significant for the benefit of future generations, as well as information that is significant to your organisation or to you individually." Though trucking in universalist ideals, AWA's holdings are hardly designed for the public good. The facility's founder Piql AS, a for-profit technology and innovation company based in Norway, "offers several different storage plans for your information." Pricing for these plans is not listed, but the completion of an online form will prompt the company to "get in touch with a proposal." "You can choose to store information for a period of perpetuity. We will help find your suitable timeframe," they promise. The striking formulation of Piql's slogan, "physically present, future preserved," conjures the

ultimate archival fantasy of preserving the future in advance of itself, even conjuring that future into the physical, present moment.

AWA and SGSV also exhibit similar concerns with and investments in prolonging life itself. As the website explains, "the combination of resilient long-term storage technology and the remote, safe and cold conditions found on Svalbard, enables data to live on into the distant future." Data's claim to life in this expression is more than just a metaphor—physically proximal and ideologically aligned, AWA and SGSV function as analogies for one another, wherein media and biological registers inflect each other. In fact, the two facilities are so conflated that an online search for the Arctic World Archive pulls up images of the Svalbard Global Seed Vault. To be fair, AWA's premises are a far cry from the awe-inspiring structure that constitutes the SGSV: located in a decommissioned coal mine (the irony of this metabolic rift is not without poetry), AWA's above-ground presence amounts to nothing more than a clustering of dilapidated buildings. Images of the mine shaft itself evince some effort to shine up the place, but the impact of dramatic lighting, neon signage, and sleek font is almost certainly heightened through artful photography; such trappings would do little to detract from the site's very raw surroundings in real life. Whereas Google maps tags the SGSV as a "cool storage facility" (fortuitously evoking both temperature and trend), AWA is labeled as a "warehouse." No artwork adorns AWA's entry, no carvings commemorate its historical roots. What does it say that this enterprise is clearly far less invested in its physical aesthetic than the SGSV? The obvious answer is that, as a private initiative, AWA can prioritize function over fanfare. But what this contrast confirms is that the SGSV is at least as concerned with its public image as it is with its genebanking purpose—and harnesses the former to deflect scrutiny of the latter.

Whereas the SGSV offers little by way of concrete information about how, exactly, its contents are utilized, AWA provides an almost excessively detailed explanation of both its storage technologies and the processes available to decode its database now or in future. Piql's preservation medium is actually deeply interesting to think with in a media studies context: the company converts binary data into QR codes, which are then printed in four levels of grey on 35mm film, called piqlFilm. 8 million data points per frame amounts to 120 GB of storage per film reel. At the end of the world, even digital data finds recourse in material substrate. Much like the seeds stored in the SGSV, this information is effectively removed from circulation, since all AWA's records are offline. As such, records like Github's code quickly become outdated, but the facility offers regular update services. This preservation method is purportedly designed to protect its contents from cyber-attacks and electromagnetic exposure, but much like its neighboring genetic cache, AWA primarily espouses proprietary interests through this system. PiqlFilm reels can reportedly last for over 1000 years under the archival conditions on Svalbard. Where the AWA initiative departs from SGSV's is in its thorough dedication to "guaranteed future accessibility." PiqlFilm is "futureproof and technology independent, so no matter how much time has passed and how technology has evolved, the data will still be accessible." The website provides a how-to video for converting stored information: while the company recovers the original file through a piqlReader and their open-source decoding software, "you're actually not dependent on our technology to get back your data. Any compatible digital film scanner can be used as an alternative to the piqlReader."[42] The video then runs through a demonstration that employs a magnifying glass, low-quality digital camera, and standard computer—"these are all tools we assume will exist in some shape or form in the future." Piql's open-source decoding software is "written in human-readable text on the film." Though recovering AWA's files still

depends on several conditions—chiefly, access to the arctic locale (logistical, practical, financial) and at least rudimentary coding skills—the endeavor as a whole exhibits a clear investment in the eventual reinsertion of its contents into the world—even if that future world is already imagined as a technologically diluted, desperate place.

In stark contrast, the SGSV incorporates little to no "human-readable" data concerning the cultivation of its holdings (never mind their cultural and historical significance). The Vault's catalogue includes no record of traditional, Indigenous, or local practices, no historical or scientific frameworks—in fact, no practical information about how to farm these seeds whatsoever. This opacity and disregard about rendering seeds legible is just one more indication of the Vault's true purpose as a resource reserve rather than a humanitarian archive. In failing to recognize the need for seed literacy, the Seed Vault upholds a world in which seeds are a dying language. Graddy identifies in seedbanking a tendency for "the conflation of biodiversity with biological resources," with the latter being "an attempt to give quantifiable value to the former";[43] humanists have an opportunity to offset this tendency through qualitative attention to environmental media such as seeds. "Considering the dire pace of agrobiodiversity erosion worldwide, such measures do serve a purpose," Graddy explains. "Yet … a myopic focus on ex situ preservation will stockpile and store germplasm—but not keep alive agricultural biodiversity, which thrives when actually cultivated in fields, on farms, in practice."[44]

Seed saving represents the dynamic alternative to seedbanking's death-driven preservation project. At the most basic level, seed saving describes the practice of recuperating seeds from harvested crops for replanting. But in the wake of the Green Revolution, seed saving has come to designate projects specifically engaged in protecting, cultivating, and propagating traditional and heirloom seed varietals. Often central to these missions is a recognition of the

particular cultural and historical significance of these crops and plants, which entails a commitment to keeping alive not just the seeds but also their heritage: the oft-under-valued farming practices, skills, and knowledge that paved their lifeways. As such, many seed saving initiatives are also deeply tied to anti-racist and decolonial movements, and understand seeds as ancestors and companion species rather than as commodities or resources. These projects embrace the importance of cultivating seed communities through circulation and exchange, often setting up "seed libraries" for sharing seeds as well as knowledge about food, farming, and culture. While some seed saving projects do store seed stock in seedbanks, their primary method of conservation is through cultivation *in situ* (on site)—or, as anthropologist Virginia Nazarea proposes, "*in vivo*, or conservation as a way of life."[45] Notable seed saving initiatives in the U.S. include Iowa's Seed Savers Exchange, Philadelphia's True Love Seeds, New York's Soul Fire Farm, Arizona's Native Seeds/SEARCH, and California's Sierra Seeds.

Imbricated in these of seed saving initiatives, inspiring artists, activists, farmers, and scholars from all over the globe advocate for the urgent transformation of farming practices and land relations in the fight for food sovereignty and restorative justice. In its ethos, this dissertation is rooted in the inspirational work of these (literally) ground-breaking figures and projects. As such, while an expanded discussion is provided in this chapter's notes, the main body of this writing would be incomplete without an acknowledgement of the foremost models and interventions that drive it. In occupied America, seed legacies represent complex cultural and political entanglements stemming from the transatlantic slave trade and the colonization of Indigenous lands. Founder of Soul Fire Farm*,* author, activist, and farmer Leah Penniman charts the histories of Black farming on U.S. soil and campaigns for Black liberation through food sovereignty.[46] Professor, acclaimed botanist, and member of the Citizen Potawatomi Nation,

Robin Wall Kimmerer weaves together teachings from Traditional Ecological Knowledge systems and her training in the hard sciences to highlight the importance of care and reciprocity in reimagining our relationship to land and food.[47] Beyond American shores, artist, conservationist, and founder of the Palestine Heirloom Seed Library Vivien Sansour amplifies traditional stories through image, sketch, film, soil, and seeds to conceive a political and cultural mandate for biodiversity.[48] World-renowned environmentalist, ecofeminist scholar, and founder of Navdanya, Dr. Vandana Shiva advocates for food sovereignty, conservation, farmers' rights, and suicide prevention through community development in India and around the globe.[49]

As with this chapter's historical consideration of modern agricultural development, this condensed catalogue of initiatives and figures falls very much short of the rich and radical body of work on seed saving that animates environmental and social justice movements the world over. But these cases all have one thing in common: the principles and teachings of seed savers model how seeds should be respected and understood not only in archives but as archives. Seeds can even be understood in positive ways as genetic archives: as Fullilove notes, "when we regard seeds as genetic material, the code becomes indistinguishable from the matter, which is itself a grammar. This is a poetic reduction of the seed, and not necessarily a degrading one. Put bluntly: in genetic terms wheat is smarter than you are, or at least more complicated. Common bread wheat has some 17,000,000,000 base pairs of DNA, about five times as many as people."[50] The point of this discussion has never been to vilify scientific or genetic considerations of seeds, but rather to take seeds seriously for the knowledge they represent—and mediate—rather than for their resource value.

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[1] Courtney Fullilove, *The Profit of the Earth: The Global Seeds of American Agriculture.* University of Chicago Press, 2017, 14.
[2] John Seabrook, "Sowing for the Apocalypse," *The New Yorker*, August 20, 2007. TK.

[3] Seabrook, TK and Courtney Fullilove, *The Profit of the Earth: The Global Seeds of American Agriculture.* University of Chicago Press, 2017, 15.
[4] Seabrook, TK.
[5] Fullilove, 17-19.
[6] Jon Betz and Taggart Siegel, *Seed: The Untold Story*. PBS Independent Lens, 2016.
[7] Colin K. Khoury et. al., "Increasing homogeneity in global food supplies and the implications for food security," *Proceedings of the National Academy of Sciences*, vol. 111 no. 11 (March 2014), 4001-4006 and FAO, *The State of the World's Biodiversity for Food and Agriculture*, edited by J. Bélanger & D. Pilling. FAO Commission on Genetic Resources for Food and Agriculture Assessments. Rome. 114. http://www.fao.org/3/CA3129EN/CA3129EN.pdf
[8] Ibid, 76.
[9] Vandana Shiva, "The Poison Cartel," Navdanya International, https://navdanyainternational.org/publications/poison-cartel-fact-sheet/
[10] Fullilove, 9.
[11] Carey Fowler and Patrick R. Mooney, *Shattering: Food, Politics, and the Loss of Genetic Diversity*. Lutterworth, 1990, xiii.
[12] Christina Gish Hill, "Seeds as Ancestors, Seeds as Archives: Seed Sovereignty and the Politics of Repatriation to Native Peoples," *American Indian Culture and Research Journal*, vol. 4, no. 3 (2017), 95.
[13] Catherine Fullilove's *The Profit of the Earth* offers a comprehensive and politically conscious history and serves as a jumping off point for further research into the rise of contemporary agriculture across the globe.
[14] Perhaps the most famous instance of such an occurrence was the 2012 relocation of ICARDA (the International Center for Agricultural Research in the Dry Areas) from Aleppo, Syria, to the Bekaa Valley, Lebanon, during the Syrian Civil War. Researchers withdrew seeds from the Svalbard Global Seed Vault (the first and only instance of withdrawal to date) for renewal at the new location. Jumana Manna's 2018 documentary film *Wild Relatives* offers an in-depth look at the complex global networks that made such an endeavor possible.
[15] "Svalbard Global Seed Vault," Crop Trust, https://www.croptrust.org/our-work/svalbard-global-seed-vault/. December 2021.
[16] Fullilove, 10.
[17] Darko Suvin, *Metamorphoses of Science Fiction: On the Poetics and History of a Literary Genre*, Yale UP, 1979.
[18] Since the time of writing, Crop Trust has redesigned the virtual tour and eliminated much of the dramatic flair under scrutiny here.
[19] Amitav Ghosh, *The Great Derangement*, University of Chicago Press, 2016, 7.
[20] Frederic Jameson, *The Political Unconscious: Narrative as a Socially Symbolic Act*, Methuen, 1981.
[21] Neil Lazarus, *The Postcolonial Unconscious*, Cambridge University Press, 2011.
[22] Pallavi Rastogi, *Postcolonial Disaster: Narrating Catastrophe in the Twenty-First Century*, Northwestern University Press, 2020.
[23] Iyko Day, "Reordering Hiroshima: Uranium Extraction and Indigenous Abandonment" (presentation, Mellon Visiting Speaker Series on Asian American and Global Asian Studies, University of Chicago, January 19, 2020).
[24] John Durham Peters, *The Marvelous Clouds: Toward a Philosophy of Elemental Media*. University of Chicago Press, 2015, 33.
[25] Rachel Carson, *Silent Spring*, Houghton Miflflin, 1962, 3.
[26] Patrick Jagoda, *Network Aesthetics*, University of Chicago Press, 2016, 21.
[27] Jacques Derrida, *Archive Fever: A Freudian Impression*. Translated by Eric Prenowitz. University of Chicago Press, 1996,, 7.
[28] Garrett T. Graddy, "Situating *in situ*: A Critical Geography of Agricultural Biodiversity Conservation in the Peruvian Andes & Beyond," *Antipode*, vol. 46, no. 2 (2014), 426.
[29] Neil. A. Campbell and Jane B. Reece. *Biology*, Seventh Edition, Benjamin Cumings, 2005, pp. 1209-1216.
[30] "Our Donors," Crop Trust, https://www.croptrust.org/about-us/donors/.
[31] "accession, n.". *OED Online*. December 2021. Oxford University Press. https://www-oed-com.proxy.uchicago.edu/view/Entry/1036?rskey=6mh7P4&result=1&isAdvanced=false (accessed January 04, 2022).
[32] Allison Carruth, "Cultural Politics of Seeds, Allison Carruth, Seed Banks & Seed Networks: Narratives, Images, Infrastructures," UCLA Center for the Study of Women, YouTube Video, 18:30, May 30, 2013, https://www.youtube.com/watch?v=ZJtaYTNjlX0.
[33] Ibid.
[34] Derrida, 2.

[35] NordGen Seed Deposite Agreement. Accessed February 2, 2022. https://seedvault.nordgen.org/common/SGSV_Deposit_Agreement.pdf
[36] https://www.theguardian.com/world/2020/feb/07/cherokee-nation-seeds-arctic-vault-svalbard https://www.youtube.com/watch?v=K0gtlWJfP8A#:~:text=A%20group%20of%20Indigenous%20Paiwan%20leaders%20have,seeds%20to%20the%20Svalbard%20Global%20Seed%20Vault.
[37] Fullilove, 220.
[38] For an in-depth discussion of seeds as genetic resources and the semantics of the International Treaty on Plant Genetic Resources for Food and Agriculture, see Thom van Dooren, "Banking Seed: Use and Value in the Conservation of Agricultural Diversity" in *Science as Culture*, vol. 18, no. 4 (December 2009), 373-395.
[39] Carruth, "Cultural Politics of Seeds."
[40] Derrida,18.
[41] Svalbard Global Seed Vault, "Seed Portal," accessed January 14, 2022. https://seedvault.nordgen.org/Search
[42] https://arcticworldarchive.org/service/
[43] Graddy, 428-9.
[44] Graddy, 427.
[45] Virginia Nazarea, *Heirloom Seeds and Their Keepers: Marginality and Memory in the Conservation of Biological Diversity*, University of Arizona Press, 2005, x.
[46] Leah Penniman's 2018 book *Farming While Black: Soul Fire Farm's Practical Guide to Liberation on the Land* (Chelsea Green Publishing) confronts colonial histories and examines non-extractive farming practices through stories of community, politics, and agriculture. Stories of enslaved women hiding seeds in their clothing or braiding them into their hair, and doing the same for their children, have persisted in the oral histories of the Black diaspora. These acts of resistance had and still have profound effects on both agroecology and restorative justice. See also Christian Brooks Keeve's article "Fugitive Seeds" in *Edge Effects* for a geographical history of "fugitive seeds" and the resilience of Black women through centuries of ongoing oppression: https://edgeeffects.net/fugitive-seeds/
[47] See Kimmerer's 2014 book *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teaching of Plants* (Milkweed); Kimmerer is discussed more fully in the next chapter.
[48] Sansour's 2019 audio-visual performance *Autonomia* comprises a collection of stories both personal and universal that tell of seed keepers, of finding and reviving lost foods, and of honoring bio-cultural heritages in the Middle East.
[49] Also known as the "Ghandi of Grain" for her anti-GMO activism.
[50] Fullilove, 214.

CHAPTER TWO | A POEM PRESSED IN FLOWERS

In May of 2016, *The New York Times* ran an article titled "The Lost Gardens of Emily Dickinson."[1] Featured in the magazine's science section, the exposé details the efforts of archaeologists from the University of Massachusetts, Amherst in their mission to excavate and restore the poet's original conservatory and plant beds in partnership with the Emily Dickinson Museum. Though the Homestead has undergone significant modifications to architecture and landscape since the Dickinson family's 19th-century occupancy (subsequent owners uprooted the orchard, tore down the conservatory, laid down lawn, and built a tennis court), the team of researchers was hopeful it could unearth and reestablish Dickinson's very own garden, "plants and all," by the end of the year.[2] Though geared toward the general public, the article privileges a clinical approach to its subject matter—unsurprising given that its author, regular *NYT* contributor Ferris Jabr, is a science writer who also publishes in *Scientific American*. A handful of minor outlets picked up the story in the subsequent days before interest effectively withered in the eyes of the media[3]—follow-up reports of progress or successful completion of the project are all-but non-existent.[4]

Though short-lived, this attention to the revival of Emily Dickinson's garden culminates cliff-hanger-fashion in one particular fascination: the recovery of the poet's seeds. What seems to have captured the imagination of the author is the potential for these nearly two-hundred-year-old seeds to be revived; it is noteworthy that this prospect seems to have originated not from the restoration project's objectives (no mention of seed revival is made by or credited to the project directors in the report), but rather from Jabr's own speculative reasoning. He concludes, "studies have shown that some seeds are highly resilient; researchers have been able to coax sprouts from seeds buried for tens of thousands of years. And that raises an exciting possibility: that, much

like the fascicles of poetry Dickinson secreted away in her room, organic fragments of the poet's gardens have survived this whole time, just waiting for someone to find them and give them new life."[5] Though published under a science heading, Jabr's article closes with a sentiment at least as poetic as it is botanical—a spirit that aptly reflects the piece's interdisciplinary concerns.

Emily Dickinson's seeds represent an untapped, precious text ripe for literary study and media analysis especially. This exceptional quality does not derive only from the seeds' historically significant status as objects that once belonged to the renowned poet (phenomenological as much as they are material, seeds signify in registers more complex than would, say, Dickinson's hairbrush), nor does the singular implication of this case study reside solely in the dialectic potential of the seeds themselves (otherwise, seeds having belonged to any literary or culturally significant personage would meet the criteria). Though both aspects are important, they are exponentially amplified by the poet's own ideological understanding of her botanicals: Dickinson conceived of seeds, flowers, and plants as language, poetry, and art. In other words, the unique nature of Dickinson's seeds hinges on her employment of botanicals as media. Whereas Chapter One of this dissertation attends to archives *of* seeds, this chapter looks to seeds *as* archives and ambles between literary/media historicism and close reading to illustrate the mediative potential of Dickinson's seeds and to ground the stakes of climate change in literary contexts.

Emily Dickinson's earthbound affinities have received thorough attention among the plethora of publications concerning the canonical poet's life and oeuvre.[6] Judith Farr's 2004 volume *The Gardens of Emily Dickinson* represents perhaps the most comprehensive exploration of Dickinson's poetry in relation to her gardening.[7] A noteworthy biographical detail highlights the importance of such scholarship: Emily Dickinson was more renowned during her lifetime for

her gardening than for her poetry.[8] When one recalls that her poems were only published and widely circulated posthumously, this fact is less surprising, but the idea of Dickinson with soil rather than ink (or lead) darkening her nailbeds remains a defamiliarizing one. Certainly, this image does not align with what Marta McDowell describes as "the Dickinson mythology," in which the poet is construed (partially for promotional reasons) as a cloistered or sometimes love-sick genius;[9] perhaps this is one reason for the common ignorance of this aspect of her life. And yet horticulture was central to Dickinson's existence from a young age. During her time at Amherst Academy, which she attended between the ages of ten and seventeen, she studied botany and collected over 400 dried specimens and flowers into an herbarium.[10] "I was reared in the garden, you know," a twenty-nine-year-old Dickinson wrote to her Norcross cousins.[11] Even when the poet began to withdraw from society in her 30s, she apparently remained well-known in Amherst for her impressive cultivation of flowers and vegetation around the Homestead.

Dickinson's garden is a crucial intertext for her poetry. Her oeuvre comprises nearly 1800 poems and a prolific correspondence of poetic letters with family, friends, acquaintances, and intellectuals. Botanical concerns of various kinds appear in over a third of Dickinson's poems—that is to say, over 600 of them—as well as in hundreds of her poetic letters (note that this census includes only obvious references, never mind obscure allusions or looser figurative constructions). Considering this vegetal promiscuity in her work, any sophisticated grasp of Dickinson's poetics suddenly becomes contingent on at least a minor understanding of horticulture. Farr notes that "so important were flowers to Emily Dickinson, so knowledgeable was she about botany, that the key to a successful reading of an individual Dickinson lyric can depend on one's knowledge of the background and identity of a plant or flower or of weather and climatic conditions to which the poet may familiarly allude."[12] Evoking the mid-Victorian pun

that plays on the aesthetic association of "posies" and "poesie," Farr's scholarship meticulously sketches the complex intersections—personal, artistic, ideological—between Dickinson's cultivation of verse and bloom (or, as Donna Haraway would put it, between composing and composting).[13] Quoting from a letter to Susan Gilbert, Farr suggests that Dickinson's "real garden served as an index to [her] conception of 'that garden *unseen*'—the inner plot she called the soul."[14] Spirituality and horticulture coalesce at the heart of Dickinson's fundamental conception of her poetic identity.

Emily Dickinson is by no means the first or only poet to demonstrate a powerful captivation with botany or the natural world broadly.[15] Artists, philosophers, and writers have integrated and meditated with such concepts throughout history (hence the development of the environmental humanities). Nevertheless, Dickinson's oeuvre represents an exceptional case in this regard, for the poet not only wrote about flowers, she wrote *with* them. She frequently enclosed blooms in her letters, often alongside poems and poetic messages.[16] Along with her conception of gardening as a spiritual and creative experience, the importance Dickinson accorded to her actual flowers represents an inextricable factor in any understanding of her oeuvre. This material and, I argue, multimedia practice complements the ontological alignment of gardening and poetry in her work: for Dickinson, botanical inclusions are not simple decoration or quaint embellishments, but rather vessels of meaning in their own right—constitutive elements of the poet's verse, these flowers, like seeds, are forms of media.

If literary scholarship has begun to take seriously Dickinson's botanical concerns, the discipline of media studies has yet to recognize the import of these poem-flower hybrids as significant and rich objects of inquiry. Bringing media theory to bear on Dickinson's floral poetics showcases these texts in their unique, multimedia form, and highlights their material and

figurative valences. Building on the argument that Dickinson's horticultural experience and knowledge provide vital context for poetic interpretation, I employ a media framework to demonstrate how Dickinson's gardening process and artistic use of florals were so coterminous with her poetic practice as to produce an emergent, multimedia art form. This consideration of Dickinson's oeuvre as exceeding the limits of what literary scholars traditionally conceive of as poetry complements Virginia Jackson's groundbreaking argument that the lyric as genre has been anachronistically imposed on the poet's work, a siloing that has drastically narrowed opportunities for scholarly intervention and analysis. As Jackson suggests, "Dickinson's use of commercial advertisements, pasted clippings, other people's poems, bits of fabric, dead insects, pressed flowers, accidental blots, and collections of her own lines as companions for her writing not only expand that writing's field of reference but should expand our notion of the genre on which her lines so often comment."[17] By articulating an understanding of Dickinson's verse as multimedia in form, this article extends this challenge into the disciplines of media studies and the environmental humanities.

Dickinson was fluent in the language of flowers. Like most educated Victorians, she was well versed in the metaphorical and mythological resonances of various plants and blooms.[18] Catherine Harbeson Waterman's 1839 dictionary *Flora's Lexicon: An Interpretation of the Language and Sentiment of Flowers* was all the rage in New England upper-class circles, and is generally believed to have been a staple in Dickinson's repertoire.[19] In her study of Dickinson's letters, Stephanie Tingley remarks that "comments in letters, as well as the pressed blossoms that often accompanied them, indicate that she regularly used the Victorian language of flowers as a kind of visual and verbal shorthand" in which her correspondents were likely conversant.[20] Blooms were employed as a sort of code: seasonal wildflowers, for instance, carried emotional

connotations for Dickinson, while orchids represented adventure, jasmine signified passion and sensuality, and roses (a hallmark of the poet's) encompassed love and pain, beauty and death.[21] In one of her letters, Dickinson expresses her thanks to her cousin in "flowers, which without lips, have language"[22]—the poet's use of flowers as nonverbal texts is more than implied in her missives, it is articulated outright. This discussion thus far has attended to flowers as enclosures in or appendages to Dickinson's written forms, but the reverse configuration was also a common assemblage of the poet's. Baskets of flowers sent to neighbors were often accompanied by "a lyric under the leaves."[23] In his memoir *Emily Dickinson: Friend and Neighbor*, MacGregor Jenkins recalls how "occasionally, Emily wound a verse around the stem of a flower sent a friend, perhaps part of a larger bouquet, suggesting more than unity with it."[24] Both literarily and figuratively, Dickinson's poems contained flowers, but her flowers also contained poems. Farr notes that "her poetry … was often enclosed in letters pinned together by flowers, or in bouquets that made the poem concealed at the flowers' center and the flowers themselves one message."[25] Marshall McLuhan's famous phrase "the medium is the message" flits in the background of this analysis, and for good reason:[26] for Dickinson, flowers were not subordinate to text in terms of semantic value, nor were they secondary devices in her modes of communication. Any botanical additions to Dickinson's poems and letters should thus be understood as deliberate supplements to their textual contents: not verse *and* flower, but verse *with* flower—two forms of media coalescing in a synergistic whole.

Locating media in the natural environment is not a new concept, though it has become increasingly more relevant as the digital age intersects with the budding discipline of the environmental humanities. John Durham Peters perhaps formulates the most concise treatise on this mode of thinking in his book *The Marvelous Clouds*, which articulates a philosophy of

elemental media as "a judicious synthesis, difficult though it may be, of media understood as both natural and cultural."[27] But an understanding of flowers as media has purchase in registers other than recent elemental media theory, and more ancient ones at that. Floral semantics are even present in the terms we use to define certain textual forms. "Fascicle," the word most often employed in reference to Dickinson's discrete, disordered, and sometimes fragmented poetic manuscripts, is also a botanical expression: "a cluster of leaves or flowers with very short stalks growing closely together at the base; a tuft. Also, a bunch of roots growing from one point."[28] Meanwhile, as Zach Marshall remarks, "an 'anthology' is 'a collection of the flowers of verse, i.e. small choice poems' and it was 'originally applied to the Greek collections so called' (*OED*). Etymologically, it derives from the Greek *anthos*, meaning 'flower,' and *logia*, meaning 'collection,' which is distantly related to the Greek word *logos*. One of the now obsolete definitions literally means 'a treatise on flowers.'"[29] Woven into our conception of media is the way we first made sense of plants and flowers.

Attending to Dickinson's floral poetics as multimedia offers novel avenues of critical inquiry: while a literary approach considers the figurative valences of Dickinson's poetry, a media approach expands analysis to the material aesthetics and formal affordances of her work and asks how these factors compound the textual and symbolic meanings already at play. As opposed to the term mixed media which is used in visual arts to define pieces that incorporate distinct materials and visual modes of expression, multimedia describes assemblages of different forms of media beyond the material—text, audio, digital, etc. Though McLuhan and, more recently, W.J.T. Mitchell have argued that all media are multimedia in that they inherently contain a multitude of nested media forms, I employ the term here to lend emphasis to

Dickinson's poetry as a more-than-textual form and to insist on flowers as more-than-material signifiers, the better to draw attention to the dialectics that exists between verse and flower.[30]

If the poet displayed acute attention to visual composition and stylistic elements in verse, the same is true in her composition and artful arrangement of blooms. Dickinson's *Herbarium* can be read as a precursor to the eventual development of her botanical poetics. Herbaria originated in the 16th century as a pedagogical and mnemonic device when the study of plants and vegetation was growing in popularity and esteem. The collection and preservation of physical specimens held an appeal for naturalists who had hitherto relied on illustrations and woodcuts to document their findings. These scientific projects became even more prevalent during the 18th and 19th centuries as the influence of first Linnean and then Darwinian thinking took hold alongside colonial projects of expansion and exploration, when exotic plant varietals became the fashion, if not the fetish, for middle- and upper-class Europeans.[31] Traditional herbaria were designed to facilitate the recording and transmission of knowledge, and were dedicated to the constitution of universal order by means of taxonomic methods. They prioritized the inclusion of deconstructed elements of the plant in question (seeds, roots, stems, leaves, fruit) as well as empirical data (date, climate conditions, location, other circumstances of specimen collection) the whole autographed by the merchant-collector, of course. In many ways, the modern genebank represents the extension of such ideals of accretion and classification.

Dickinson's *Herbarium* is no such text—her catalogue might as easily be described as a poem pressed in flowers as a botanical record. The volume encloses 424 specimens. "Of these, approximately 250 specimens are species that are known to be native or naturalized in the Amherst, Massachusetts vicinity. The rest are almost all garden, yard or house plants," according to Ray Angelo's explanatory notes on the catalogue.[32] Dickinson's pressed treasures are arrayed

on 66 pages between emerald-green cloth hardcovers. The volume's spine, gilded in gold, is stamped with the functional designation "HERBARIUM"; nowhere is its owner identified. Though now so brittle and delicate that access to the original is all-but impossible, the collection is available online in high-quality, digital facsimile through Harvard's Houghton Library. Even a casual perusal of its contents evokes aesthetic satisfaction and delight: the poet's floral arrangements and meticulous composition on the page testify to her acute stylistic awareness, even at such an early age. Given her formal botanical training, Dickinson would have been familiar with the above-mentioned standards and protocols of traditional herbaria. As such, which practices she eschewed and which she followed (and how strictly) become a matter of deliberate choice rather than a function of inexperience. Contrary to traditional scientific methodologies, Dickinson's compendium includes no sampling data. Farr notes that "her herbarium, for all the scientific knowledge implied by its Latin names, has a genuinely artistic quality, derived from the appealing placement of the floral specimens and from their loveliness, diminished but not eradicated after a century and a half."[33] Dickinson's careful identification of specimens in Latin and her inclusion of the Linnean classification system denote at the least a respectful nod to her education and testify to her diligence in consulting reference manuals and textbooks, though the slight uptick in blank labels on later pages suggests a slip in her commitment to such rigor as the project advanced.[34] The specimens themselves are catalogued not according to a taxonomic logic—field blooms and prized garden varieties often appear side-by-side—but rather according to the poet's own aesthetic and symbolic preferences in an overall effect that is almost alchemical (though her labels adhere to Latin nomenclature in this volume, Dickinson also used common, vernacular names for her pressings, many of which are enchantingly evocative: mad-dog skullcap, love-in-a-mist, whorled loosestrife, candle larkspur,

stargrass).[35] She eschews standardized alignments in favor of balance and symmetry, a stylistic flourish that manifests on every page: her layouts exhibit a predisposition for central focal points around which a constellation of sprays complement one another in tone and silhouette. Frequently, she employs leaves as beds or mats for flowers in a collage-like technique that demonstrates an attention to contrast and depth (figure 2, page 51). In some cases, these leaves

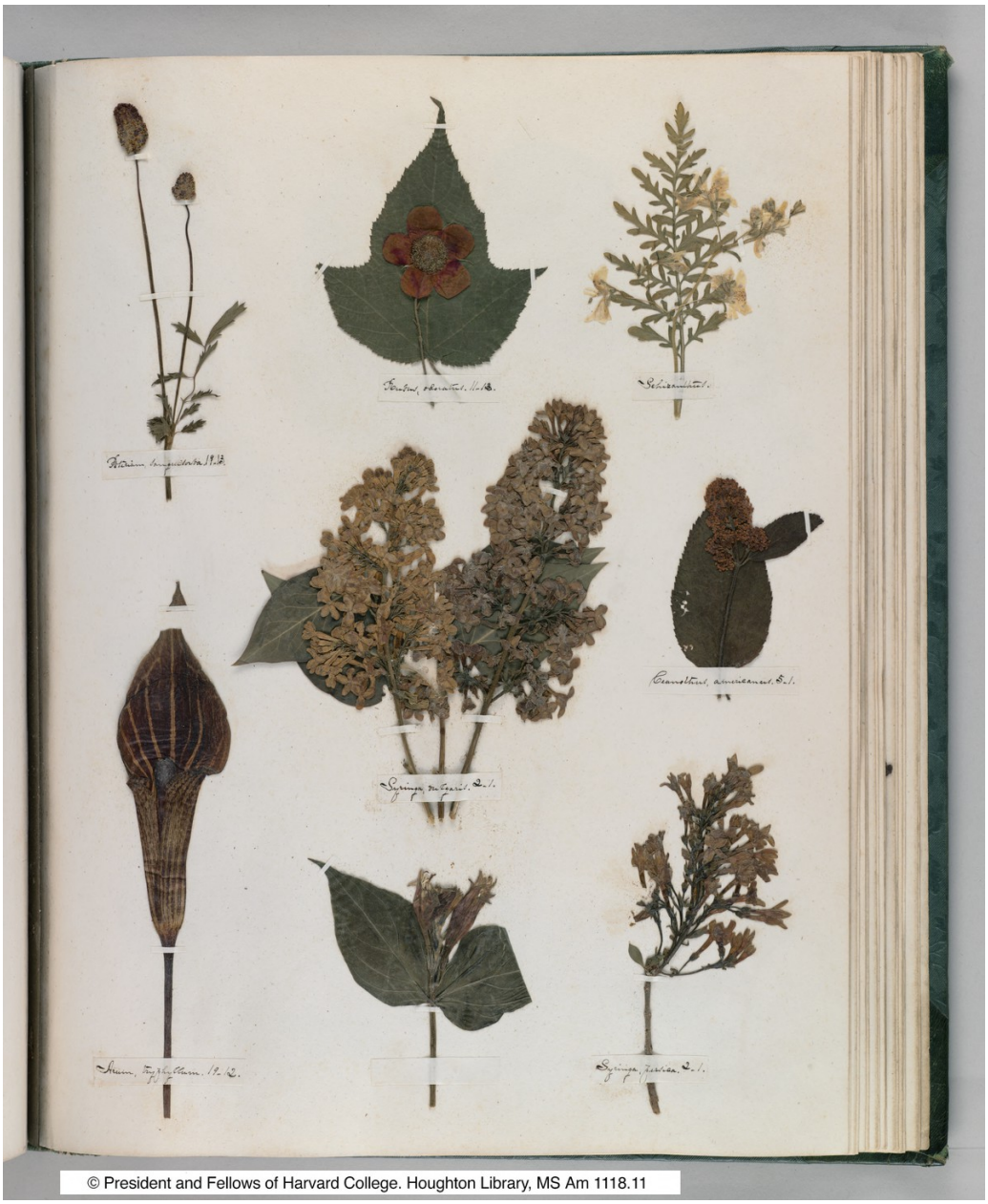

Figure 2: Digital Facsimile of Emily Dickinson's Herbarium, p.51.
MS Am 1118.11, Houghton Library, Harvard University.

are the bloom's conjoined sepals (leaves that form the calyx or base of the flower's petals) but in others she integrates discrete leaves, arranged not in their physiologically correct position but as embellishments to the specimens in question. Sometimes leaves even cover portions of the labels (to the chagrin of archivists), suggesting that the poet valued presentation over practicality.

It is telling to see where Dickinson elected to disregard the form's quantitative criteria in favor of stylistic predilections, but it is also important to consider which standards she adhered to, and how rigorously. Traditional herbaria prize diversity, and the poet seems also to have valued variation and multiplicity in her collection, though perhaps not purely for scientific or methodological reasons. Though rare, Dickinson's collection includes nonsequential doubles: *Jasminum* on the first page and again on page 28, *Amaranthus* on 18 and 32, *Antirrhinum, majus* on 15 and 53, *Cactus* blooms on 56 and 64 (page 69 includes a different segment of the succulent), and *Lonicera* on 52 and 62. This list omits duplicates that exhibit significant differences in physical attributes, as well as accidental recurrences—those doublings that result from a misidentified varietal or an originally blank label that has since been identified (there are several cases of each). In other words, Dickinson would have been aware of the recurrences here mentioned, and as such they are likely a function of her whimsy and aesthetic taste, or simply because she came across a specimen she liked better at a later date; otherwise one would expect the duplicates always to appear on the same page, as per standard protocol. In cases when she did imitate traditional criteria, she seems to have done so with an ulterior motive in mind. Page 57 (figure 3), a rare instance of repeat specimens arranged on a single panel, is essentially a study in *Narcissus*—floral iterations adorn the sheet like an exercise in figure drawing; given the young poet's familiarity with classical mythology, it is hard to believe that she would have composed such a layout in ignorance of its symbolic implications.

Figure 3: Digital Facsimile of Emily Dickinson's *Herbarium*, p.57.
MS Am 1118.11, Houghton Library, Harvard University.

Dickinson's playfulness shines through many of her arrangements, and perhaps particularly so on page 8 (figure 4): the bottom-third of the sheet features two thin stalks tipped

Figure 4: Digital Facsimile of Emily Dickinson's Herbarium, p.8.
MS Am 1118.11, Houghton Library, Harvard University.

with ochre blossoms and crossed at mid-stem, where the young poet's elegant script curls across the volume's only vertically placed label: *Chrysanthemum, leucanthemum*. Something in the singsong specimen name echoes the teetertottering placement of the flowers to conjure the clever self-awareness that familiarly permeates Dickinson's poetry. Chrysanthemums, or ox-eye daisies, signified cheerfulness and truth for the poet. Above this merry buttress hover three artfully arranged miniature bouquets—delicate, full, and dancerly *Campanula, aparinoides* on the left is offset by bold, minimal, and sophisticated *Cistus, canadensis* on the right, with a sprig of *Dirca, palustris* to anchor them at the page's epicenter—dare I suggest, à la nuclear family portrait of parents flanking child. Even without a complete symbolic understanding of Dickinson's floral selections, this single page reads like poetry—an interplay of light and dark, movement and stillness. Much like her poems, Dickinson's *Herbarium* rewards the careful, engaged reader with unexpected depth, complexity, and meaning.

Though traditional botanists would be skeptical of Dickinson's *Herbarium* as an object of scientific value, the poet's project activates the affordances of its multimedial form to challenge the standards of preservative practices and retain something vital beyond the empirical. As with most archival endeavors, the clinical methodology involved in the production of traditional herbaria comes at a cost. Plant humanities scholar Yota Batsaki argues that herbaria were invested in "decontextualizing organisms from their natural environments, and rendering them stable and inert"[36]: "while the herbarium's mode of preservation privileges the two-dimensional shape of the pressed plant it cannot capture fully its overall appearance, nor can it preserve important qualities such as smell or color."[37] While it is true that the sensual qualities of the flowers themselves—texture, aroma, etc.—remain closed to observers of the Dickinson *Herbarium* (especially via digital access to the volume), the poet's collection is anything but

inert. Though practically devoid of empirical data, Dickinson's artistry recontextualizes the volume's contents by privileging and mobilizing their aesthetic qualities, and in so doing (though this claim may seem counterintuitive), it reifies its connection with the natural environment.

The rivalry over access to nature that pits science and technology against culture and art dates back, in Western philosophy, to the Scientific Revolution, when the false ideological binary that distinguishes the human from nature in the first place was established and popularized, the better to sanction environmental exploitation at a time of industrial expansion.[38] As recent scholarship has shown, the boundary between scientific and humanistic disciplines is far more porous than it seems. In her 2013 book *Braiding Sweetgrass*, Indigenous scholar and acclaimed botanist Robin Wall Kimmerer tells the story of her initiation into the botany major at SUNY College of Environmental Science and Forestry.[39] An eager freshman keen to impress her advisor, young Kimmerer expressed a fascination with asters and goldenrod—specifically, with why they "looked so beautiful together."[40] Her advisor summarily dismissed this line of inquiry as unscientific and sent the deflated student off to train in the quantitative methods proper to general botany. Kimmerer reckoned with the clash between her scientific studies and her Indigenous knowledge throughout her degree, but the story has a happy ending. Asters and goldenrod are purple and yellow, respectively. As complementary colors, purple and yellow appear more vividly when juxtaposed, making the reciprocal pairing more striking to human perception. As Kimmerer discovered, the same happens to be true for bees, and therefore goldenrods and asters that grow together receive more attention from pollinators. To reach these conclusions, the scholar needed to circle back "to the question of beauty. Back to the questions that science does not ask, not because they aren't important, but because science as a way of knowing is too narrow for the task."[41] Though Kimmerer is by no means the first thinker to

ponder the relationship between nature and beauty, her particular approach to this philosophical question is fundamentally decolonial in its tenets of land relations and reciprocity. Kimmerer's story is a poignant allegory for the inextricable relationship between science, culture, and nature, and articulates the importance of an expansive and reciprocal methodology across both scientific and aesthetic inquiry.

To suggest that Dickinson's *Herbarium* is somehow farther removed from nature because of culturally coded qualities is to cement the nature-culture binary that posthumanism is so desperately attempting to dissolve (late on the heels of non-Western philosophies and belief systems). Instead, reframing its aesthetic qualities as legitimate, environmental features brings the volume to life. Even in the absence of an obvious scientific explanation for the aesthetic allure of Dickinson's *Herbarium*, Kimmerer's claim that questions of beauty signify and catalyze connections between human experience and their environments reifies the *Herbarium*'s natural context and reminds us that science is not the only way into nature. Kimmerer insists, "when botanists go walking the forests and fields looking for plants, we say we are going on a *foray*. When writers do the same, we should call it a *metaphoray*, and the land is rich in both."[42] Rather than rendering its specimens less knowable or accessible, the privileging of poetic artistry over scientific methodology lends an almost enchanting quality to the *Herbarium*'s contents; Dickinson's floral compositions, far from feeling two-dimensional, seem almost to vibrate on the page—even though viewed on a screen.

As previously mentioned, the precarious condition of Emily Dickinson's *Herbarium* has rendered it inaccessible for study. In its original form, the volume is essentially an obsolete artifact: it is more meaningful as an idea—a touchstone of authenticity—than as a functional document. For all intents and purposes, the object that is Dickinson's *Herbarium* exists now in

the form of its online, open access, high-resolution digital facsimile, taken in 2005 by the Houghton Library at Harvard. A certain discomfort—if not an outright sense of betrayal—arises from understanding the *Herbarium* as legitimate in this new media form: what does it mean to consider Dickinson's work in the context of technology she could never have imagined? We tend to disregard digitization as a means to an end—a tool that immortalizes, if not the original document, then its next best thing—a copy. But this perspective is based on a value judgment that pedestalizes authenticity and exclusivity, and by extension able-bodiedness and social privilege. Certainly, much is lost in the original record being locked away against humanity, but even before access went from restricted to impossible, any perusal of the volume—at a distance, with gloves, under the supervision of an archivist—would have had greater significance in terms of experience than for its actual use value. Meanwhile, the digital version boasts affordances which the physical document does not and never could have: it is available for free, at any time, to many at a time, internet connection permitting; its image quality is exceptional, with a zoom ratio that can render details imperceptible to the naked eye. For many, the debate surrounding the rise of the digital humanities will feel germane to this conversation, but the truth is that, as scholars, we do not have to side with one method over the other: we can honor Dickinson's *Herbarium* as an invaluable literary object while still taking seriously its ongoingness via digital form.

Other artifacts of the poet's did not fare so well: though it is plain from Dickinson's correspondence that she engaged in the Victorian custom of enclosing pressed flowers in letters throughout her life, none of these floral accoutrements remain in archival collections, or at least not in any suitable condition. Tingley describes how "the crumbled remnants of dried, pressed blossoms still fall from between the pages of some of the manuscript letters housed in the

Houghton Library special collections."[43] While many might perceive melancholia and even romance in these lines, I cannot help but to experience frustration at what they imply: a rather egregious instance of curatorial negligence with irrevocable consequences. Given this loss, understanding Dickinson's *Herbarium* as a precursor to her botanical poetics is all the more crucial in inferring heightened complexity of meaning in those missives which once comprised both text and bloom. At the very least, the *Herbarium*'s characteristics teach us to wonder at how these epistolary flowers might have been positioned or affixed on the page, or whether they were loose inserts; at how many cuttings, and which parts of the plant, might have been inserted, and whether bound together or discrete; at how the bloom might have complemented the missive or poem aesthetically as well as symbolically. Though these questions are effectively unanswerable, delimiting the contours of what might have been lost allows us not only to speculate on supplementary layers of signification, but also to recognize natural elements as culturally significant components of media forms and in so doing to adjust our understanding of what constitutes a text. Ultimately, these concerns invite us to recon with the limits and inherent biases of our archival practices, and to reflect on how to improve these practices going forward—especially in the face of the climate crisis.

If an understanding of much of Emily Dickinson's poetics emerges in the context of her gardening practice, then it is worth considering what other methods allow access to this horticultural knowledge. Learning about her garden—the species and varietals that she favored, struggled with, cultivated, and sought after, the seasons during which she tended to each, the layouts of her windowsills, conservatory, and grounds, among other aspects—provides valuable insight. But beyond historical research, it is also possible to engage in the material project of reproducing—that is to say, literally growing—Dickinson's garden. Farr's book concludes with a

substantive “how-to” chapter authored by professional gardener Louise Carter. Designed to instruct readers on how best to recreate and maintain the poet’s botanical surroundings, the section includes information on sourcing suitable seeds, mimicking soil conditions, and the selection of varietals according to season. As such, growing Dickinson’s garden can reproduce, to an intimate degree, the conditions in which she wrote, worked, and lived, resurrecting her original environment and, in a sense, the poet herself—hence the chapter’s title, “Gardening with Emily Dickinson.”

While these meticulous guidelines might provide a solid basis for a Dickinsonian horticultural project, much has changed since the poet’s lifetime a century and a half ago. Rapid agricultural and industrial development, a surge in global population, fierce neocolonial expansion, and the rise of the nuclear age have radically altered the socio-economic and environmental conditions of the planet in what some historians have coined the Great Acceleration.[44] The years that separate us from the poet have seen the most drastic transformations in human history, and gardening with Emily Dickinson becomes somewhat more complicated in this altered world. Carter’s instruction manual opens with the first piece of concrete information necessary for any keen gardener: “Emily gardened in what is known today as USDA Zone 5.”[45] USDA plant hardiness zones are guides for farmers and gardeners that delimit the growth ranges for plant varietals throughout the country.[46] On a map, they represent different segments in average temperature at intervals of 10 degrees Fahrenheit. Significant warming in the last few decades has pushed USDA Zone 5 almost entirely out of the state of Massachusetts, where the Dickinson Homestead is located; Amherst now sits in Zone 6.[47] Based on this data, it is quite literally no longer possible to garden in the same climate and geographical conditions as the poet did in the mid-19th century. Nor would it be possible to assemble her

Herbarium today. In fact, according to Angelo, "five species in the herbarium are on the Massachusetts rare plants list … (*Clematis occidentalis*, *Adlumia fungosa*, *Oxalis violacea*, *Asclepias verticillata*, and *Veronicastrum virginicum*)" and "one species, *Castilleja coccinea*, is now thought to be extinct in Massachusetts."[48] Framed in these terms, the gravity of the situation registers more keenly, but there is something captivating about this scenario beyond its ability to elicit feelings of mourning and nostalgia.

Emily Dickinson's case is interesting to consider in the context of climate change because it represents a unique nexus of environmental, literary, historical, and material factors. Again, the poet and her oeuvre belong to a moment in history that just preceded the most extreme period of change humanity—and our climate—has ever undergone; as such, her case can act as a sort of yardstick for comparison, the "before" to our "after"—or rather, to our ongoing—circumstances. Moreover, Dickinson is a canonical American literary figure, and more recently a celebrated feminist icon; she therefore garners the interest, esteem, and adoration—in both academic and public circles—that comes with such cultural cache.[49] Her story has purchase in the contemporary imagination, a fact that is hardly negligeable considering that so much of the conversation on climate change is concerned with generating meaningful engagement. Whereas warming geographies might feel abstract to most—difficult to grasp and even harder to care about—the Dickinson Homestead in Amherst provides a concrete, familiar, and evocative locus for grappling with the consequences of climate change. This case study thus addresses the oft-discussed problem of scale in ecocriticism: perhaps most famously, Amitav Ghosh has argued that the climate crisis is also a crisis of representation, culture, and imagination. The vast timespans and planetary distances that inflect temperature fluctuations and weather patterns exceed the limits of human spatial and chronological understanding, thus rendering climate

change unthinkable.[50] But the Dickinson example anchors these questions in time and space such that this crisis becomes both intelligible and—more importantly—meaningful. The same can be said for the poet's floral specimens: it might be easy to dismiss a few endangered flowers, but when they are Emily Dickinson's flowers, the loss suddenly feels far more poignant. Consider the extinct species mentioned in Angelo's survey: *Castilleja coccinea*; or, in the rather quaint vernacular with which Dickinson would have been familiar, Painted Cup. Consider now its presence as the first specimen on page 38 of the *Herbarium* (figure 5), the specimen was labeled by Dickinson as *Bartisa, coccinea* (Angelo employs the modern equivalent). Does the bloom not stand out more starkly, glow more vividly, and register more movingly for the knowledge of its singular, tragic status—even via digital interface? And is this effect not palpable *regardless* of whether the poet knew the species would one day be no more? Painted Cup—how exquisite.

Among the urgent stakes of climate change, the plight of plants is hardly a priority in the Western cultural imaginary. "Plants are deemed less charismatic than animals in the rhetoric of conservation," Batsaki explains, "among other reasons because they cannot be rendered familiar to us in the anthropomorphic terms that we often bring to our emotional and ethical engagement with other living organisms."[51] Plants do not have eyes or faces; they do not exhibit pain or fear. In a society that prizes independence and individualism, plants blur into ubiquitous greenery hard enough to distinguish according to species, never mind relate to as singular entities. But we can care about Dickinson's Painted Cup. Ursula K. Heise, in her book *Imagining Extinction*, argues that cultural understandings of extinction are not based in conservation science or the environmental movement, but rather in "the stories that human communities tell about

themselves: stories about their origins, their development, their identity, and their future horizons."[52] Sociocultural engagement, Heise insists, is routed through these narratives, "these

Figure 5: Digital Facsimile of Emily Dickinson's Herbarium, p.38.
MS Am 1118.11, Houghton Library, Harvard University.

broader structures of imagination" which render endangered species tangible to us. What is the Dickinson case if not such a structure? As Batsaki reminds us, "art can refresh our perception, defamiliarize that which has become mundane or invisible, and restore to plants some of their complex significance."[53] With the threat of extinction looming and with the messages of science falling short, it is time to recognize art—and narrative, specifically—for its capacity to reconnect us to nature.

Though the concept of extinction was hardly common currency in Dickinson's day, the limited, waning temporality of flowers was a phenomenon not lost on the poet. This material condition lends a crucial degree of ephemerality to any poem-flower hybrid. From the ancient Greek, the word "ephemera" refers to a plant that last but a single day.[54] Dickinson was likely aware of this etymology: in letter 1037 she writes, "If we love Flowers, are we not 'born again' every Day?" Dickinson herself mobilized her poetry to address this very concern: Farr suggests that "translating her own living but ephemeral flowers into poems about the idea of gardens and the fact of flowers, she could be assured that her art would make nature 'perennial.'"[55] For Dickinson, poetry and nature were bound in a regenerative, ongoing dynamic of care, cultivation, and composition. Durham Peters says that "media capture and fail to capture time, whose fleetingness is the most beautiful and difficult of all natural facts"[56]—what manifests this sentiment better than Dickinson's Painted Cup, a medium in-and-of-itself, pressed into the medium of the *Herbarium*, captured by high-resolution photography, accessed via digital interface, and inserted into this narrative more than a century and half later? Thinking with this case study therefore raises crucial questions about archival failure, but it also implores us to take seriously what remains.

Which brings us back to Emily Dickinson's seeds: in the context of the poet's understanding of botanicals as poetry, these archives represent more than just artifacts—they consist of art in their own right, literal evidence that the poet's "verse is [still] alive."[57] If florals held significant figurative import for the poet, seeds represented the inspirational catalysts in and for Dickinson's poetics. Though alluded to in several poems, this cleaving of seed and poetry manifests most explicitly (which is not saying much, given the poet's characteristically ambiguous style) in the opening stanza of "This is a Blossom of the Brain – ":

> This is a Blossom of the Brain –
> A small – italic Seed
> Lodged by Design or Happening
> The Spirit fructified – [58]

Dickinson harnesses the metaphor of the garden to illustrate her creative process, wherein verse blooms from little but insistent germs of imagination sown either by divine order or experience. The final line indicates either (or both) the fertilizing of the seed by the Holy Spirit or suggests the poet's own genius coming to fruition. That "italic" is the Seed's modifying adjective is notable for several reasons. Italics denote "letters slopping to the right: now usually employed to emphasize a word or series of words, or to distinguish a word or phrase (e.g. one in a foreign language) from others in the same context."[59] But in this case the word "Seed" is not itself written in italics (Dickinson did, on occasion, employ italics in her poetry); instead, it is deliberately marked as such in a formulation that defines the "Seed" as an active agent—"italic" rather than italicized, fundamentally significant rather than deemed important, emphatic rather than emphasized. For Dickinson, seeds are not passive objects to be stored, but autonomous sources of meaning. Her line of verse stresses the idea over the term: the word "Seed" does not require distinguishing, because the concept of the Seed is inherently exceptional. Exhibiting the poet's proto-imagistic style, an "italic Seed" evokes something sharp and angular—almost

reminiscent of the architectural shard of the Seed Vault. But unlike the static and stagnant Arctic monolith, Dickinson's Seed eschews any impression of stability, resonating instead with energy and tension—an insistent prick alive with potential. Within and beyond Dickinson's poetics, the Seed is an active, profound, and unique site of creative emergence.

Rather than diminishing its import, the "small" aspect of Dickinson's italic Seed endows it with an almost venerative quality. Frankfurt School philosopher Walter Benjamin's thoughts on small objects, and on seeds in particular, provide a striking intertext in this instance, for he too "had a passion for small, even minute things." In her introduction to Benjamin's *Illuminations*, Hannah Arendt remarks on his

> admiration for two grains of wheat in the Jewish section of the Musée Cluny "on which a kindred soul had inscribed the complete *Shema Israel*." For him the size of an object was in an inverse ratio to its significance. And this passion, far from being a whim, derived directly from the only world view that ever had a decisive influence on him, from Goethe's conviction of the factual existence of an *Urphänomen*, an archetypal phenomenon, a concrete thing to be discovered in the world of appearances in which "significance" … and appearance, word and thing, idea and experience, would coincide. The smaller the object, the more likely it seemed that it could contain in the most concentrated form everything else; hence his delight that two grains of wheat should contain the entire *Shema Israel*, the very essence of Judaism, tiniest essence appearing on tiniest entity … In other words, what profoundly fascinated Benjamin from the beginning was never an idea, it was always a phenomenon.[60]

That Goethe's "archetypical phenomenon" should coincide with a fascination for grains in Benjamin's thinking is almost uncannily suited to this discussion. Not only does the philosopher locate a manifestation of his monumental worldview in "grains," but this concurrence of "significance and appearance, word and thing, idea and experience" also arises in media theory, in what Mark Hansen calls the "ineliminable oscillation between the materiality and the phenomenality of media."[61]

According to the *New York Times* article, a number of Dickinson's seeds were recovered during excavation efforts at her Amherst Homestead. As Jabr mentions in his conclusion to the

piece, researchers have successfully managed to revive ancient seeds in the past: a 30,000-year-old Siberian flower was regenerated in 2012 using in vitro techniques, while 2000-year-old Judean date palm seeds were sprouted just a few years ago after a simple treatment with fertilizer and growth hormones.[62] As already glossed, ample information is available with regard to recreating Dickinson's garden, and seeds of the plant varietals she grew are easily sourced—so why go to the trouble of reviving these old seeds? And yet, the prospect of germinating Dickinson's very own seeds is tinged with wonder: more than just historical artifacts, these seeds retain something of the poet herself. Materially, they conjure the tactility of Dickinson's hands as she tended to them, but they also comprise the genetic traces of her gardening practice. As examples of what Haraway would call companion species, seeds preserve the imprint of human interaction, and vice versa:[63] "cereals domesticated humans," Anna Lowenhaupt Tsing reminds us in the very first issue of *Environmental Humanities*—as a species, we are co-constituted with the seeds we cultivate.[64] Seeds have long temporalities and are therefore uniquely suited to discussions on climate change. Whereas the Homestead no longer boasts the climate conditions of its 19th century heyday, Dickinson's seeds index and interpellate her surroundings. Figuratively meanwhile, the poet's seeds elicit the generative semantics of her artistic thinking, and they evoke an auratic quality not unlike her original manuscripts and fascicles. [65] In other words, the seeds mediate the inherent relationship between person, poetry, and garden. Much like the Seeds of inspiration described in her poetry, Dickinson's actual seeds are italic—they resonate with emphasis, they demand our attention, they claim the state of exception.

This chapter has applied a media framework to botanical specimens other than seeds both to illustrate the critical potential of such an approach and to substantiate the claim that Dickinson conceived of botanicals as art. Nevertheless, these pressed flowers subsist by virtue of archival

evidence and digital interface; though alive in meaning, they are static or lost in form. Dickinson's seeds represent something different. A seed is at least as much a phenomenon as it is an object and signifies at an inextricable nexus of conceptual and material conditions; a defunct seed—one that cannot grow—is nothing more than a disposable bit of organic matter. Ontologically, then, seeds are bound up in their regenerative potential. The physical existence of Dickinson's seeds is compounded by this potential, a phenomenon which in turn activates the seeds' symbolic resonances and in a sense reincarnates the poet herself in much the same way as poetry eternalizes its author. Seeds are animate archives that yoke nature and culture—time capsules that embody a continuous link from past memory to future promise for humans and nonhumans alike. Though these seeds have arguably lost their environmental context as a result of warming temperatures in Massachusetts, they are far from obsolete: as this discussion shows, their cultural context is abundantly fertile. To conceive seeds as texts repositions them in registers more-than-bioagricultural and helps us to understand why the recovery of Dickinson's seeds so potently captivates the imagination. At a time when the stories we tell crucially underpin our engagement with global crises, Emily Dickinson's is just one example that showcases the stakes of accessing the historical, cultural, sacred, affective, artistic, and aesthetic potential of seeds.

The dissertation thus far has considered seeds in and as archives to lay the groundwork for understanding seeds as texts. A testament to the sweeping potential of this analytical approach, this discussion has also meandered through history, science, culture, and politics to lay an extensive, if not exhaustive, contextual foundation for the place of seeds in and beyond our world. The agro-industrial complex since the Green Revolution has radically altered and corrupted human-land relations, severely compromised food sovereignty and security, and

promoted some of the most environmentally devastating practices on the planet. In this era of climate crisis, the complex forms that are seed media challenge widespread assumptions about agriculture and reify the inextricable relationship between environment and culture. Though arguably necessary for the preservation of genetic diversity, seedbanks fall disastrously short in their ability to recognize seeds across their more-than-agricultural valences, and tend worryingly toward obsolescence, if not outright extinction. Thankfully, seed saving, keeping, and exchange projects comprise *in-situ* alternatives that treat seeds as archives rather than sequestering them in archives; these initiatives maintain seeds in circulation and relation with environments and people while honoring their cultural legacies. While seed collections showcase both the oppressive power relations and the recursively annihilative paradox that subtend the archival project, seeds as archives offer a generative and potentially redemptive formulation in the context of the climate crisis. As I have suggested through Emily Dickinson's case, folding seeds into media studies offers another possibility: the products of culture—literature, film, games—complement and supplement existing seed archives, providing powerful, readable forms that treat seeds as historical, social, and cultural signifiers. Harnessing the principles of archival thinking articulated here, the chapters that follow take up representations of seeds across these forms of media to ask what lessons these remediated seeds can teach us in turn.

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[1] Ferris Jabr, "The Lost Gardens of Emily Dickinson," *The New York Times*, May 13, 2016. https://www.nytimes.com/2016/05/17/science/emily-dickinson-lost-gardens.html

[2] Jabr, "The Lost Gardens."

[3] See Kirsten Fawcett, "Archaeologists Plan to Restore Emily Dickinson's Gardens" in *Mental Floss*, May 16, 2016. https://www.mentalfloss.com/article/80066/archaeologists-plan-restore-emily-dickinsons-gardens and Erin Negley, "Restoring Emily Dickinson's lost gardens" in *LancasterOnline*, May 16, 2016. https://lancasteronline.com/features/home_garden/restoring-emily-dickinsons-lost-gardens/article_40a1a4d8-1ba7-11e6-bb34-77dd648d28ae.html

[4] One 2018 write-up in Penn Museum's Expedition Magazine mentions that the archaeobotanical project is ongoing: https://www.penn.museum/sites/expedition/in-search-of-emily-dickinsons-gardens/

[5] Jabr, "The Lost Gardens."

[6] For extensive close readings and scholarship on Dickinson's botanical poetics, see Paul Crumbley, *Inflections Of The Pen: Dash and Voice in Emily Dickinson*, The University Press of Kentucky, 1996; James Guthrie, "Darwinian Dickinson: The Scandalous Rise and Noble Fall of the Common Clover," *The Emily Dickinson Journal* 16.1 (2007):

73–91; Marta McDowell, *Emily Dickinson's Gardens,* McGraw-Hill, 2004; Gerhardt, Christine. ""Often seen - but seldom felt": Emily Dickinson's Reluctant Ecology of Place." *The Emily Dickinson Journal* 15, no. 1 (2006): 56-78.
[7] For an in-depth analysis on the use of floral imagery in Dickinson's letters, see Stephanie A. Tingley's "'Blossom[s] of the Brain': Women's Culture and the Poetics of Emily Dickinson's Correspondence" in *Reading Emily Dickinson's Letters: Critical Essays*, edited by Cindy MacKenzie and Jane Donahue Eberwein. University of Massachusetts Press, 2009.
[8] Judith Farr. *The Gardens of Emily Dickinson*, Harvard University Press, 2004.
[9] Marta McDowell, *Emily Dickinson's Gardening Life: The Plants and Places that Inspired the Iconic Poet*, Timber Press, 2019.
[10] Emily Dickinson, 1830-1886. Herbarium, circa 1839-1846. Houghton Library © President and Fellows of Harvard College. https://nrs.harvard.edu/urn-3:FHCL.HOUGH:883158
[11] McDowell (KT) and Farr, 18.
[12] Farr, 9.
[13] For more on composting as a philosophy, see "Chapter 2: Tentacular Thinking" in Donna Haraway's *Staying with the Trouble: Making Kin in the Chthulucene*, Duke University Press, 2016.
[14] Farr, ix.
[15] Henry David Thoreau and Walt Whitman certainly match Dickinson's artistic communion with nature. On that note, though the posthuman turn (in Western theory) has effectively dismissed the dichotomy between nature and culture as a fallacy, the English language is limited in its capacity to express an idea of nature that is not inherently distinct and separate from the human. Of course, in this 19th century context, the traditional understanding of nature is actually the more relevant.
[16] For more on Dickinson's floral correspondence, Stephanie Tingley, "'Blossom[s] of the Brain': Women's Culture and the Poetics of Emily Dickinson's Correspondence," in *Reading Dickinson's Letters*, 2009, 56-79.
[17] Virginia Jackson, *Dickinson's Misery: A Theory of Lyric Reading*, Princeton University Press, 2013, 62.
[18] For more on Dickinson and the symbolic code of flowers, see Elizabeth Petrino, *Emily Dickinson and Her Contemporaries: Women's Verse in America, 1820–1885*, Univ. Press of New England, 1998, 129–160.
[19] Farr, 39.
[20] Tingley, 71.
[21] Farr, 99, 106-108, 188-9. This brief gloss does not do justice to the range of meanings and metaphors employed by the poet through floral inclusions; see Farr for more elaborate readings and discussions of specific poems and letters.
[22] Dickinson, L1002 to Eugenia Hall.
[23] Farr, 26.
[24] MacGregor Jenkins, *Emily Dickinson, Friend and Neighbor*. Little, Brown, 1930, 257.
[25] Farr, 3.
[26] Marshall McLuhan, *Understanding Media: The Extensions of Man*, MIT Press, 1994.
[27] Durham Peters, 2.
[28] "Fascicle, n." *OED Online,* Oxford University Press, October 2021.
[29] Zach Marshalls, "What Do Collections Tell Us?—Teaching Dickinson's Poems, the Herbarium, and Contemporary and Historical Material Practices." *Teaching American Literature: A Journal of Theory and Practice*, vol. 7 nos. 3-4 (Fall/Winter 2015), 62-3.
[30] McLuhan, *Understanding Media* and W.T.J. Mitchell, *What Do Pictures Want?: The Lives and Loves of Images*. University of Chicago Press, 2005.
[31] For a detailed history of herbaria, see Barbara M. Thiers, *Herbarium: The Quest to Preserve & Classify the World's Plants*, Workman Publishing, 2020, and Brian W. Ogilvie, *The Science of Describing Natural History in Renaissance Europe*. University of Chicago Press, 2006.
[32] Ray Angelo, "Explanatory Notes for Catalog of Emily Dickinson Herbarium." *Emily Dickinson's Herbarium*. A facsimile ed. Belknap Press of Harvard University Press, 2006.
[33] Farr, 97.
[34] For background on Dickinson's botanical references and the Linnean classification system, see Ray Angelo's "Explanatory Notes," 1.
[35] Mary Kuhn offers a fascinating discussion of Dickinson's potentially radical perception of, and intimate relationship with, the plant world: "she departs from dominant theories of natural philosophy that elevated human consciousness above other forms of life, aligning herself instead with an emergent scientific discourse about plant feeling. Whereas the many theories of life in the nineteenth century—like the great chain of being or argument from design—tended to see the world as an orderly and stable hierarchy with humans at the top, Dickinson finds in the

plant realm another possibility: life whose very nature is collaborative, decentralized, and communicative with other environmental agents in ways that human actors cannot anticipate or control" (141-2). See "Dickinson and The Politics of Plant Sensibility." *ELH* 85, No. 1 (2018): 141–70 for the full article.
[36] Yota Batsaki, "The Apocalyptic Herbarium: Mourning and Transformation in Anselm Kiefer's *Secret of the Ferns*," *Environmental Humanities* 13:2 (November 2021), 391.
[37] Batsaki, 399.
[38] Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution*, Harper Collins, 1980.
[39] Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*, Milkweed, 2013.
[40] Kimmerer, 39.
[41] Kimmerer, 44-5.
[42] Kimmerer, 47.
[43] Tingley, 70.
[44] J. R. McNeill, *The Great Acceleration: An Environmental History of the Anthropocene since 1945*, Harvard University Press, 2014.
[45] Farr, 224.
[46] It is worth nothing that this system functions according to an artificial, essentialist, and limited logic—the intricacies and complex factors of an ecosystem can hardly be measured according to segments of 10 degrees Fahrenheit.
[47] Plant Hardiness Zones Interactive Map, Office of Sustainability and Climate, USDA. https://storymaps.arcgis.com/stories/9ee0cc0a070c409cbde0e3a1d87a487c.
[48] Angelo, 1.
[49] The recent Apple TV series featuring the poet testifies to this ongoing popularity.
[50] Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable*, University of Chicago Press, 2016, 8.
[51] Batsaki, 393.
[52] Ursula K. Heise, *Imagining Extinction: The Cultural Meanings of Endangered Species*, University of Chicago Press, 2016, 5.
[53] Batsaki, 393.
[54] "Ephemera, n." *OED Online*, Oxford University Press, October 2021.
[55] Farr 25.
[56] Durham Peters, 12.
[57] Dickinson, L260 to Thomas Wentworth Higginson.
[58] F1112.
[59] "Italic, adj." *OED Online*. December 2021. Oxford University Press. https://www-oed-com.proxy.uchicago.edu/view/Entry/100268?redirectedFrom=italic (accessed January 17, 2022).
[60] Walter Benjamin, *Illuminations: Essays and Reflections*, Translated by Harry Zohn, Edited by Harrah Arendt. Schocken Books, 1968. 11-12.
[61] Mark B.N. Hansen, "Media Theory." *Theory, Culture & Society*, vol. 23, no. 2-3 (2006), 297.
[62] Yashina, Svetlana et al. "Regeneration of whole fertile plants from 30,000-y-old fruit tissue buried in Siberian permafrost." *Proceedings of the National Academy of Sciences of the United States of America* vol. 109, no.10 (2012). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3309767/ and Sallon S, Cherif E, Chabrillange N. et al. "Origins and insights into the historic Judean date palm based on genetic analysis of germinated ancient seeds and morphometric studies." *Science Advances* vol.6, no.6, (2020). https://www.science.org/doi/10.1126/sciadv.aax0384
[63] Donna Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness*, Paradigm Press, 2003.
[64] Anna Tsing Lowenhaupt, "Unruly Edges: Mushrooms as Companion Species," *Environmental Humanities* vol. 1, no. 1 (2012), 145.
[65] See Walter Benjamin's "The Work of Art in the Age of its Technological Reproducibility: Second Version." Translated by Edmund Jephcott and Harry Zohn. In *The Work of art in the Age of its Technological Reproducibility, and Other Writings on Media.* Edited by Michael W. Jennings, Brigid Doherty, and Thomas Y. Levin. Cambridge, Mass: Harvard University Press, 2008.

CHAPTER THREE | SMALL SEEDS ON BIG SCREENS

If growth and life are cornerstones of a seed's ontology, reading seeds in post-arable contexts puts pressure on this foundational property and emphasizes how seeds mediate in registers other than bioagricultural. Derrida cautions in his discussion of the archive that "if we want to know what this will have meant, we will only know in the times to come."[1] The orphaned, obsolete seed, effectively extinct though still viable in form, represents a powerful metaphor for thinking about how our present, lived realities signify in the context of a dying planet. Perspectives from the future change the stakes in the present. As Matthew Omelsky, writing specifically about African science fiction, deftly articulates, to conceive of a "present-as-past through the optic of the future opens up the possibility of a restructured present and shift in the normative modes of social thought. It engenders a new politics of our historical moment."[2] Though Omelsky likely references the perspectival connotation in his formulation of future optics, the visual implications of this critical stance lend themselves particularly well to film.

The works of cinematic fiction taken up in this chapter posit scenarios in which agrarian systems are either threatened or obsolete: at the potent intersection of cinematic representation and the post-arable imaginary lies the desert. With their endless horizons, dazzling uniformity, and sublime emptiness, deserts push against the limits of perception. Baudrillard's writing on the desert emphasizes precisely this visual potency: "When you emerge from the desert, your eyes go on trying to create emptiness all around; in every inhabited area, every landscape they see desert beneath, like a watermark. It takes a long time to get back to a normal vision of things and you never succeed completely."[3] The desert, like film, imprints on the psyche—its "watermark" not unlike a film negative that hauntingly indexes light particulate of times past. Characterized by increasingly wider screens and high-resolution image quality, the cinematic form is an ideal

medium for desertscape depictions.[4] The desert's entrancing optics are compounded by their narrative and symbolic inflections: across literary genres in the Western canon—from biblical to epic, modern to dystopian—the desert trope signals inner conflict, trial, pilgrimage, new frontiers, transformation, existential enlightenment. No wonder Baudrillard calls these landscapes "extraordinary piece[s] of drama."[5]

Deserts are as formidable in reality as they are in the cultural imaginary, but the sublime sterility that often goes hand in hand with representations of desert wastelands also dangerously eclipses the delicate and unique ecosystems they sustain—not to mention the vulnerable human populations that call deserts home. Desert inhabitants, human and non-human alike, are considered dispensable, if they are considered at all—making these spaces ideal locales for unfettered exploitation. Though commenting on the American desert specifically, Joseph Masco's formulation of the desert as "sacrifice zone, simultaneously a fantasy playground where individuals move to reinvent themselves on their own terms and a technoscientific wasteland where many of the most dangerous projects of an industrial, militarized society are located" applies to desertscapes the world over. Deserts have become exploited sites of violence, whether in the service of nuclear experimentation or weaponized as border control—a legacy of atomic and biopolitical harm that is echoed in both this chapter's films.[6]

These socio-political conditions only intensify in an era of climate change defined by increasingly high temperatures, incidences of drought, and resource scarcity. Whereas the term "desert" specifically denotes a biome that receives less than 10 inches of rainfall per year, "desertification" describes the process of permanent, human-induced degradation of land that was once arable. Characterized by arid and semi-arid conditions, areas known as drylands are particularly vulnerable to desertification; they account for more than 40% of the world's

terrestrial surface, and are home to nearly 45% of the globe's cropland; they support roughly two billion people, 90% of whom live in the majority world.[7] The United Nations estimates the current pace of desertification to have reached 30 to 35 times the historical rate (it bears noting that desertification describes an inherently anthropocentric process, wherein land use is determined according to the values of extractive capitalism rather than a holistic understanding of more-than-human relationships).[8] This very urgent state of global desertification is both context and setting for the production and consumption of the films here considered. Given the extent of land degradation and its devastating effects on human and non-human populations across the globe (and especially and unsurprisingly on historically oppressed communities in the majority world), we need to reframe the ways in which we romanticize and theorize the desert in the Anthropocene. This chapter's discussion of seed media attempts to do just that.

Climate change discourse has always been characterized by a keen concern with the problem of scale, both spatial and temporal—and often inextricably from each other such that resulting processes become ever more difficult to describe: what is weather if not the development over time of ambient physical energies? In contrast to scholars like Ghosh, I argue that scalar ineffability is not an issue of representation, but rather a symptom of limited frameworks and inadequate methodologies. The point should not be to define and circumscribe time and space (even were such a thing possible, I doubt very much it would solve the problem in question), but rather to develop a processual perspective that curates modes of situated encounter as an ongoing practice. This method is more than analytical—it demands care and attention, and thus by its very formulation it anchors environmental justice within climate change discourse. As Donna Haraway claims, "it matters what stories tell stories, which concepts think concepts … we need stories (and theories) that are just big enough to gather up the complexities

and keep the edges open and greedy for surprising new and old connections."[9] Seed media deploy precisely such an approach.

Seed temporalities are broadly misconstrued in Western modalities of thought. In *The Profit of the Earth*, environmental historian Courtney Fullilove articulates this scalar difficulty:

> Currently, we read seeds through a welter of incompatible time scales: eschatological/apocalyptic, traditional/timeless, capitalistic/foreshortened. This disjointedness produces gaps in our thinking, making it difficult to understand the implications of broad social, technical, and cultural processes. We are led to believe that nature's time, in climatic or geologic terms, can give us better perspective. But historical time contains natural time, inasmuch as it renders the latter calculable through techniques of measurement and narrative.[10]

The tendency and temptation to define the seed only for its instrumental value and anticipatory potential—to understand it as a future, goal-oriented process—is a bias borne of capitalism's teleological and linear hegemonies. Seeds are inherently process, indexes of the past, present participants, and interpellations of the future; their temporal vectors point forward and back, and operate according to linear and cyclical, iterative and algorithmic paradigms. In short, seeds keep time, in more than just the temporal sense: they yoke experience to process and anchor history to place; more than just tracking time, they "keep" time in the sense that they hold time in suspended status. Fullilove's observation points to a common difficulty in media and cultural studies: that of thinking and articulating process. If historical time renders natural time tangible through narrative, seed media instead expose the dialectic relationship between historical and natural time: "the grammars we use to structure temporality express control, but the seed's immensity and defiance exposes their artifice, contrivance, and limits. By adjusting our perception of everyday life and cultivating moments of immersion and elongation, we create space for new ethical sensibilities and politics."[11] Committed to a historical and political intervention, Fullilove's argument—invested in "grammars," "perception," and "immersion"—

also points directly to the significance of media in the context of seed encounters. Seed media are where past histories and future possibilities coalesce in a present/presence of emergence.

With regard to spatial concerns, seeds mediate their environments. Quite literally, whether and how seeds grow convey constitutive information about their surroundings and comprise a physical record of their geographic and ecological trajectories. The process of germination can also be described as one of recognition between land and seed, wherein the establishment of a mutual relationship converts space to place (echoed in the common expression "to put down roots"). Seeds are portable caches of home. In a climate changing world increasingly defined by displacement and refugee crises, seeds perform an orienting function and offer grounding modes of resilience. At the intersection of time and space, seed media are crucial vectors of memory. As Rob Nixon urgently explains,

> attritional catastrophes that overspill clear boundaries in time and space are marked above all by displacements—temporal, geographical, rhetorical, and technological displacements that simplify violence and underestimate, in advance and in retrospect, the human and environmental costs. Such displacements smooth the way for amnesia, as places are rendered irretrievable to those who once inhabited them.[12]

We are living in the long apocalypse: coordinates both spatial and temporal are becoming precarious or lost before our eyes yet beneath our notice; against such an amnesia, seed media offer portable, durational anchors to collective memory. Like seeds, "media are pivotal to the construction of individual and collective identity—creative acts and products through which people make sense of their lives and the lives of others and connect past to future."[13] As the urgencies of contemporary moments dilute into crises of recent pasts as our focus shifts toward concerns for the future, the media we produce become crucial for keeping time—ideological landmarks—for anchoring the human experience under neoliberal capitalism.

This chapter implements a form-specific analysis of two kinds of films—full-length feature and short—each of which harnesses various techniques to represent seeds that exemplify the role of seed media in keeping time. In George Miller's *Mad Max: Fury Road* (2015), seeds operate as chronotopes—orienting indices of material and cultural histories across form and content—that index the film's narrative and figurative stakes. Wanuri Kahiu's *Pumzi* (2009) deploys seed media in both diegetic and extra-diegetic dimensions to exemplify how dissemination and mediation are one and the same. Ultimately these films model how our relation to both seeds and "media is one of mutual and reciprocal constitution: we create them, and they create us."[14] Comparing the formal difference of these films makes seed time visible and reframes how we conceive seeds as processes.

"It's a Detour" | *Mad Max: Fury Road*

Reading seed media in *Mad Max: Fury Road* (hereafter referred to as *Fury Road*) is an exercise in paradoxical thinking, wherein seemingly opposing concepts dialectically activate one another to highlight the complex layers of signification of and across seeds and cinema. One of the central tenets of this dissertation is that thinking with seed media offers alternative modes of engagement that challenge the inconceivability of climate change contexts. Temporal and spatial scales are stressed to excess in *Fury Road*—aesthetically, conceptually, and formally (categories that themselves spill their boundaries and bleed into one another)—in ways not dissimilar to the unfathomable dimensions of climate change. At the heart of this representational chaos, I argue that seed media perform a crucial orienting function as chronotopes. In *The Dialogic Imagination*, Mikhail Bakhtin defines the "chronotope (literally, 'time space') [as] the intrinsic connectedness of temporal and spatial relationships that are artistically expressed in literature."[15] Like seed media, chronotopes operate "almost as a metaphor (almost, but not entirely)" to

describe chronospatial dynamics as they unfold in narrative: "time, as it were, thickens, takes on flesh, becomes artistically visible; likewise, space becomes charged and responsive to the movements of time, plot and history."[16] The concept of the chronotope has only recently been taken up in environmental humanities discourse and represents a methodologically promising intervention in the field. As Timo Müller contends in his essay "The Ecology of Literary Chronotopes," "chronotopes are not mere representations of time and space but epistemological structures that influence our very perception of time and space."[17] To consider *Fury Road* through the chronotopic lens of seed media is to parse the grey areas between the ideological bifurcations that precipitated the climate crisis in the first place: life and death, human and non-human, speed and stasis, animate and inanimate.

Directed by George Miller and released in 2015, *Fury Road* is unlike any Hollywood blockbuster that preceded it and became a cinematic phenomenon with an avid cult following. Produced by Warner Brothers and Village Roadshow Pictures, the film was nominated for ten Academy Awards, including Best Director and Best Picture, and recognized with six. Though technically the fourth instalment in the *Mad Max* series, *Fury Road* is so divorced from its predecessors as to be easily considered independently.[18] In fact, attempting to frame *Fury Road* as a continuation of the earlier trilogy generates chronological inconsistencies that are impossible to reconcile (despite rigorous attempts by die-hard fans). Writer Eric Blakeney describes it as "more of a cousin of the *Mad Max* movies than a *Mad Max* movie," while Miller himself insists that he never thinks "in terms of a franchise."[19] Meanwhile, it would be easy to argue (and many have) that the titular character, Max Rockatansky (Tom Hardy) cannot even claim the role of protagonist, with that mantle taken up instead by the Imperator Furiosa (Charlize Theron).

Set in a postapocalyptic, nuclear-blasted wasteland, *Fury Road* presents a dystopian hellscape in which a military dictatorship mobilizes resource extraction, biopolitical control, and religious fanaticism to maintain authority. The strongholds known as the Bullet Farm, Gastown, and the Citadel comprise the reigning triumvirate, the last of these being the dominant seat of power and the desert's only source of fresh water, dubbed Aqua Cola.[20] Ruled by the tyrannical Warlord Immortan Joe (Hugh Keays-Byrne), the Citadel rises like a monolithic oasis from the arid plains, offering sanctuary to the privileged few while the Wretched—hordes of maimed, diseased, and desperate refugees—gather at its base awaiting ceremonial cascades of water from on high. To maintain trade with the other strongholds, the Citadel also grows vegetables, referred to as "produce," and harvests "mother's milk" from what is essentially a human dairy farm. *Fury Road* opens with a brief but spectacular car chase, in which a maniacal scavenging party hunts down and captures Max and his iconic XB Falcon amidst riotous and explosive effects. The film's dominant plotline (which takes place over three consecutive days and which I will summarize here) then kicks into gear.[21] Back at the Citadel and amidst full fanfare, Imperator Furiosa[22] embarks on a supply run driving the War Rig—an 18-wheeler tanker truck so outlandishly souped-up that it may as well be considered a character in its own right—only to divert course unexpectedly. The stakes: Furiosa is attempting an escape of epic proportions and harboring the Warlord's enslaved wives to boot. Enraged at this betrayal, Immortan Joe and his chaotic caravan set after the fugitives, quickly bolstered by reinforcements from both Gastown and the Bullet Farm. During the initial chase, Max manages to free himself from the pursuit convoy and joins Furiosa and the five women on their journey East toward a destination Furiosa calls "the Green Place of Many Mothers," the home from which she was stolen as a child. War boy Nux (Nicholas Hoult) likewise turns coat to aid the fugitives in their mission. After a

colossal sandstorm and a series of violent, action-packed skirmishes—all of them close calls—the band of renegades at last encounter the "many mothers": a handful of fierce biker-warrior-women known as "the Vuvalini." They welcome the runaways but deliver crushing news: the Green Place is no more—poisoned, sour, abandoned. The warrior women are "the only ones left." Shattered, Furiosa collapses to her knees and screams into the desert sunset in what is arguably the film's most memorable and visceral scene (all the more remarkable for its contrasting lack of spectacularly explosive content). The following day, as the group prepares to cross the possibly endless salt flats in search of a new settlement, Max proposes a different plan: "we go back." The Citadel, now undefended, offers the only reliable chance for hope, for "redemption." With the Vuvalini bolstering their ranks, the renegades charge furiously back the way they came. The unsuspecting enemy parties quickly rally to the chase. Bullets fly (a lot), knives stab, chainsaws slice, engines roar. Severe casualties mount on both sides. Furiosa, gravely injured, at last slays Immortan Joe. Nux jackknifes the War Rig into a canyon pass in an explosive sacrifice that blocks off pursuit for good. Arriving at the Citadel with a barely recovered Furiosa at their helm, the survivors are hailed in celebration and raised up to sanctuary. The soundtrack swells triumphantly, a better world is possible. On the ground, Max slips away among throngs of revelers, his journey unfinished.

At the heart of this chaotic, rapid-fire progression of events, seeds mediate formally, aesthetically, and conceptually via two dynamic chronotopes that are at once antithetical and inextricable: bullets that mirror cinematographic form and catalyze the dissolution of the false trichotomy of human, nature, and machine, and heirloom seeds that activate and perform the film's retrospective chronological and narrative ethos. According to Bakhtin, the chronotope of the road is a prime narrative structure for the occurrence of "meetings and adventures," both of

which certainly play out in this film. One problem: despite its title, *Fury Road* is a road movie without a road. In fact, the action precipitates from the moment when Furiosa veers "offroad"—"it's a detour," she announces, her character's first line of the film. Instead, the setting is an absence of setting: a desert wasteland so vast that it generates a sense of the sublime. In contrast to the "exceptional precision and clarity" of "time and space markers" proper to the chronotopic road, temporal and spatial descriptors become interchangeable in such landscapes of nothing:[23] "There was a place we shot in the desert called Blanky Flats," a film crew member recalls, "which is six square kilometers where you could close your eyes and drive for ten minutes and not hit anything." The renegades' ostensible destination—the Green Place—is not a dead end (though dead it is) but no end at all, having vanished from the face of the earth. In lieu of the road, I argue, the seed is the film's dominant chronotope, organizing time and orienting space aesthetically, conceptually, and formally in a film defined by excess. Seeds both constitute and conjure a sort of mobile destination, a place temporarily divorced from space in suspended potential. The desert is massive, barren, empty—even time seems to stand still. The seed, in contrast, is minute, full of life and meaning—time encapsulated.

Temporal and spatial excess define the film's material and formal architecture. When production wrapped, *Fury Road* counted over 480 hours of footage—"the equivalent of over three million feet of film in digital practical hours."[24] Despite the analog-to-digital shift, the term "footage" indexes how cinematic duration continues to be conceived in spatial terms—we think time in "feet." Editor Margaret Sixel managed to winnow the material down to two hours—just barely—by retaining only the absolutely essential content (even shaving off individual frames to gain split seconds—no wonder she won the Oscar for Best Editor), generating a sense that the film is bursting at the seams with time and space condensed under pressure. These extreme

formal strategies are mirrored in the film's overwhelming aesthetic and conceptual excess. Though its environmental message seems fairly obvious—the classic progression of petro-culture to resource wars to eco-collapse to deadly dystopia—*Fury Road*'s concerns with climate justice are as dynamically entangled as they are critically nuanced, ranging from an ecofeminist critique of gender and reproductive politics to the dissolution of the ideological binary that undergirds human exceptionalism. For a film conceived in storyboard form and produced without a traditional screenplay, *Fury Road* is a triumph of narrative—a highly detailed and in-depth masterpiece of worldbuilding. Every character, vehicle, and even every prop has an elaborate backstory that enriches performances and heightens the realism of the wasteland, even with its cacophony of chaotic absurdities. Packed to the brim, the film nevertheless gives the impression that, as viewers, we have barely scratched the surface. This mind-blowing excess approximates the vast temporal and spatial dimensions that make climate change so difficult to parse and represent; deploying seed media as chronotopes rises to this challenge.

Fury Road first introduces the concept of the seed in the form of its antithesis: the bullet. In a scene midway through the outbound journey—incidentally, at the mid-point of the film—the wives, whilst inventorying their remaining ammunition, comment offhandedly about the bullets: "Angharad used to call them anti-seed: plant one and watch something die." This analogy seems a simple one—a contrast of life-giving and life-taking properties; but the relationship between seeds and bullets is rife with conjunctions that reflect our neoliberal climate crisis. The *OED* etymological entry for "bullet" is peppered with seed references: among its origins is the word "bud," with the term's third definition being "beans or peas."[25] Coming at the comparison from the botanical side, "ballistic dispersal" is a well-known distribution strategy for many plants, wherein the seeds are propelled or catapulted away either when the seedpod reaches maturity or

when triggered by an external stimulus. More recently, seeds have even been pseudo-weaponized in the service of global fast capitalism: in the summer of 2020, thousands of people throughout the U.S. and the U.K. received mysterious seed packets in the mail (myself included). Originating from China and at the height of the COVID-19 pandemic, these seeds caused a mild panic as (racially prejudiced) conversations turned to biowarfare—news outlets and even the USDA urged recipients to treat the seeds "as radioactive," to bake them at high temperatures before throwing them out so as not accidentally to send them invasively sprouting into the world.[26] These packets were in fact part of an e-commerce scam tactic known as "brushing," wherein fake transactions with real packages—and thus, real tracking records—are generated to undergird fake positive reviews for various products. This particular wave of mystery mail showcases precisely the ways in which seeds can and do mediate their biological, cultural, and political contexts, for better or for worse.

The relationship between bullets and seeds in the film echoes this complexity. In an extension of this agricultural metaphor, bullets are sourced not from a factory but from the Bullet Farm—*the* farm par excellence in a wasteland of violence. Cultivated and flourishing in this postapocalyptic environment, bullets represent a warning of what seeds can become in extreme situations of capitalist extraction: weaponized and deadly. This violent scenario is hardly contained to the postapocalyptic future on screen, but rather rages rampant in the neoliberal capitalist conditions that have existed since the Green Revolution. A prime example is the 1998 introduction of Bt cotton in India: spearheaded by Monsanto, the distribution of the GMO seed not only eradicated traditional cotton varietals in the decade that followed, but increased seed costs by over 8000%. Despite its purported resistance to pests, Bt cotton relied on increased use of chemical inputs, which contributed to rising farm expenses. Farmers across the country went

into massive, irreconcilable debt; to date, an estimated 400,000 farmers have committed suicide in the face of the financial chokehold. Dr. Vandana Shiva, the eco-activist responsible for bringing worldwide attention to this crisis (among many other, admirable causes), reminds us that "food is a weapon. When you sell real weapons and arms you control armies. When you sell food, you control society. When you sell seed, you control life on Earth."[27]

Alongside the environmental analysis made possible through the contrasting analogy of the seed/bullet, formal questions likewise open up: paying attention to bullets as anti-seed highlights the relationship between seeds and cinema, as triangulated via firearms. As Paul Virilio thoroughly details in his book *War and Cinema*, the technologies of cinematography and warfare have converged since their inception. Cameras and guns share a language: point and shoot, line up that shot, etc. But this connection between firearms in cinematography is not just linguistic: these technologies have entangled material histories. Even answering the question of which came first: the camera or the gun? is less simple than one would expect. The movie camera's precursor is a device known as the chronophotographic gun, invented by French scientist Étienne-Jules Marey in 1882. Using a metal shutter to shoot 12 images per second, it was the first device to capture moving images on a single chromatographic plate. Machine guns were adapted from the same design—ammunition rotating through a chamber in the same way film threads through a camera. But going back further, the instrument that preceded Marey's device was the Janssen revolver, invented in 1874 by French astronomer Pierre Jules César Janssen, to capture movement from a sequence of images. And the Janssen revolver apparatus was directly inspired by the revolving cylinder of the Samuel Colt revolver. Alongside this mechanistic co-evolution, a chemical transference was also taking place: the paper negative developed for the first Kodak camera, released in 1888, employed guncotton to create a stable

celluloid—perhaps the greatest breakthrough in photographic technology.[28] If everything is immanent in its opposite, it should come as no surprise that gunpowder—destructive energy release—would also allow for image retention—creative energy capture. Guns and cameras not only arose from the same design but continued to influence one another as they progressed in technology and function: as Virilio notes, "the industrial production of repeating guns and automatic weapons was thus followed by the innovation of repeating images, with the photogram providing the occasion. As the video signal supplemented the classical radio signal, the video camera further extended such 'cinematography' and allowed the adversary to be kept under remote surveillance in real time, by day and by night."[29] From a historical-materialist perspective, film and violence are inextricable from one another.

With its exceptionally fast pace and ruthlessly precise cinematography, *Fury Road* in particular exemplifies the intrinsic and aggressive relationship between shooting firearms and shooting film. The 21st century Blockbuster action movie has become characterized by rapid editing and chaos cinema styles, with some films comprising around 3000 individual shots (for reference, the average feature film counts around 1250 shots). *Fury Road* is among these behemoths, with over 2700 shots in its 120-minute run, and an average shot length of 2.1 seconds. Where the film stands apart from its fast-paced contemporaries (such as *The Bourne Ultimatum* and *Resident Evil: Apocalypse*) is in its consistent and exacting composition: the subject of the shot—whether a character, a weapon, etc—is always center-framed. This method keeps the eye focused across rapid cuts and allows crucial visual information to remain the center of attention. Events in a sequence are thus more easily perceived and cognitively processed by the viewer, diffusing kinetic and sensory overload to allow for a coherent audience experience. This technique is called crosshair framing. During the shooting of every such scene,

Miller's emphatic edicts reportedly pierced through the walkie-talkies: "Put the crosshairs on her nose! Put the crosshairs on the gun!" Meanwhile, in a video interview, Miller describes the rhythm of these sequences with the expression "Bang! Bang! Bang!" Designed with viewer experience in mind, crosshair framing goes both ways—the subject is centered such that cinematic content might hit the *target* audience. As such, firearm frameworks interpellate the spectator.

Ironically, this gunshot pace works in part because we do not actually need to see a bullet in motion to understand its action or consequences: "plant one and watch something die." Case in point, to render a scenario in which a bullet does *not* hit its target—and spectacularly so—effects designer John Gaeta famously developed an extended visual sequence in which bullets are tracked along their slow-motion trajectory amidst swelling shock waves as they narrowly miss their mark—*The Matrix*'s renowned "one," Neo. Accomplished with an extremely expensive and heavy camera, the effect became known as "bullet time" in critical and technical discourses in cinematography as well as in common parlance. If bullet time structures the audience experience by slowing the rate of action to give the illusion of perception at bullet speed, what can we make of seed time? This question is more fully explored in this chapter's following section on *Pumzi*, but for now suffice it to say that the concept of anti-seed encapsulated in the bullet exemplifies the cinematic potential for the visual translation of discordant temporalities—a crucial formal affordance in the face of climate change's vast timescales.

Miller's ultra-fast-paced style is not just an aesthetic choice, but a testament to evolving capacities for visual consumption and emerging modes of attention in hyper-digital contemporary culture. N. Katherine Hayles notes that "film directors accept as common wisdom

that the time it takes for an audience to absorb and process an image has decreased dramatically as jump cuts, flashing images, and increased paces of image projection have conditioned audiences to recognize and respond to images faster than was previously the case."[30] Or, as Miller himself puts it, "we are speed-reading movies now."[31] Hayles describes this co-evolution as technogenesis, building on Marshal McLuhan's theory of media as extensions of ourselves. She advances the idea that humans and technics have coevolved together: "our interactions with digital media are embodied, and they have bodily effects at the physical level."[32] *Fury Road* takes this technical embodiment to the extreme. Immortan Joe and his sons are outfitted with various devices to augment their differently-abled bodies, while Furiosa famously sports a mechanical arm.[33] The film's many vehicles are portrayed as extensions of their drivers, and vice versa, with detachable steering wheels vaunted as personalized emblems.

But in *Fury Road,* this cyborg condition extends beyond the human-technology exchange described by technogenesis, looping nature into its holistic purview. What is exceptional about *Fury Road*'s dissolution of nature as a conceptually isolated category is that it arrives at nature not via the human, by via the machine: if the film's characters are mechanized, its machines are in turn animated. In *The Death of Nature*, Carolyn Merchant traces the historical origins of the ideological division of Nature from the Human, showing how these once coterminous concepts were bifurcated during the Scientific Revolution to justify environmental exploitation (and, by association, the subjugation of women) under industrial capitalism. This is the same kind of logic that fuels Immortan Joe's regime of dominance and exploitation. Aside from the tyrant's immediate male progeny, the remainder of the Citadel's inhabitants are commodified chattel, fire-branded with the Warlord's insignia: captive lactating women, cancer-riddled war boys (mostly children) as manual labor and "battle fodder," and of course, Immortan Joe's enslaved

wives. Interestingly, though this last ensemble is generally dubbed "the wives" in interviews and production testimonials, in the film itself "wives" is but one, hardly employed designation for these women, who are also referred to as "treasures," "breeders" or "breeding stock," "the assets," "things," and "stuff." When first taken prisoner in the bowels of the stronghold, Max is quickly dehumanized—branded and tattooed with relevant biological characteristics such as blood type "O-negative" and "universal donor," along with the directive to "keep muzzled." While the film largely refrains from passing didactic value judgements on its subject matter, this logic of violent exploitation is clearly condemned.

Before the ideological fragmentation of Human and Nature, animate qualities were commonly recognized in non-biological objects and processes, including technology. Merchant notes that

> in the early modern period, the term *organic* usually referred to the bodily organs, structures, and organization of living beings, while *organicism* was the doctrine that organic structure was the result of an inherent, adaptive property in matter. The word *organical*, however, was also sometimes used to refer to a machine or an instrument. Thus a clock was sometimes called an 'organical body,' while some machines were said to operate by organical, rather than mechanical, action *if the touch of a person was involved*. (emphasis mine)[34]

Fury Road celebrates this connection in its storyworld, blurring the line between inanimate and animate entities both in its production aesthetics and the interactions of its characters. Machines in this world are ontologically very much alive. Furiosa's War Rig perhaps best embodies this phenomenon. Sound editor Mark Magini overlayed the tanker's engine sounds with whale song "to give it a living quality"—song which shifted into "whalelike groans" whenever it was hit by a harpoon. In the slow-motion sequence that depicts the tanker's final, epic crash, "realistic sounds" are eschewed in favor of "whale sounds and slowed-down bear sounds," the better to convey "the final death rattle of a dying creature."[35] The characters also treat the machine like a

living thing. The tanker carries mother's milk, dispensed through taps along its lower hull—not unlike teats on an abdomen. Nux describes the overheated engines as "real thirsty," and later blows fuel into the intake ducts mouth-to-mouth fashion, the better to egg on the pursued beast. During a scene in which the engines are on fire and Furiosa lowers the cowcatcher to quench the flames in a wave of sand, the War Rig appears temporarily to hold its breath, releasing a massive sigh as the intakes unseal. Even the film's limited script cleverly testifies to a more holistic ideology: Immortan Joe's physician is dubbed the "Organic Mechanic," while a character with mechanical skills is referred to as a "black thumb," an expression that plays on the garden-savvy label of green thumb and that, by reverse logic, implies a measure of nurture and instinct in machine-care. Triangulating seeds, bullets, and cinematic media in *Fury Road* opens up formal and conceptual throughlines that challenge human exceptionalism and make visible holistic relationships across traditionally segregated ontological categories (in Western thinking). *Fury Road* sets the stage for the convergence of technogenesis and symbiogenesis: technology and media are celebrated as extensions of the human but also recognized for their relationship to natural processes and their organic, co-constitutive role as companion species. Humans are co-evolving with media in the same way they are co-evolving with seeds: technogenesis and symbiogenesis are two words for the same process.

No matter how effective cinematic media may be at transporting audiences to other worlds, their production and consumption hardly occurs in a vacuum. A cinematic tour-de-force, the style of *Fury Road* also brings into relief how the formal affordances of the Hollywood feature film index our contemporary moment. High-speed content that caters to a limited mode of attention aptly describes our neoliberal culture of consumption. Moreover, a strict center-focus implies a significant amount of information and detail going unnoticed at the edges of the wide

screen—much in the same way we overlook or dismiss our surrounding environments. Destructive practices such as industrial agriculture thrive in this cycle of immediate gratification. Like seeds, films are inextricable from the material conditions that make their existence possible. The endless wasteland that comprises the postapocalyptic setting of *Fury Road* is in fact a real place—one that still bears the scars of the film's production. In 2010, *Fury Road* was set to start filming on location in the desert surrounding Broken Hill, a mining town in the far west region of New South Wales, Australia, where *The Road Warrior* (*Mad Max 2*) was shot back in 1980. Ironically, just days before the shoot was scheduled to begin, the area experienced its first rainfall in 15 years, a weather pattern that developed into superstorms and resulted in the second-highest season of rain in over a century. From the red, arid earth bloomed a flower garden, salt lakes filled with water, flocks of birds returned to the region. Rendering the film's quintessential barren wasteland from such scenery was out of the question: even CGI could not scrub out so much vegetation. Producers explored other options, including using blue screen or shooting on abandoned airstrips to substitute backgrounds. Desert locales in the United States were quickly deemed too expensive. After two years, they set their sights on the endless deserts of Namibia, in Africa.

The production, including a freight ship filled to the brim with the film's anarchic armada, relocated to Dorob National Park in the Namib Desert, situated along southern Africa's Atlantic coast. Estimated to be between 50 and 80 million years old, Namib is the planet's oldest desert. Though described as a barren, inhospitable wasteland, and taken for granted as such by the production crew of *Fury Road*, the Namib Desert is in fact home to one of the world's most delicate and ancient ecosystems, with many unusual and unexpected species of endemic flora and fauna exclusively adapted to the area—rare reptiles, cacti, and a fine lichen crust. With

insignificant rainfall, the desert's gravel plains bear the marks of tire tracks for decades or longer. Meanwhile the crew reportedly dragged nets over large areas to erase marks and even out surfaces, uprooting the scarce vegetation. Already incredibly sensitive, these habitats are impossible to rehabilitate. No environmental impact assessment was conducted prior to filming, a fact that both indicates a severe lack of ecological awareness and respect, and complicates attempts to measure the extent of the harm done over the course of the ten-month shoot. "Since then, Namibia has introduced new environmental legislation that would prohibit filming in many of *Fury Road*'s locations."[36] Equally important to note is the lack of engagement with and acknowledgment of the Namibian people and culture that hosted the production for nearly a year: aside from what many have called a whitewashed main cast, most of the extras were brought in from South Africa, and the franchise's legacy locates the setting in Australia—though a fundamental factor for the film's existence, Namibia is essentially eclipsed from the final product. The only exception is, curiously, a small skull that harbors a basil plant: its short horns identify it as that of a klipspringer—a small antelope native to eastern and southern Africa. This erasure constitutes a form of violence, and highlights the need for film—both as industry and as art form—to take responsibility for the material conditions of its production.

For all its cautionary messaging of resource scarcity and white patriarchal violence, *Fury Road*'s hand in perpetuating environmental harm and neocolonial exploitation is impossible not to condemn. The environmental impacts of *Fury Road*'s production are a keen reminder of the ongoing toll the film industry is levying on the planet, a toll in which we are complicit as consumers of film media, both financially and extractively: servers "use more energy streaming a high-def movie just once than does fabricating and shipping a DVD."[37] Though the logics and rhetorics of individual carbon footprints are themselves the deflecting strategies of behemoths in

the fossil fuel industry, I do believe that a collective shift is possible at the cultural level. Like Allison Carruth, I contend that "the environmental humanities have a potentially unique contribution to make to such tactical digital humanities by delving into what we could term … the ecological materiality of digital 'knowledge production' and by collaborating on 'techniques, frames, and paradigms' that model alternative labor conditions and alternative environmental ethics to those of late capitalism."[38] While my approach does not redeem the specific harms caused by the film's production, I contend that reading seed media in *Fury Road* can teach us something about the radical power of storytelling and collective memory in socioenvironmental crises.

Foreshadowed in the concept of the anti-seed and thus in the veritable mass dispersal of bullets, actual, material seeds at last make an appearance as *Fury Road* transitions from its second to its third act, on the eve of the ragtag band of renegades' decision to "go back the way [they] came," to retake the now-undefended Citadel. What at first appears to be a simple conversation between the Dag (Abbey Lee Kershaw) and one of the Vuvalini (played by Melissa Jaffer, unnamed in the film but identified as the Keeper of the Seeds in the credits) is in actuality a lynch pin for the narrative's reproductive and gender politics, its deadly survival culture, and how these two throughlines coalesce in the socio-historical matrix of seeds.

Still reeling from the devastating discovery that the Green Place is extinct, Max, Furiosa, Nux, and the wives mingle quietly among the Vuvalini, bathed in the shades of deep azure that characterize the film's nocturnal aesthetic. Melancholy and nostalgia suffuse the scene, evident in the characters' postures, the subjects and tones of their conversations. The Keeper of the Seeds sits astride her motorcycle, cleaning and reloading her long-barrel musket as the Dag runs her hands over her stomach.

“Stay right where you are, little Joe,” she dryly quips to no one and everyone. “Kind of lost its novelty out here.”

“You havin’ a baby?” asks the Keeper.

“Warlord Junior,” answers the Dag, softly cynical. “Gonna be so ugly.”

“It could be a girl,” replies the Keeper.

As though unwilling or unable to consider this possibility or its implications, the Dag changes tack, gesturing at the musket as she challenges, “You kill people with that, do ya?”

This sequence’s opening pairing of pregnancy and firearm should feel familiar by now, but the progression of the dialogue enacts a subtle shift in the dynamic between violence and reproduction. The Dag’s potential daughter represents a complex nexus of biopolitical tensions—she risks the perpetuation of violence both as a child of rape and a would-be victim in turn, but also offers the possibility for radical change in the embodiment of the Warlord’s opposite—a girl. The Dag’s conversational shift to the subject of killing is both deflection and accusation, as though the Vuvalini, as killers, are somehow upholding the status quo and are thus complicit in her own violent circumstances.

“Killed everyone I ever met out here,” the Keeper answers pragmatically. “Headshots, all of them. Snap. Right in the medulla.”

The Dag bites back disapprovingly, “thought somehow you girls were above that.”

The Keeper doesn’t quite roll her eyes at this high-horse judgement, but her wry exasperation is evident as she scoffs at the Dag to “come here.” She tugs a large Gladstone case from her sidecar, sets it on the motorbike seat and knowingly goads, “take a peek.” The Dag approaches as the Keeper opens the case, revealing its treasures.

"Seeds," the Dag marvels as she careful lifts a woven pouch of beans from among the packets and vials on display, her criticism quickly evaporating.

"These are from home," the Keeper explains reverentially. "Heirlooms. The real thing." She extracts a small skull, a makeshift planter cradling a tenderly swaying basil shoot, continues pragmatically: "I plant one every chance I get."

"Where?" asks the Dag.

The Keeper prods at the roots and replies, "so far nothing's took: earth's too sour."

Undeterred, the Dag continues her inspection: "Aah. So many different kinds."

The soundtrack swells, the Keeper's voice at last betrays some emotion as she elaborates, "trees, flowers, fruit. Back then, everyone had their fill. Back then, there was no need to snap anybody." The women lock eyes, smiling, as the Dag understands the lesson, takes in the significance of the seeds and the history of peace and plenty that they embody—proof that the Vuvalini are, in fact, "above all that."

The Keeper's seeds themselves corroborate this sentiment: though this twilit introduction to her collection makes it nearly impossible to distinguish the case's contents, an extremely brief close-up (figure 6) of the seed cache in the light of day offers additional, noteworthy specifics:

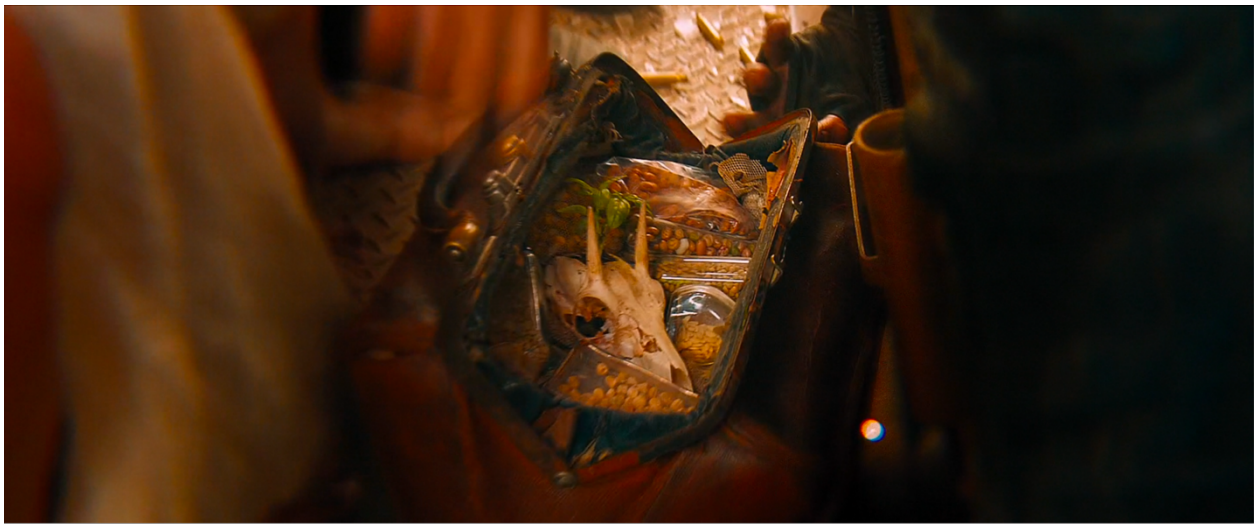

Figure 6: Screenshot of Seed Cache; Mad Max: Fury Road, *dir. George Miller, 2014.*

The crinkled husks in the foreground appear to be nightshades (tomatoes or peppers), properly dried to preserve the delicate seeds inside. In line with the skull is a jar containing cucurbit seeds (cucumbers, melons, squash), while the large case and vials crammed into the far half of the case boast beans and cowpeas, with many varietals on display. Basil plant aside, the collection is remarkable for its climate suitability: nightshades, cucurbits, and beans are all heat lovers. It is worth noting that the Keeper does not attribute her unsuccessful planting attempts to excessive heat or water scarcity, but rather to the sourness of the earth—presumably the result of post-nuclear toxicity (which can be read to suggest either that the Citadel crops thrive because of bioengineered adaptions to said toxicity or that their cultivation method is hydroponic). In this context, the Keeper's anaphoristic insistence on "back then" emphasizes the mediative role of the seeds she has stewarded: they are memorials of a by-gone environment and a lost civilization, narrative chronotopes and orienting vectors of memory that pierce through the otherwise unnavigable geohistories of the nuclear desert: they index and interpellate a soil and an agricultural tradition that once was.

Figurative and material signifiers abound in this screenshot. Center stage, the basil's shock of green against the film's predominantly ochre and sepia-toned color-palette draws the eye and captures the imagination with its promise of lush renewal (perhaps it is not a coincidence that basil's traditional symbolic association is with love and abundance). At the same time, the fragile seedling conveys the extreme precarity of vegetation in these hostile conditions. Tucked in its skull nursery, the sprout symbolically evokes the cycles of decay and renewal that comprise the foundation of life. Visually, the tableau of skull nestled in its seed collection calls to mind the Dutch still-life painting tradition, which aimed to capture ephemerality and precarity through depictions of skulls (memento mori) alongside rare blooms and botanicals. The tension inherent

in the genre is particularly relevant to seeds in post-arable worlds: the connotations of still-as-adjective (motionless, static) and still-as-adverb (even now, all the same) are entangled to reflect the arrested-yet-viable paradox of seeds in inhospitable environments. The French term for the style, "nature morte" or dead nature, approaches the same paradox from the opposite direction, placing emphasis on the contradiction inherent in representing life via an inanimate and static form—not unlike the concept of the stilled film frame (required for this kind of close reading) which, excerpted from its moving-image context, both allows for and arrests the process of mediation by troubling the dynamic logics of the cinematic form. In fast-paced cinema, reading seed media exposes the complexities and contradictions inherent to this liminal site of encounter.[39] As Laura Mulvey has deftly explored, "the cinema combines, perhaps more perfectly than any other medium, two human fascinations: one with the boundary between life and death and the other with the mechanical animation of the inanimate."[40] The stilled frame likewise evokes the photographic index in which, as in seeds, "the trace of the past in the present is a document, or a fact, that is preserved in but also bears witness to the elusive nature of reality and its representations."[41]

As chronotope, the Vuvalini heirloom seeds structure time by conjuring the past and interpellating the future, orienting narrative in an otherwise incommensurable landscape. Sandwiched between the statements "these are from home" and "the real thing," the use of the term "heirlooms" is two-fold: in seed jargon, "heirloom" designates a traditional variety of plant that was not coopted by or associated with large-scale agriculture but rather stewarded by gardeners and growers over time—"the real thing." Despite the obviously harsh conditions of hunger and lack in which her people carve out their existence, the Keeper's motivation for safeguarding these seeds is not food-driven; she lovingly lists "trees" and "flowers" before also

mentioning “fruit,” indicating an aesthetic and phenomenological value at the heart of her collection. “From home,” the seeds are cultural heirlooms, sacred and cherished objects passed down from previous generations. With the Green Place gone, the seeds are all that remain of the Vuvalini legacy. These seeds signify in both registers, singular and precious for their cultural significance as well as their biological potential. At the same time, scientifically speaking, the unfortunate likelihood is that the entire cache is no longer viable. Without actual refrigeration, seeds typically last no longer than five years, and even then only in cool and dark conditions (seedbanks and seed vaults rely on subzero temperatures to maintain their collections in states of long-term dormancy). In the post-arable world, all seeds are in some ways anti-seed: plant one and watch something—the seed itself—die.

Vegetal life is not entirely absent from *Fury Road*, but its degree of authenticity and mediative potential is suspect, to say the least. When the Keeper declares her heirloom seeds to be “the real thing,” the implication is that whatever is being cultivated at the Citadel (“a lot of crops,” Toast confirms) are not the real thing—not heirloom varietals and certainly not “from home.” Though the Citadel seemingly grows enough produce to supply not only its privileged inhabitants but also the Gastown and Bullet Farm strongholds, the film offers but a single glimpse of a hydroponic operation as Immortan Joe rushes to his wives’ now empty chambers. Tracking along golden shafts of sunlight, the six-second shot slants downward from vaulted heights to reveal cascading troughs of misted greenery in all their plentiful glory (figure 7). Even an experienced farmer or botanist would struggle to identify anything besides cabbage upon first viewing, especially as the frantic Warlord quickly commands the shot’s focus, but the contrast of verdant blur against terra-cotta cavern effectively conveys an impression of abstract abundance—which is the point: industrial agriculture relies on the illusion of abundance to

Figure 7: Screenshot of Vegetable Garden; Mad Max: Fury Road, *dir. George Miller, 2014.*

drown out questions of sustainability and biodiversity that are crucial to maintaining nutritious and sustainable foodways. Closer inspection (and many a pause-rewind-pause) of the hanging gardens reveals celery and/or parsley, chard or collard greens, and what appear to be beans or peas vining in the back ranks.[42] Of these crops, only the beans would truly be suited to the hot desert climate, which also suggests some form of genetic engineering in the other vegetables. Moreover, the homogeneous green palette indicates little-to-no variation in crop diversity. If this example is representative of the necessarily numerous such operations housed within the Citadel, then the overall model is one of small-scale monoculture. No trees, flowers, or fruit here.

In contrast, the Vuvalini seeds are powerful signifiers in the film, emblems of resistance and persistence. Their value is rooted in survival—not as edible resource but as memorials of culture. Relics of what came before, they are also vectors of storytelling for what comes next, allowing the Keeper of the Seeds to share an oral history of a time "back then" when "everyone had their fill." They are the last thing she reaches for as she bleeds out during the film's culminating action-packed chase; she dies with a smile on her face and the case clutched in her lap. Though biologically unviable, seeds flourish as cultural disseminators. Introduced in the film's final act, the Vuvalini's heirloom seeds encapsulate collective memory: they are both

proof of the past and promise for the future, a promise not for the reintroduction of those varietals, but rather for the reintroduction of the matriarchal culture that nurtured them. Ideological scales tip as the concept of the seed breaks free of the hyphen that chained it to its antithesis in the form of the bullet.

The seed's narrative role is both temporal and symbolic. Bakhtin observes that "quite frequently in literature the chronotope of meeting fulfills architectonic functions: it can serve as an opening, sometimes as a culmination, even as a denouement (a finale) of the plot." In *Fury Road*, heirloom seeds serve all these functions—in fact, in yet another firearm parallel, the seeds are akin to Chekov's gun in their intrinsic narrative purpose: if present, present for essential reason. The Dag, who inherits the seeds (clutching the precious case all the way through to the film's closing scene), is the only remaining wife who is with child, a child with an already-prophetic potential for radical change. In a film in which every minute detail has been overthought, it is significant that the heirloom seeds are introduced in the same scene and conversation as the existence of the Dag's unborn child. Bakhtin claims that "the motif of meeting is also closely related to other important motifs, especially the motif of recognition/nonrecognition, which plays an enormous role in literature (for example, in ancient tragedy)."[43] The Vuvalini's heirloom seeds produce a sense of recognition in the Dag, one that confirms her belief in the prosperous and peaceful matriarchal legacy and renews her hopes for the rebirth of such a society. As chronotope, the heirloom seeds also structure how the film's audience experiences meaning as a function of time. Their latent appearance in the film demands a retrospective—the stewardship of the seeds infuses the story with an unexpected purpose that changes the significance of the narrative as a whole.

This retrospective chronological ethos plays out spatially and structurally at the level of plot as well. Despite the film's action-packed progression, one aspect of *Fury Road* is deceptively simple: at its most basic level, the film is a riotous car chase from point A to point B, the discovery that point B does not, in fact, exist, followed by a riotous car chase back to point A. But the pointless journey is entirely the point. Furiosa's "detour" describes the film's narrative trajectory—not a tour but an un-tour, an un-doing, or as the literal French translation reads, an un-turning. The French word for the act of filming is "tournage": "tourner un film" means to record a film. This un-turning then extends to the cinematic form itself, whereby the film undoes itself in this narrative reneging. The road forged into the desert by the fugitive band toward a green utopia instead becomes an exercise in revision: ~~we're going to the Green Place~~. As they retrace their steps, their original plan is quite literally struck through, canceled out. In its place, the characters perform a sort of narrative editing—not a redundant escapade, but rather a revisionist history concretized in the spatial navigation of the film. Furiosa tells Max that while the wives are looking for hope, her own path is one of redemption—a process that is inherently oriented toward the past. In his bid to convince the band of fugitives to turn around, Max indicates the citadel on a makeshift map and affirms, "this is your way home." "We go back?" the others ask, incredulous, before coming round to the idea. This conversation echoes the exchange between the Keeper and the Dag that occurred the night prior, just a few scenes earlier, in which the heirloom seeds "from home" made possible the recollection and retelling of the Vuvalini's cultural legacy, the evocation of the "back then." Superseding narrative and cinematic teleology, seeds keep the time.

If *Fury Road* mobilizes seed media as memorial chronotopes that parse aesthetic, conceptual, and formal excess to challenge human exceptionalism and perform revisionist

history, *Pumzi* imagines seed media as a synthesis of the digital and the dream to access and reanimate ancestral memory.

To See the Forest for the Seed | *Pumzi*

Pumzi exemplifies seed media, mobilizing its formal affordances and symbolic valences to highlight the inextricable relationship between mediation and dissemination along the braided lines of nature, culture, and technology. Not only is the film's central seed "played" on a scanning device to mediate the dream vision it encompasses—a vision comprised of images that both recall a traditional holistic culture and promise its resurgence—but its mise-en-abyme framework extends this mediative phenomenon beyond the screen to the audience. To plant a seed is to press play.

Written and directed by Wanuri Kahiu, the Kenyan short film premiered at the Sundance Film Festival in 2010 as part of the New African Cinema Program, and later won Best Short at Cannes. Set in a dystopian East African Territory 35 years after the Water War (or the Third World War), *Pumzi* focalizes on the ostensibly self-sustainable Maitu Community compound in the heart of the desert wasteland. Protagonist Asha (Kudzani Moswela), curator of the Virtual Natural History Museum, receives a mysterious packet of soil, marked only with the supposed coordinates of its source location.[44] Upon analysis, she discovers the miraculous, life-sustaining properties of the sample and decides to plant the Maitu seed, which takes root and sprouts in the earth, proving that the outside world is not entirely dead. Thrilled at her discovery, she reports her findings to the council only to be strictly reprimanded and stripped of her position. With the help of an unnamed sanitation worker (Chantelle Burger), Asha recovers the seedling bundle and flees the compound via an air vent. Emerging from the structure amongst heaps of discarded trash—a shocking reveal of the community's deceptive sustainability ethos—Asha sets out to

find the origins of the viable soil. She travels through the barren desert in search of the promised oasis of her dreams, only to succumb to exposure and (seemingly) delirium. In her final act, she plants the seedling in the sand and nourishes it with her own perspiration. As the film concludes, an aerial pan-out reveals lush foliage erupting from Asha's expired figure, and a verdant forest just beyond the nearby mountain range. Despite being only 21 minutes long, *Pumzi* compellingly raises issues of environmental accountability, biopolitical control, and ancestral memory.

The film's symbolic and political valences occur at the intersection of the Maitu seed, protagonist Asha, and the digital medium of the moving image. In the film's opening montage, a tour of panning shots showcases both the fossilized displays and the framed newspaper headlines that comprise the Virtual Natural History Museum before coming to rest on a seedpod suspended delicately in a glass jar. The scene cuts—the soundtrack, quietly curious up to this point, resonates with gravitas as the camera slowly homes in on a display placard that reads:

"MAITU (Mother) Seed".
"Kikuyu Language. 1. Noun - Mother. Origin:
Kikuyu Language from MAA (Truth) and ITU (Ours). OUR
TRUTH".

The next shot parallels this intensity, now focalizing in on the sleeping form of the Museum curator, Asha. The colors are grey and muted, the light low, the décor austere. This mise-en-scène leaves no doubt as to the intertwined narrative significance of the seed and its keeper. The perspective then flashes into Asha's mind's eye, revealing a lush dream that feels both ancient and prophetic: a smiling Asha marvels at the bright world around her, clad not in her ascetic compound uniform but in a riotously patterned dress, her face and scalp artfully painted in a fashion that recalls Kikuyu tradition and ceremony (to design her film's futuristic aesthetics, Kahiu "looked to the past, as well as the future" to evoke Indigenous African art and traditional practices).[45] A giant tree beckons in the distance, its sprawling canopy a vivid green. This dream

vision grounds the film in ancestral memory and resurgent hope, with Asha and the seed together as catalyst.

The Maitu seed's identification placard inscribes layers of history, geography, and culture beyond the film's fictional realm. Embodying community knowledge ("OUR TRUTH"), the Maitu seed is particularly relevant in the fraught agricultural situation of present-day Africa. Keen to tap "Africa's full agricultural potential," GMO seed companies and investors are increasingly deploying aggressive strategies to increase yields and profits through modernized production—of course promising economic development and the reduction of hunger in the process.[46] As with the situation in India, the consequences of this neocolonial, corporate extraction are severe: in places where these systems have been implemented, hunger has actually increased over the last decade, sometimes by up to 30%;[47] fertilizers, pesticides and herbicides, and mechanized equipment are contributing to soil erosion and desertification, which already affects over 45% of Africa's land area.[48] Meanwhile, local food systems, ancient practices, and seed legacies are undergoing displacement and erasure. With so many Western organizations keen to "fight against hunger in Africa" by "telling Africans what kind of agriculture Africans need," and funneling billions of dollars to make those edicts a reality, stories that celebrate African traditions and honor seed stewardship are more important than ever.[49]

The linguistic roots of the Maitu seed articulate these historical and geopolitical contexts. Note that the placard does *not* display any scientific classification or species-specific identification—its descriptive purposes are purely historical and cultural. Kikuyu is the English form for the language and the proper name of the Gikuyu tribe, which in turn designates a giant sycamore fig—or, *mukuyu*. The sycamore fig figures at the heart of Gikuyu mythologies; it is a central ceremonial tree, both as location and as symbol, for its people. Though never explicitly

stated in the film, the tree from Asha's vision is indeed a sycamore fig, an identification made possible via the very apparent fruiting body protruding from the sapling, to be discussed later. Highlighting the Kikuyu language and, by extension, the Gikuyu culture and lineage is especially important in a film written in English, and even more so given *Pumzi*'s unusual staging of communication practices: all vocalizations occur through typing and machine oral transcription, with the characters remaining perfectly mum, even expressively—no cries of alarm or protest punctuate the silence. In short, no one speaks. The interaction between Asha and the sanitation worker is non-verbal—they converse through gesture and meaningful glances that corporeally reify their common cause. These vocalizations once removed index the colonial history of the film's setting and subjects. Kenya was under British rule from 1895 to 1964, first under the umbrella of the East Africa Protectorate, then as the Kenya colony from 1920 onward. The chasm between Asha the typist and her digitally mediated voice renders palpable the distance between subject and language when that language arises from colonial imposition rather than cultural expression. In *Pumzi,* English is a linguistic prosthetic to subjects whose native dialects have been curtailed, repressed, and erased. The loss of cultural identity is expressed in the muting of the speaker, the absence of the unmediated voice and its oral/aural resonance.

But while the film seems overall to favor tactile and intuitive engagements with the world over mediated, virtual encounters, technology is by no means vilified. After all, the soil is deemed viable first via computational analysis, without which confirmation Asha would not have risked planting the singular Maitu seed. In fact, this scene operates at the heart of the film both formally and substantively, exemplifying the synergistic potential of seed media. Summoning the council to present her findings, Asha triumphantly types, "the soil is alive." "You are not qualified to determine that," the virtual council admonishes. "But I know it's alive," she

counters. “It has to be. Look.” But rather than showing the council the vial of soil in which the Maitu seed has already germinated (which would seem like the obvious, most demonstrable evidence of the soil’s viability) or, alternately, submitting some form of diagnostic results that detail the soil’s composition and/or the seedling’s biological development, Asha does something different: she places her palm on the scanner beside the vial containing the germinated seed, causing her vision of submersion followed by the ceremonial sycamore fig tree to play on the screen. Asha “knows” the seed is alive not because of her technical training or the lab data at hand, nor even because she can see the germinating specimen, but because she bears in mind and body the collective “truth” that is at once ancestral memory and future possibility inherent in the Maitu seed. The projection of this truth on screen results from the catalytic combination of seed and keeper.

This matrix of ancestral memory, symbiogenetic relationships, and (in this case) digital representation encompasses the paradigms of seed media, with this scene offering a diegetic demonstration of how seed media operate at a more-than-diegetic level. When Asha scans the seed alongside her palm to generate the vision they both encompass—a vision mediated on the Museum screen—she enacts in condensed form the dialectic dissemination of the film as a whole. The Museum screen is the diegetic stand-in for the film screen, and the scene in which palm and seed together are “played” is the model for the film’s meta-experience. Only through the triangulation of the digital platform/screen, the seedling bundle, and Asha’s flesh can her ancestral dream be rendered visually shareable (regardless of the dismissive council); in the absence of said screen, the film screen takes on that triangulating role, bringing the audience into its orbit: Asha’s imperative to “look” transfers to the viewer, compelling an engaged mode of attention. Since its release in 2010, *Pumzi* has been frequently screened—in countless

classrooms, over 100k times for free on YouTube and Vimeo, and most recently to unnumbered viewers at the Science Fiction exhibition at the Science Museum in London (March 2023); a prolific seed indeed.

Asha's association with the seed extends to her mediative capacities as well: she, like the seed, can access and directly mediate the viability of her environment, an ability most obviously rendered through her first encounter with the mysterious soil sample. After opening the unmarked package, she dutifully uses a scalpel-like tool to extract a small amount of earth from the container and places it in a dish for computer analysis. Her scanning system reveals an abnormally "high water content" and "no radioactivity." This moment marks a shift in Asha's behavior from clinical, standard procedure to intuitive, intimate heuristic: though the analysis results flash definitively on the screens before her, Asha seems to follow a very unscientific compulsion to engage the soil in an embodied, immediate way. She carefully tips some soil into her palm, tenderly sifts its grains between her fingers, and finally cups the earth to her face, inhaling its scent. Asha shudders, seizes, and quite literally plunges into a vision in which she is submerged underwater, disoriented and surprised but clearly not in danger. The water is green and particulate-rich, a gradient of soft light promising sunshine above the surface; roots extend downward and drift leisurely in the gloom; Asha is dressed and adorned in the same traditionally inspired fashion as in her opening dream; the sycamore tree flashes as she gasps awake. Asha's sensorial encounter with the soil generates a visual, cinematic representation of its abundant water content, its nourishing potential for rooted things, and—of crucial importance—its role in perpetuating cultural traditions. The soil preserves the memory of what once was such that Asha can inhabit and renew her collective history. Through Asha's mediation, these environmental and cultural inflections also become immersively available to the viewer—phenomenologically if not

aquatically. *Pumzi* showcases the potential for mediation inherent in the human-seed symbiotic relationship.

As the film's conclusion makes abundantly clear, Asha is not only the seed's steward, but also an extension of the seed itself. Having failed to locate the soil's origins, Asha collapses among a desiccated forest and plants the fig sapling before sacrificially sopping up her body's remaining perspiration to moisten the bundle. Curling up in the hot sand, she makes a tent with her shawl to shade the delicate seedling against the scorching sun before closing her eyes for the last time. In a stylistic flourish that bookends the film, the camera shifts to an aerial perspective and pans out clockwise, capturing and audibly amplifying Asha's final breath as the fabric collapses downward, and accentuating the smallness of her form against the vastness of the dunes. Lush foliage erupts from her figure, eclipsing it beneath the canopy of the tree she gives her life to protect and nourish. She becomes the embodied extension of the Mother Seed, her organic matter crucial to its growth and flourishing—a phenomenon that is more than metaphorical, and one the film articulates through the visual transubstantiation of Asha's form (figure 8) not just into the sycamore but first into the seed itself: as the camera recedes, the organic textures, earthen colors, and fetal position of Asha's body very much resemble a

Figure 8: Screenshot of Asha's Body; Pumzi, *dir. Wanuri Kahiu, 2009.*

germinating seed. The sycamore is generated from the site of encounter between soil, seed, and Asha—nature, nurture, culture. As with many before her and with many after, Asha is the Mother Seed.

Seed and keeper thus mediate synergistically, but this mediation also extends beyond the interface that is the cinematic screen. Perhaps most relevant to the viewer, the film's frame as a whole is digitally defined: as the opening montage cuts away from black screen to circle down toward the compound, the setting—"Maitu Community, East African Territory; 35 years after World War III – 'The Water War'"—is typed out at the bottom left of the screen. At the cusp of the diegetic divide, introductory strategies such as this one are often mobilized by found footage or video journals, and though arguably most effective in the horror genre, these mise-en-abyme frameworks generally foster a rapprochement between audience and text. Even with stories set in the distant future or in other worlds, this trope produces a slight sense of contemporaneity in the viewing experience—for instance, every captain's log that kicks off a *Star Trek* episode positions the viewer as a distant Starfleet operator receiving a new transmission. *Pumzi*'s introductory framework generates such an interface: it addresses the audience directly and integrates us in a chain of mediation that bypasses the barrier of the screen in either direction—we are akin to Asha receiving information on a screen, information that we are then responsible for mediating and disseminating in our own way.

The film's measured pace and resonant soundtrack affectively reinforce this audience engagement by fostering an immersive, thoughtful viewing experience, as exemplified by the film's early zoom-in shots of the Maitu seed and its placard. Unlike the rapid-fire shots of the seed cache peppered throughout *Fury Road*—shots that necessitate pausing, rewinding, and replaying fully to parse—*Pumzi*'s close-up framing generates an intimate intensity between

viewer and seed that compels attentive engagement without interrupting cinematic continuity. *Pumzi* wants to teach us something about this seed, to provide context and allow for that context to be absorbed and remembered. Film scholar Richard Raskin, in his discussion of the principles that define the short fiction film, explains that "short films … are most likely to be experienced by viewers as being deep, because they leave a habitable space inside for viewers to enter and explore and construct meanings. Films full of clever twists or excessive detail are more likely to be experienced as superficial, keeping the viewer at a distance as an observer rather than a participant."[50] *Pumzi* invites the viewer in, and generates a lasting, transformative impression.

The dream trope at the heart of the film's plot likewise offers a site for diegetic solubility at the intersection of form and content. Cinema's oneiric qualities have already been widely recognized and theorized, perhaps most famously in Roland Barthe's musings on "Leaving the Movie Theatre."[51] In short, dreams are like movies, movies are like dreams. Movies infiltrate our dreams; as dreamers, we are primed to immerse ourselves in movies. Short films are particularly dreamlike—the domain of brief impressions and oft-unresolved scenarios. As Mitchell reminds us, "mental life (memory, imagination, fantasy, dreaming, perception, cognition) is mediated, and is embodied in the whole range of material media"[52] In the isolated world of *Pumzi*, dreams are suppressed through prescribed medication, and diagnosed as ailments. Censorship undermines its own logic: though a system of control, it is also a direct indication of the potential threat to said system. As such, if dreams are suppressed, it stands to reason that they are dangerous—just as media have the potential to be dangerous and revolutionary. Dream suppression in this case continues the tradition of totalitarian censorship in dystopian fiction (and, unfortunately, in our political history and contemporary moment), wherein critical thinking and speculative imaginaries disrupt the status quo and make systemic oppression visible.

Asha discovers this unfortunate power relation when she naively attempts to present her dream vision to the council as evidence in support of the soil's viability. "Take your dream suppressants," the council instructs, to which Asha replies, "I have." In immediate punishment, she is stripped of her position and forced into physical labor. But this action and its consequence—Asha's dream presented as evidential support of soil viability being met immediately with harsh punishment—suggest that dreams in this world constitute real, meaningful experiences that have power and potential. That Asha begins to dream in spite of taking her dream suppressants indicates a physiological and/or psychosomatic shift that can only be attributed to her contact with the medium of the viable soil sample—her mediating capacities become activated, along with those of the germinating Maitu seed. By extension, our relationship with cinema has the potential both for the kind of disillusionment and the alternative forms of imagination that lead to radical change.

In relation to its dreamlike duration and feel, the short film form boasts certain formal affordances and conditional logics that are particularly salient to depictions of seed media; *Pumzi* takes full advantage of these features. As is the case with short stories, short films imply a larger world beyond the text to which the audience will never have access. While full-length features come with high expectations of plot soundness and resolution, viewers are far more likely to suspend their disbelief in the face of inconsistencies and shortcuts, and to allow questions to percolate unanswered, when watching a short film. The contract of verisimilitude is less rigid, the parameters of these storyworlds more ambiguous and forgiving. In *Pumzi,* the most obvious of these allowances is the hyper-speed at which the Maitu seed takes root, sprouts, and then grows to a veritable sapling, fruiting body and all. In reality, germination for sycamore figs takes about 15 days, and a 4-inch sapling would take two months to develop in ideal conditions.

Furthermore, no sapling of such immature size would already bear fruit (the seed bundle prop in the film is likely fashioned from a cutting from a much older tree). At the end of the film, Asha plants the Maitu seedling and—a few seconds and a handful of cuts later—a shock of green emerges from the soil, sprawling at hyper-speed into a full canopy. The aerial, clockwise retreat of the camera visually enhances this chronological acceleration. Cutting together organic plant matter here collides with cutting together film to generate powerful imagery. Even the most horticulturally ignorant viewer would recognize the impossibility of such an augmented growth rate, but in the short film narrative development supersedes and renders irrelevant such unfaithful depictions. This plot point neither registers as a mistake (cinematic errors and discontinuities jar the audience out of the viewing experience) nor a magical phenomenon (the sycamore seedling, while certainly sacred, is hardly a fantastical plant like Jack's beanstalk), but rather an accelerated cinematic progression so acceptable most viewers would not even think to remark upon it, let alone question it.

As already discussed in the introduction to this chapter, seeds inhabit utterly different, and much slower, temporalities than do humans. Avid gardeners and growers know the importance of paying minute and constant attention—daily, if not several times daily—to their plants. This kind of care demands great amounts of patience and time but rewards amply with experience and understanding. The language of seed tending is a relationship: it emerges through praxis and flourishes through exchange. And yet, with attention spans shrinking in the face of sensorial overload in the always-on digital age, most people can hardly be bothered to observe plants develop, let alone wonder what they can teach us. Not for nothing does the old idiom "to watch the grass grow" signify boredom and time wasted. Perhaps this is why timelapses of seeds germinating and maturing are so magical and captivating: they make visible the otherwise

inaccessible minutia of extended timeframes. Considering the timelapse brings into sharp relief what visual media—specifically moving images—can reveal to us about seeds and how we conceive them: they are inherently process, in potential form. They comprise an ongoing present until they are planted/activated/played, at which point they shift into the past while simultaneously anticipating a future in which the plant will cycle through to a new seed—an outcome of this newest cycle and an encapsulation of all those that came before.

Pumzi makes this seed time visible: the film employs a timelapse to move the plot forward, both within the film's timeline and into the post-diegetic future—Asha must escape the compound to ensure the Maitu sprout's survival (i.e., if the sycamore seed actually took 15 days to germinate, we would not have a film). The accelerated physiological development of the fruiting body is likewise important for the story's symbolism—the fig growing on the sapling conclusively identifies the seed's species as *mukuyu*, therefore anchoring Gikuyu mythology firmly as one of the film's foundations, and reifying the inextricable relationship between media and seed: named after the language that is named after the seed, the seed *is* language, and vice-versa.[53] The limited scope of the short film also renders its subject matter more pointed, which in turn produces more focused modes of attention. Raskin contends that one hallmark of the short film form is that "objects are charged with meaning for the main characters, becoming the focus of their (and our) attention, and taking on important storytelling functions in the process."[54] Though as I have been arguing, seeds can hardly be categorized merely as "objects," this principle highlights the phenomenon at work in *Pumzi*: the Maitu seed is the *only* seed—an exclusivity that opens up the relevance of its particular histories and effects, both with regard to its cultural significance and in relation to its current keeper, Asha. The fig operates as figure, and as such it reifies the inextricable relationship between media and seed. By growing the Maitu

seed in fast-forward, so to speak, *Pumzi* activates the capacity for seeds to mediate complex relationships, histories, and possibilities. Just as bullet time makes visible speeds too rapid for the eye to detect, cinema accelerates seed time to make it accessible to the viewer as symbol.

But it would be a mistake to claim that *Pumzi* is invested in linear chronologies or forward/progress-oriented momentum. Like *Fury Road*, *Pumzi* destabilizes the traditional, quixotic telos of the desert-crossing narrative, instead celebrating human failure and sacrifice as alternative modes of more-than-human possibility. Facing the desertscape with compass artifact in hand, Asha presumably sets out with a heading toward the soil's source coordinates, but this calculated directionality quickly devolves into disorientation and delusion. The film tracks Asha's increasingly meandering gait, cut across searingly bright shots of desert scenery over an indeterminate timeframe. The compass, emblem par excellence of a purposeful journey, tumbles from exhausted fingertips, abandoned in a sea of sand. This montage culminates with the appearance of Asha's dream-sycamore in the distance, a haven to which she stumblingly and desperately rushes only for the mirage to dissipate at her touch. A blasted tree trunk rises before her, ancient and lifeless. Faced with the barren truth of her surrounding desertscape, Asha abandons her pilgrimage. Her final resting place is not a predetermined destination but rather a question mark (a symbol also visually akin to fetal position/seed germ) at the intersection of many possible readings—random delirium, intuitive fate, dystopian conspiracy—that resist any definitive hermeneutic.[55] The film's concluding aerial reveal of lush forests mere miles from Asha's transubstantiated body affectively triggers a powerful sense of environmental resurgence, and yet is tinged with the bitterness a destination unreached—the so-close, the almost-there. The film, in short, is not interested in anything like a happy ending in the Western narrative sense.

Kahiu has spoken widely of her aims, through this short film, to celebrate the

"storytelling" traditions of African peoples, and to dispel the myth of a Western monopoly in the science fiction tradition.[56] Speaking on "Africa and science fiction" during an interview with Oulimata Gueye for the "Si ce monde vous déplaît" exhibition, Kahiu argues for a reframing of both the labels of "science fiction" and "afrofuturism," cautioning against the Western stereotypes that risk diluting or skewing an otherwise longstanding tradition. She calls for an expansion of what the terms mean, arguing that Africa has always used science fiction:

> I think science fiction has been a genre in Africa that has been used a lot for a long period of time—way before I was even born. If we think of science fiction as something that is fictitiously science or speculative fiction within a story, then we've always used it. Because we've used botany, we've used entomology; the idea of the study of animals to tell stories or the idea of insects to tell stories or the idea of natural sciences and using trees, and—that's all science fiction.

Kahiu is suspicious of limiting "futurism and speculative fiction" to "trends," explaining that "there is an afrofuturist trend but some of that trend backdates itself," it involves work that existed before the term was coined. Kahiu's nuanced conception of cross-pollinated chronologies aligns with *Pumzi*'s modalities. As she reminds us, "in every culture that I've heard of, there have always been people in all parts of Africa … who are seers, who could see into the future, and who could *disseminate* the future" (emphasis mine).[57]

As the film rotates aerially upward to its concluding shot, the camera rises through what is soon revealed to be the stenciled title of the film, with the letters "PUMZI" cut from a black background. The forested expanse is revealed at the edges of this word window. Though the film itself never provides a translation, *Pumzi* means breath in Gikuyu. These grammars of mediation—visual, linguistic, animate, symbolic—expose the forest for the seed. Breath is the quintessential and inseverable tether between human and tree, the exhale-inhale that exchanges oxygen for carbon dioxide and vice-versa in a holistic cycle. Asha's last breath propels the sapling to its mature, glorious form. If, as Alexis Pauline Gumbs reminds us, "to conspire means

to breathe together," *Pumzi* takes up the conspiratorial charge to disseminate the more-than-human future.[58] Seed media keep time: the ancestral traditions of the Gikuyu people are reinscribed through the language inherent in the Maitu seed—communal truth, inherited memory—and are remediated through a virtual rendering that culminates in the bio-cultural flourishing of the sycamore tree, which promises its own dissemination in turn.

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[1] Jacques Derrida, *Archive Fever*: *A Freudian Impression*, Trans. By Eric Prenowitz. University of Chicago Press, 1996, 36.
[2] Matthew Omelsky, "After the end times: Postcrisis African science fiction." *The Cambridge Journal of Postcolonial Literary Inquir*y, vol. 1, no. 1 (2014), 48.
[3] Jean Baudrillard, *America*, Translated by Chris Turner, Verso, 1989, 69.
[4] Contemporary consumers of cinema are increasingly favoring home viewing over the movie theatre experience; nevertheless, the flat-screen televisions that have come to dominate western living spaces have mimicked the wide-screen appeal: LCD TV screens averaged 55.5 inches in 2021, up from 49 inches in 2017. https://www.statista.com/statistics/961283/united-states-average-tv-screen-size/
[5] Baudrillard, 69.
[6] Kevin Cooney, "Weaponizing the Desert at the U.S.–Mexico Border," *Edge Effects* (2020): https://edgeeffects.net/weaponizing-the-desert/
[7] A.L. Burrell, J.P. Evans, and M.G. De Kauwe, "Anthropogenic climate change has driven over 5 million km^2 of drylands towards desertification," *Nature Communications*, vol. 11, no. 3853 (2020): https://www.nature.com/articles/s41467-020-17710-7
[8] See "Desertification and its effects" at the United Nations official website**:** https://www.un.org/en/observances/desertification-day/background
See also Eyal Weizman's *The Conflict Shoreline: Colonialism as Climate Change in the Negev Desert*, Steidl, 2015; With a focus on the Israeli campaign against the Palestinian Bedouin, this part-photography, part-ethnographic essay details how the desert threshold advances and recedes as a function not just of climate change but also of political and economic pressures, displacements, developments, and territorial violence. This ever-shifting line in turn becomes the marker along which political and juridical processes are enacted and enforced.
[9] Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*, Duke University Press, 2016, 160.
[10] Courtney Fullilove, *The Profit of the Earth: The Global Seeds of American Agriculture*, University of Chicago Press, 2017, 211.
[11] Ibid., 211.
[12] Rob Nixon, *Slow Violence and the Environmentalism of the Poor*, Harvard University Press, 2011, 7.
[13] Jose van Dijck, "Preface," *Mediated Memories in the Digital Age*, Stanford University Press, 2007, xiv.
[14] W.J.T. Mitchell, *What Do Pictures Want? The Lives and Loves of Images,* University of Chicago Press, 2005, 215.
[15] Mikhail Bakhtin, *The Dialogic Imagination*, Edited by Michael Holquist, Translated by Caryl Emerson and Michael Holquist, University of Texas Press, 1982, 84.
[16] Ibid., 84.
[17] Müller, Timo. "The Ecology of Literary Chronotopes," *Handbook of Ecocriticism and Cultural Ecology*, Edited by Hubert Zapf, De Gruyter, 2016. 593..
[18] In the interests of keeping the scope of this section narrow and focused, I elect to do just that.
[19] *Blood, Sweat, and Chrome*, NP
[20] Myriad references to capitalist tropes are incorporated into the language, expressions, and names of *Fury Road*'s storyworld.
[21] In truth, no summary can do this film justice, as every split second of its runtime overflows with meaningful detail.
[22] "Imperator" is a title denoting an elite ranking in Immortan Joe's militia.
[23] Bakhtin, 98

[24] *Blood, Sweat, and Chrome*, Kento Watanabe, visual effects editor (NP)
[25] "bullet." *Oxford English Dictionary.*
[26] https://www.theatlantic.com/science/archive/2021/07/unsolicited-seeds-china-brushing/619417/
[27] Vandana Shiva in *The Seeds of Vandana Shiva*, Directed by Camilla Becket and James Becket, Becket Films, 2021.
[28] Paul S. Landau, "Empires of the Visual: Photography and Colonial Administration in Africa," in *Images and Empires: Visuality in Colonial and Postcolonial Africa*, edited by Paul S. Landau and Deborah D. Kaspin, University of California Press, 2002, 146-49.
[29] Paul Virilio, *War and Cinema: The Logistics of Perception*, Translated by Patrick Camiller, Verso, 1989, 4.
[30] N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, University of Chicago Press, 1999, 97.
[31] Plante, Chris. "Comparing the number of shots in Mad Max: Fury Road with The Road Warrior." *The Verge*, May 12, 2015. https://www.theverge.com/2015/5/12/8592629/mad-max-fury-road-cuts-director-interview-the-road-warrior
[32] Hayles, 3
[33] For an extended discussion of disability in the film, see Fletcher, Brandon and Alvin J. Primack's "Driving toward disability rhetorics: narrative, crip theory, and eco-ability in *Mad Max: Fury Road*" in *Critical Studies in Media Communication*, vol. 34, no. 4, 2017, 344-357.
[34] Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution*, Harper Collins, 1980, *xxiii-xxiv*.
[35] *Blood, Sweat, and Chrome* (NP)
[36] Judith Eckenhoff, "The Desert Wasteland and Climate Change in *Mad Max: Fury Road*," *The Apocalyptic Dimensions of Climate Change*, Edited by Jan Alber, De Gruyter, 2021, 102.
[37] Mark P. Mills, "The Cloud Begins with Coal: Big Data, Big Networks, Big Infrastructure, and Big Power: An Overview of the Electricity Used by the Global Digital Ecosystem," Digital Power Group, sponsored by National Mining Association and American Coalition for Clean Coal Electricity, August 2013, https://www.tech-pundit.com/wp-content/uploads/2013/07/Cloud_Begins_With_Coal.pdf?c761ac
[38] Allison Carruth, "Ecological Media Studies and the Matter of Digital Technologies," *PMLA* vol. 131, no. 2 (2016), 367.
[39] It is worth noting that such a reading is made possible by the ways in which we consume cinema in the contemporary moment—on smaller screens, with playback and pause at our fingertips.
[40] Laura Mulvey, *Death 24x a Second: Stillness and the Moving Image*, University of Chicago Press, 2006, 10.
[41] Ibid., 10.
[42] Testimonials from film production are rife with examples of highly dedicated and extremely thorough set and prop design: the craftspeople who fashioned the film's 120 iconic vehicles (a team of found object artists, mechanics, metalworkers, and special effects crew) were instructed only to use salvaged or repurposed parts. Though no mention is made of the gardens or seed collection specifically, I infer from this design ethos a deliberate attention to detail across the film and choose to close-read these sets and props as intentionally and meaningfully curated rather than the result of arbitrary/uninformed production choices.
[43] Bakhtin, 98
[44] The coordinates in question, 1°13'34.99"N 36°15'47.11"E, ping a point adjacent to Mount Silale in Kenya.
[45] Brendan Seibel, "Kenyan Sci-Fi Short *Pumzi* Hits Sundance with Dystopia," *Wired*, 22 Jan. 2010.
[46] Goedde, Lutz, Amandla Ooko-Ombaka, and Gillian Pais. "Winning in Africa's agricultural market." *McKinsey*, February 15, 2019. https://www.mckinsey.com/industries/agriculture/our-insights/winning-in-africas-agricultural-market#/
[47] https://www.rosalux.de/fileadmin/rls_uploads/pdfs/Studien/False_Promises_AGRA_en.pdf
[48] https://www.britannica.com/place/Africa/Agriculture and https://navdanyainternational.org/the-gmo-lobby-has-moved-to-africa/ and https://news.un.org/en/story/2021/09/1101632
[49] https://www.rosalux.de/en/publication/id/42635 and https://www.scientificamerican.com/article/bill-gates-should-stop-telling-africans-what-kind-of-agriculture-africans-need1/
[50] Interview with Dr. Richard Raskin: "New Theories of the Short Film," in *Musicbed*, https://www.musicbed.com/articles/filmmaking/writing/new-theories-of-the-short-film-a-conversation-with-dr-richard-raskin/
[51] Roland Barthes, "En sortant du cinema," *Communications*, 23 (1975), 104-107. See also Robert T. Eberwein, *Film and the Dream Screen : A Sleep and a Forgetting*. Princeton Legacy Library. Princeton, New Jersey: Princeton University Press, 1984; And Raymond Bellour and Guy Rosolato, 'Dialogue: se (ce) souvenir d'un film', *Hors*

Cadre, Spring 1983, 150-167, English Translation: 'Dialogue: Remembering (this memory of) a film', in E. Ann Kaplan, *Psychoanalysis & Cinema* (New York-London: Routledge, 1990), 198-216.
[52] Mitchell, 215.
[53] For reference, the Latin designation of the species is *Ficus sycomorus*, but centering European knowledge systems in this context would utterly defeat the purpose of the argument.
[54] Richard Raskin, *The Art of the Short Fiction Film: A Shot by Shot Study of Nine Modern Classics*, McFarland, 2002, 169.
[55] One of many ways to interpret *Pumzi*'s storyworld is as a totalitarian experiment, wherein the compound's residents—none of whom appear older than 35 (the number of years since The Water War)—have been told a lie about an inhospitable outside world in order to observe and control their behavior in an isolated setting. The film's concluding aerial reveal of lush forests mere miles away from Asha's final resting place, if taken literally rather than symbolically, would corroborate this reading.
[56] Matthew Durkin, "*Pumzi*." *African Studies Review*, Vol. 59, No. 1, April 2016, 230-2.
[57] Wanuri Kahiu, "Africa and science fiction" interview with Oulimata Gueye for the *"Si ce monde vous déplaît"* exhibition, 2009. https://www.youtube.com/watch?v=SWMtgD9O6PUart
[58] Alexis Pauline Gumbs, *Undrowned: Black Feminist Lessons from Marine Mammals*, AK Press, 2020, 9.

CHAPTER FOUR | SEEDS IN THE LITERARY FIELD

In literary prose forms, seed media emerge at the intersection of language and narrative, inflecting both. Whether metaphorical, magical, or representational, seeds have been scattered across literary prose forms for millennia, from biblical texts to fairytales to various novelistic genres. To foreground current urgencies of life under neoliberalism and climate change, this chapter takes interest not in seeds embellished by, for instance, fantastical powers or sci-fi-esque alterations, but rather in how seeds are represented in literary realism. I thus turn to two contemporary realist novels that explore seed media in the context of food systems both modern and traditional, cultural legacies both colonial and inherited, and stories both personal and (supra-humanly) collective: Ruth Ozeki's *All Over Creation* (2003) and Diane Wilson's *The Seed Keeper* (2021).

Since the rise of what is now the commonly recognized category of climate fiction, critics have snubbed, if not outright rejected, literary realism's capacities for representing climate change in tangible and compelling ways. In his landmark 2016 text *The Great Derangement: Climate Change and the Unthinkable*, Amitav Ghosh identified the imaginative limitations of the modern, realist novel and proclaimed the form incapable of rendering the scope and scale of climate change.[1] Authors and critics turned to the more malleable genres of science fiction and horror, and to the more amorphous forms of experimental and weird writing to grapple with climate-related subjects; meanwhile Ghosh's arguments took hold among ecocritics to such an extent that they are still often regarded as disciplinary tenets of the environmental humanities. Pieter Vermeulen, in his extensive 2020 survey *Literature of the Anthropocene*, reiterates Ghosh's claims to articulate the instability of genre per se as a framework for climate change narratives, ultimately dismissing its relevance altogether.[2] But what if literary scholars were too

quick to eschew the affordances of realism? What if they misdiagnosed what needed representing in the first place? Over the last two decades, climate change skepticism has been stripped down to its true form: climate change apathy. The public no longer needs convincing that climate change is real; its effects have become almost mundanely visible and overly discussed despite the critically stunning and radical work of artists and writers who have dedicated themselves to raising awareness and compelling engagement through various genres, realist and non-realist alike.[3] Perhaps what needs representing, now more than ever, is not climate change, but the world for which those in power never cared, and for which large swathes of the population stopped caring as a result: the land taken for granted, the environment no longer understood—all behaviors which brought about and exacerbated climate change in the first place. Literary scholars have been so concerned with representations of the consequences and effects of the climate crisis that they have failed to acknowledge and elevate models for recognition and repair.

Another question: what if tasking realism with adequate representations of the deep timescales and unthinkable datasets of anthropogenic climate change exemplified not the genre's limitations, but rather the futility of such agendas? As Stephanie LeManager observes in her chapter "Climate Change and the Struggle for Genre," conceptualizing the Anthropocene on geological timescales is in fact antithetical to human engagement: "the idea of epochs works to organize new modes of forgetting. The Anthropocene, conceived as a geologic epoch, is a coping strategy of sorts, externalizing not the world so much as time, such that we can forget the moment-by-moment loss of the world by naming its passing on a geologic scale authenticated (and externalized) by a golden spike."[4] LeMenager identifies the harmful, alienating potential by which Anthropocene thinking ironically further divorces the human from the environment, where

the golden spike acts as "an indicator that our own time can be understood as displaced onto an elsewhere in which narrative significance resides. The elsewhere is the stratigraphic record, not history per se, and it is not exactly continuous with ourselves."[5] Relegating the Anthropocene to the problem of deep time removes it from contemporary, immediate spheres of engagement and accountability. Meanwhile, as more and more critics are noting, empirical data and scientific evidence such as the facts, figures, and trends released by the IPCC and various news outlets—half degree temperature increases, CO2 levels in parts per million—are proving largely ineffective with regard to instigating behavioral or policy change. Climate change is not going away. The military industrial complex and massive oil conglomerates have all but guaranteed that any hope for mitigation—never mind reversal—is utterly futile. But climate change is also not the problem; rather, it is the massive consequence of a litany of problems—greenhouse gas emissions, fossil fuel extraction, industrial development, mechanized agriculture, environmental degradation and pollution, deforestation—all of which share a singular root cause: a loss (in Western, imperialist societies) of respect for and relational understanding of the world. This aberrant disconnect, borne out of religious dogma, exacerbated under industrialization and exploited in the rise of global capitalism, is ideological, material, and semantic. Though the regimes which fostered such perverse attitudes are nigh impossible to shift, let alone overthrow (Jameson's famous edict that "it is easier to imagine the end of the world than an end to capitalism"), the attitudes themselves can change.

All Over Creation and *The Seed Keeper* highlight the inconvenient labor, precarious circumstances, and intimate knowledge that underpin the largely invisible and unthought of infrastructure of food and agriculture in North America. Perhaps more importantly, they emphasize the importance of reestablishing resilient and intimate relationships—symbiotic and

sacred—at the heart of such practices. They offer models for "living on a damaged planet," in Anna Tsing's words, or for "staying with the trouble," in Donna Haraway's. As LeMenager argues, "the project of the Anthropocene novel … is at best a project of paying close attention to what it means to live through climate shift, moment by moment, in individual, fragile bodies. It is at best a project of reinventing the everyday as a means of paying attention and preparing, collectively, a project of staying home."[6]

Realism is a genre of presence for the present. In her recent essay "Realism for Sustainability," Carolyn Levine articulates the radical power of "routines and their close relations—habits—[as] ways of organizing experience," and suggests that the dominant project in literary studies over the last century—that of "disrupting and dismantling"—may no longer benefit a world defined by precarity, pessimism, and capitalist logics.[7] Realism, she argues, is first and foremost about "the ongoing work of maintaining life"—work that must be emphasized in the face of the climate crisis: "Realist fictions are often interested in focusing our attention precisely on the repetitive work of keeping life going, and far from taking this labor for granted, they work to slow down perception so that we do not rush past the everyday activity of maintenance to more exciting events and adventures." She asserts that such "strategies are politically urgent in this moment of climate crisis, as the arduous, necessary, unglamorous work of sustaining life over time—securing basic food, water, and shelter—is under immediate threat."[8] LeMenager echoes this sentiment when she insists on "the present tense, lived time of the Anthropocene, and [recommends] paying attention to what it means to live, day by day, through climate shift and the economic and sociological injuries that underwrite it."[9] Ozeki's *All Over Creation* and Wilson's *The Seed Keeper* cultivate such modes of attention: they mobilize various narrative strategies—perspectival, figurative, allegorical, algorithmic, but also

descriptive and direct—to lay bare the intricate and problematic workings of our North American food systems.

As a mode of fiction deeply invested in real life, climate realism highlights the root causes of our precarious environmental condition, and there is perhaps no existential chasm more extreme than the relationship between individuals and the food they eat every day. As Levine notes, "convenience itself, the easy, steady provision of goods and services, is what blunts perception."[10] For most members of society, an understanding of edible products stops at the grocery store, where all manner of complexities—seasons, supply, labor—homogenize into expedient abundance. The extensive transport networks, energy resources, research and development initiatives, and financial stakes of our food systems are—quite deliberately—kept beneath notice. Meanwhile most people are unaware, and have never even considered, that there exist far more types of produce than what is commonly made available, and myriad more varieties even of those ingredients one is accustomed to encountering. A grocery list is a litany of reductive generalizations; it will read, for instance: milk, broccoli, cherry tomatoes. But when a shopper buys milk, they are (with 90% likelihood) buying milk produced from Holstein dairy cows, a Dutch breed imported to the Americas in the 1850s that has dominated the industry with high yields and notable quality; few are aware that there are actually different kinds of cow's milk, with six breeds of dairy cattle in the United States and dozens around the world. When a shopper buys broccoli, they are actually buying Calabrese broccoli, a variety originally brought over from Italy in the 1880s that has maintained commercial success thanks to its hardiness, attractiveness, and flavor… but there are hundreds of other types of broccoli that most people will never know of, come across, or taste. Even tomatoes, of which most grocery stores stock several kinds, are sorely underrepresented: there are over 10,000 tomato varietals in the world,

all of which have their own advantages for different preparations and dishes, as well as their own adaptations to weather conditions and resistances to disease and pests. Scientists and nutritionist have recently begun to link higher levels of lactose intolerance and other newly prevalent food sensitivities and restrictions with the weak diversity that comprises the North American diet. I have not even touched on the increasingly confusing and deliberately misleading system of labels and certifications (organic, free range, grass fed, non-GMO, etc.) that, more often than not, are the result of cleverly navigated loopholes to justify higher price tags. These seemingly mundane facts are increasingly relevant in a time of climate crisis; literary realism offers a mode for attending to such generally ignored elements of the everyday.

Traditional literary realism is about the human: class and labor struggle, strong and complex characterization, the tension between the individual and the social. Though Levine's intervention maintains such tropes, its central political project more closely aligns with recent ecocritical reclamations of realism as a more-than-human modality. Jens Elze, in his introduction to *Realism: Aesthetics, Experiments, Politics*, describes contemporary realism's reorientation toward philosophies of new materialisms and actor-network theory: "new materialisms and ANT urge us to be attentive to the manifold activities and permanent associations of human and nonhuman forces—*actants* as Latour calls them—that make up social reality; a process that new materialism privileges as *assemblage* … we should pay close attention to the distributed agencies and the multiple activities that constantly shape reality."[11] Articulating a theory of Indigenous realism, Kyle Powys Whyte insists on the "relational contexts" that describe "an interpretive framework for understanding environmental change that highlights relationships, relatives, responsibilities and interdependence ('the web of life')."[12] Whyte calls for a realism that articulates—"in complex ecological systems—what responsibilities humans and nonhumans

have to each other and the best ways to organize society to ensure everyone is motivated to carry out their responsibilities, revise them when needed, and pass enduring responsibilities to future generations."[13] *The Seed Keeper* in particular takes up this mantle. Climate change demands of realism an engaging, protean capacity of presence, and seeds in these realist novels index precisely these kinds of relational contexts and processes.

"Caring for country," LeMenager insists, "conservationism, loving local and small (as opposed to the view from the airplane) cannot be individualistic practices, and in fact they imply a more ecological and embedded politics."[14] Perhaps it is no surprise, then, that novels urgently concerned with seeds, food, and the reciprocal practices of care and attention that emerge from such stories should both be set in *the* landscape most often, stereotypically at least, viewed from airplanes: flyover country, the corn belt, the American Midwest. If dystopian, postapocalyptic films about seeds visually and logically conjure a desert setting, seeds in literary realism interpellate a different kind of desert, and one of deceptively abundant appearances: monoculture. The rural Midwest is a region of severely impoverished diversity: it boasts over 127 million acres of farmland, of which 75% is planted in corn and soybean, and farmed using mechanized and chemical means; it is also predominantly inhabited by white working- and middle-class populations, with the majority of large-scale agricultural production owned and operated by men.[15] The novels taken up by this chapter mobilize this setting to mediate seeds through literary realism. Just as dystopian desert futures in Chapter Three render their stories more evocatively, the Midwest in these novels operates as an extreme foil against which the importance of heirloom seeds and their cultural legacies is more urgently conveyed. Rather than privileging the narratives of white farmers, Ozeki and Wilson tell the stories of women of color enmeshed in the politics and subjecthood of immigration and Indigeneity, respectively.[16] These

circumstances echo the authors' own experiences, aligning with LeMenager's assertion that the "project of the novel within the lived time of the everyday Anthropocene has been … explicitly identified by writers of color and by feminist writers and philosophers."[17] Ozeki and Wilson tackle this project by mobilizing seed media via complementary strategies that converge and diverge in significant ways—a comparative reading that comprises this chapter.

Ozeki's *All Over Creation* (hereafter abbreviated to *AOC*) invests heavily in the seeds-to-media analogy—"if you learn to read them, [seeds] are very much like books," explains one of the novel's characters.[18] But this correspondence operates in both directions, such that media in the novel—and the novel itself—are also very much like seeds. Ozeki is a filmmaker by training, and her theoretical conceptualization of media inflects her novelistic treatment of seeds and the myriad, networked modalities in which they participate. Wilson, on the other hand, is a gardener, seed saver, and educator of traditional Indigenous knowledge systems. Her novel *The Seed Keeper* (hereafter *TSK*) performs the relationship between seeds and literary fiction: its narrative follows the developmental process as a seed, and seeds are treated as active and live agents of the collective story it braids together. Where Ozeki's novel weaves rich conceptual frameworks for human-seed relationships, Wilson's relational lessons approach the real and the tangible. As instances of literary realism however, neither of these novels are concerned with direct representation or mimesis: they are not merely how-to gardening books or instructional guides. Fiction inspires and engages by means of its linguistic and narrative affordances—affordances that imaginatively generate emergent and transformative experiences for and with the reader. Language and narrative, like seeds, are not static entities, but dynamic systems of interactive process that depend on and co-constitute their human collaborators. Though deploying different

approaches to seed media, both novels ultimately perform this inextricable relationship between language and seeds.

If literary realism is a genre of the everyday detail, the overlooked routine, and the bare maintenance of living—in other words, a genre that demands attention—then close reading is the corresponding analytic strategy to parse such formulations. It is no surprise, then, that both *AOC* and *TSK* should embed layers and dynamics of meaning that would put even the most diligent close reader to the test—which is precisely the point: only the relationship between audience and text can bring the novel to life, and the more careful and attentive the engagement, the more generative the story. As literary scholar Amelia Marini argues, "works of writing become literary when they are treated, actively, as literature. This requires the reader to meet the text with energy and ideas—to engage it—in order to participate in the meaning of the text."[19] In a context of climate crisis, the practice of close reading becomes even more urgent: "close reading … is more than a practice of decoding and demystifying literary ambiguities. Rather, it … presents an opportunity to inhabit texts in individual and personally resonant ways that require intersubjective imagining and relational thinking: the very skills that we must learn in order to live well upon this planet."[20] Close reading exercises precisely the modes of attention required to re-learn the language of and thus rekindle a relationship with the land.

Media manifest at the intersection of audience and artist. Ozeki herself is hyper-conscious precisely of this mutual actualization: in a 2007 talk at Cal Poly she declared, "Writing novels is a collaborative act." She describes her recognition of this fact as first her "characters refused to submit to [her] control" and then as her readers became crucial collaborators in her works' significance: "I sit in my little cabin in the woods and think up things and write them down, and eventually, several years down the road, you, for whatever reasons, pick up my novel

and apply your eyes and minds and imaginations to it, and, through that process, which is a kind of magic or alchemy, really, the novel *realizes* itself" (my emphasis).[21] Inherently triangulated with the reader, seed media activate the process of "realization" intrinsic to literary realism—a realization that is as much about bringing the novel to life as it is about transforming the reader: "literary experiences … mark us. They are sites of relationship-building in which we use language to entangle ourselves more deeply in the shared human labor of connection and questioning, of thinking and expression."[22] Wilson's novel likewise participates in this phenomenon: "I couldn't see down the road since this is my first novel," she describes in an interview, "but I knew that what the women did in 1862 was the heart of the whole novel. Their actions in protecting seeds to be sure there was food for their family teaches us what we need to do today to protect seeds for future generations. That story wanted to be told."[23] Like seeds, stories are alive; they have their own energy and volition, they exist in mutual relationship with their stewards, and they bring forth worlds. Though Wilson's novel is based on historical events, and though she had never written a novel before, she chose deliberately to channel the narrative through fiction, "because you can use beautiful language to tell the story."[24] Wilson understands and embraces the transformative power of language in narrative form.

A very brief synopsis of *All Over Creation*: in the late 90s, in a small Idaho town, former potato farmer Lloyd Fuller (white, American) struggles with his deteriorating health and increasingly limited physical autonomy. His Japanese wife, Momoko, suffers from advanced Alzheimer's disease and can provide but limited care. In light of this situation, the Fuller's tenant Cass reaches out to their estranged daughter (also her erstwhile best friend) and the novel's protagonist Yumi to convince her to return home after 15 years of absence. Yumi, through whom the majority of the novel is focalized, arrives with her three children in tow and attempts (rather

unsuccessfully) to repair the relationship with her ailing father, who had renounced her years before following an abusive teenage affair with her high-school teacher, Elliot Rhodes, that ended in abortion. Meanwhile, a band of anti-GMO activists arrives on the scene compelled by the semi-political, semi-religious sustainable farming philosophy that Lloyd has developed from Momoko's lifelong heirloom seed saving passion and circulated among farmers and growers across the nation. These new additions seem to smooth the path of reconciliation between the Fullers until, hot on the activists' heels, nefarious agents of agribusiness, including the infamous Elliot Rhodes himself, disrupt the tentative peace. The novel's resolution both heals Yumi's familial rupture and sends the bad guys packing. Ultimately, Momoko's seed collection becomes publicly available through an online library system of exchange, keeping the stories it contains alive.

The Seed Keeper, in summary, comprises a concord of narrative voices that constellate around the story of protagonist Rosalie Iron Wing and suture the legacies—ancestral, displaced, colonial, and sacred—of the Dakhóta people (seed relatives included). Following the sudden illness and death of her husband John Meister (white, American), Rosalie forsakes the corn farm (located near New Ulm, Minnesota, or Mní Sota) where they had built their life and family—first by respectful arrangement and eventually in loving partnership. She returns to her childhood home, a remote cabin where her father raised her in the traditions of their Dakhóta culture before she was forcibly taken into the foster care system. Though first set in the early 2000s, Rosalie's narrative moves back and forth through time as she mourns her loss and reflects on a life divorced from her people. She recalls her search for belonging in Indigenous communities, her struggles with environmental activism (complemented by occasional narrator Gaby Makepeace), her relationship with John and their son, Wakpá (River) who goes by Thomas, their struggles as

generational farmers in the face of corporate pressures from industrial agriculture. Among and interwoven with these experiences, seeds reestablish Rosalie's connection with the land and summon the powerful and devastating legacy of Indigenous genocide and survivance.[25] As Rosalie reconstructs an understanding of her Native identity, the voices and stories of her seed-keeping ancestors, Marie Blackbird and her brethren (daughter Susanne and granddaughters Lorraine and Darlene), are resurrected. The novel culminates in Rosalie's renewed search for her kin, her potent reconnection with her great-aunt Darlene Kills Deer and the heirloom seed relatives in her care, and the collective planting of their garden.

With these critical and contextual foundations established, my comparative close reading of *AOC* and *TSK* narrows in on what seed media can teach us: my analysis maps investigative vectors that originate at the intersection of seeds and language. I look first to the novels' central seed analogies to explore their particular brands of climate realism; I then attend to a major affordance of the prose form—narrative perspective—to assess how these stories engage the reader from the outset in a relationship of presence and mutual responsibility; I turn next to the complex, almost allegorical treatment of characters-as-seeds, including the biopolitical and cultural tensions that such dialectics expose—especially with regard to names; finally, I consider how the novels contend with threats to diversity both cultural and biological and ultimately show them to be one and the same. Close reading both novels makes visible and performs the relationship between seeds and language that comprises the dialectic at the heart of seed media.

Seed-Media Analogies

AOC articulates two central, extensive analogies to understand seeds as media—and as language specifically: seeds are likened to both the narrative that comprises a book and the software that comprises a computer program. These figurative exercises curate narrative

alignments between seed and reader and work imaginatively to complement the biological aspect of a seed's existence with its cultural and historical legacies. Interestingly, these two central analogies map almost perfectly onto the two novels under consideration in this chapter. Though one could argue that these figurative exercises are simply the product of anthropomorphic (and thus hubristic) frameworks, both novels actively displace the human from the dominant role in the symbiotic pairing, emphasizing instead interdependence. In *AOC*, media analogies become crucial to this rhetorical strategy:

> Seeds are like language … Or software, if you like … Now, take a pea, for example … A pea's a program … designed to absorb carbon dioxide, minerals, water … When you plant the pea, it's like downloading software. The pea un-stuffs and decompresses into a complex set of instructions powered by the sun. This program allows the plant to create its own food, which makes it grow … In the process the pea gives off oxygen, creating a platform to support the life of other organisms, like bacteria, or us. In a sense we're just byproducts of that program … And all the other plants, too. Each one is a complex software program, and so are we. And the really wild part is, we're all interactive![26]

The conflation of "language" and "software" in this analogy is a testament to the difficulty and inaccessibility of the seed's own mediating form, which is neither language nor software but akin to both. Software describes a set of operational instructions or data, much like the processes primed for activation in a seed—a informatics metaphor that helps to make the biological realm more tangible to technologically familiar readers, but also to bring the seed within the more immediate purview of the human: seed media constitute and perform the intersection of nature, culture, and technology. The interactive relationship that the novel describes through this informational analogy is akin to what Donna Haraway and N. Katherine Hayles describe as symbiogenesis and technogenesis, respectively, which as I have already argued are two terms for the same process.

If the climate fiction of literary realism embraces posthumanist formulations such as actor-network theory and new materialism, it is no wonder that applying a seed media

framework to *AOC* constitutes a networked, almost algorithmic methodology: activating any one analytical focus—whether plugging in variable *x* as theme, symbol, metaphor, formal characteristic, particular seed varietal, etc.—generates a vast web of interconnected throughlines of meaning, all of which inflect and nuance one another synergistically. From its very first sentence, *AOC* conflates seed and story, performing a dialectic that extends throughout the novel like a complex root system: "It starts with the earth," the as-yet anonymous (and thus, presumed omniscient) narrator opens, lending the introduction a quasi-mythical sense of grandeur. Presumably, the ambiguous referent "It" comprises the story as a whole, but considering the text's overarching agricultural fixation, "It" could also be a seed: not only does a seed "start with the earth" (the soil allows the seed to "start" its growing process), but also one definition of the noun "start" is a burgeoning seedling, while "to start from seed" is a common phrase in a grower's vocabulary.

Conflating earth plot and story plot, the novel behaves like a thriving garden, one that is deliberately planted, tended, and harvested at the level of narrative form. Gardens exist in myriad layouts, grids, and patterns, with sections and plants sometimes labelled, sometimes not—much like the winding and intertwining subplots and chapter headings that comprise a novel. A well-planned garden—much like a well-outlined novel—develops cumulatively rather than linearly as the season or story progresses, with earlier blooms and growth welcoming complementary flora or enriching the earth to make way for new vegetation. A garden boasts protagonists (specimens that take pride of place whether aesthetically, meaningfully, or in terms of care needs), flourishes with secondary characters (nitrogen-boosting cover crops and pest-resistant varietals that enrich the overall garden), and laments its fair share of villains (pests, weeds, invasives). *AOC* mimics this model both in form and content, especially with regard to seed analogies: characters are

disparate seeds, with personal journeys of development—whether fruitful or futile. About a third of the way into the story, a section titled "seeded" describes the moment of encounter between factions of characters, at which point the disparate storylines become intertwined—a crosspollination, if you will. The first-person narrator of this section, the novel's protagonist Yumi, describes the event as "the moment when some twist of your fate unfolds," an image that evokes the unfurling of a tightly wound seedling.[27] The plot is seeded in this moment, and the novel's ecosystem flourishes across these dynamic semantic entanglements—provided the reader engages them.

Among the networked modalities that shape literary realism in a time of climate crisis, an approach that grapples with the deep timescales of both human and more-than-human histories opens up complementary forms of storytelling: As Elze notes, "realism … when tackling climate change not only is interested in posthuman assemblages but often strives to combine the work of new materialism with the more dialectical and genealogical work of historical materialism and the historical novel."[28] *AOC*'s second media analogy conveys this strategy:

> Every seed has a story … encrypted in a narrative line that stretches back for thousands of years. And if you trace that story, traveling with that little seed backward in time, you might find yourself tucked into an immigrant's hatband or sewn into the hem of a young wife's dress as she smuggles you from the old country into the New World. Or you might be clinging to the belly wool of a yak as you travel across the steppes of Mongolia. Or perhaps you are eaten by an albatross and pooped out on some rocky outcropping, where you and your offspring will put down roots to colonize that foreign shore. Seeds tell the story of migrations and drifts, so if you learn to read them, they are very much like books.[29]

The books described in this passage recall the "dialectical and genealogical work of historical materialism" that Elze identifies as resurgent modes in climate realism, and of which *TSK* is a prime example. Where *AOC* exemplifies the networked potential of seed media, *TSK* deploys a genealogical understanding of seed media to articulate the complex living legacies inherent in

both story and seed. Though primarily set in the present (of 2002), *TSK* comprises a litany of flashbacks as well as a handful of what I will call historical resurgences; these latter segments are set so far in the past (1862, 1889, 1920) that they could not constitute Rosalie's personal memories. These fragments tell the story of Rosalie's great-great-grandmother, Marie Blackbird, and her fugitive experiences in the Dakhóta War, her displacement to Nebraska and her enforced cultural assimilation at Santee Normal Training School, her return to her homeland on the banks of the Mní Sota Wakpá, and the kidnapping of her grandchildren by Indian agents for detention in the infamous boarding school system. Throughout this harrowing journey, Marie keeps safe her family's sacred seed relatives, starting with the urgently secreted cache she and her mother gather as they run from colonizing soldiers: "That night, Iná showed me how to sew rows of seeds into our skirts, along the edge of our blankets, in the hem of Chaské's warm baby dress. My fingers trembled from cold and hunger as I sewed quick, uneven stitches along my skirt, folding the fabric over a double row of corn, seeds that were blue, rose, and cream. Wamnáheza, the corn for our traditional soup." Where *AOC* only cites such smuggling as an almost adventurous example of possible seed histories, *TSK* attends to this story with ethnobotanical urgency and detail—including actual aesthetic descriptions of the seeds, their culinary/sacred use, and their name; though focalized through Rosalie's fictional ancestor, these resurgences describe a historically accurate past, one that Wilson is intent on honoring and disseminating.

These narrative sections do more than simply provide historical context for the reader; they also inflect Rosalie's own psyche as she comes to understand her heritage and identity. Though the novel never overtly states that Rosalie directly shares or witnesses her ancestors' experiences, she reacts to events in her own world as if she had—rescuing the seed box when her farmhouse catches fire, recognizing the oak grove where her family's seed cache was buried and

lost. As such, the novel represents both intergenerational trauma and deep ancestral memory. Seeds constitute and execute this historical tether. In a brief, italicized segment that is part-dream part-visit, Rosalie hears the voice of her ancestor: "seeds share a memory that is a vast ribbon of time, flowing back through each season of rain, and the seasons of not enough rain, and the years when the wind blew and made the plants stronger. The seeds you planted carried the imprint of your grandmother's mouth and of her grandmother's."[30] Rosalie's family seeds offer a gateway into the memories and experiences of her lineage—one that is imprinted in the mouth. In the novel's prologue, Rosalie's great-aunt Darlene explains that "wetting [a seed] first in my mouth … wakes it, you see, tells the seed that the sleeping time is done. It's the spit that brings us together."[31] This technique is known today as stratification (the process of soaking a seed to soften its coat and encourage germination), but I personally do not know any gardeners who accomplish the task with spit. The intimate relationship between seed and their Dakhóta stewards is an oral one—both in the bodily sense as well as in the spoken, linguistic one: seeds on and as the mother tongue. Rosalie describes how she and Darlene "came to share the same memories" as they tended the plants together.[32] Seeds are integral kin in these genealogical dynamics: as the novel reminds us, "when you care for the seeds, you care for all of our ancestors. Nothing is lost. Nothing is lost."[33]

Formally, the novel itself is conceived as a seed, divided into sections—"dormancy," "germination," "pollination," and "wačhékiye" (translated as "prayer" by missionaries but more accurately denoting an address to "all creation as relatives").[34] These sections are characterized by corresponding narrative movements through time and experience. In the state of dormancy, Rosalie attempts to make a home for herself on the Meister farm, eventually discovering her deceased mother-in-law's seed collection. She plants these seeds, catalyzing the narrative

resurgence of her ancestor's 1862 experience. The novel's content performs the way seeds work with memory. Planting the garden marks a turning point for Rosalie both in the moment and regarding her journey as a whole: the significant temporal shift inflects her story with much deeper context and substance. The seeds do the genealogical work of remembering. The section titled germination, meanwhile, describes Rosalie's pregnancy and the birth of her son, as well as her burgeoning passion for journalism. These examples are the most straightforward, but the myriad braided components of the story are far less obvious; the overall effect is one of gestation for and within the reader. These broad, formal assessments exemplify how books are very much like seeds—whether as a garden-like formal assemblage or a genealogical cycle of germination. Whether via informatic analogy or as speculative companion to the seed, the reader's role is an active one—one of mediation, whether of story or experience. To conceive seeds as narrative demands both an environmental *and* a cultural/historical understanding. Whether seeds are like "programs" or "are very much like books," they become the purview of humanist scholars, a challenge directly articulated in *AOC*: "You teach literature, right?," one of the activists asks Yumi, "So what you are sitting on here at Fullers' Seeds is a library containing the genetic information of hundreds, maybe *thousands* of seeds … These seeds embody the fruitful collaboration between nature and humankind, the history of our race and our migrations. Talk about narrative!"[35]

Perspective Possibilities

Assessing seeds in different media forms exposes the myriad mediative affordances of seed media and highlights the complementary yet distinctive capacities of the forms themselves. As the extensive analyses that comprise Chapter Three demonstrate, cinematic representations of seeds produce seed media with powerful, graphic affordances: visual identification offers

environmental knowledge and reifies symbolic meaning, while chronological elasticity allows human time to align with seed time. Whereas seeds on screens comprise images of actual, material seeds (perhaps they should be given a film credit), prose seeds are necessarily imagined. Ironically, this immateriality has the potential to generate a uniquely intimate experience for the reader—where realism as a genre exceeds the limits of the real as such. Seeds are inherently alienating: beyond a cursory, superficial species identification, they are impossible to assess fully until they are grown out (and thus, no longer seeds). As Courtney Fullilove observes, "seeds embody deep … knowledge. Yet their casing renders them opaque, such that they often function as proxies or fetishes, concealing the labor and knowledge they contain."[36] But this limiting opacity is hardly an issue for the prose form, which boasts a most dynamic and capacious dimension: narrative perspective. From omniscient to intimate, shifting to imposed, unreliable to immersive, narrative perspective spans time and space at any scale, hacks subjectivity, actualizes the impossible, and even transcends the prose form itself. As such, narrative perspective easily infiltrates the opaque casing that conceals a seed's deep knowledge, allowing the reader imaginatively to access seed subjectivity. Both the novels under consideration here deploy this narrative strategy right at their outset, inviting the reader to share the perspective of a seed.

AOC invites the reader to inhabit a seed perspective by means of a thought experiment: "Imagine you are a seed," the introductory paragraph of *AOC* instructs, "of an apple, or a melon, or even the pit of a peach—spit from the lips of one of Lloyd's crossbred grandchildren, arcing through the air and falling to earth, where you are ground into the soil, under a heel, to rest and overwinter."[37] The novel compels the reader to experience the biological processes of a seed through the dramatization of its early development, the animation of its multi-sensorial perspective, and the conjuring of its companion species:

> Months pass, and it is cold and dark. Then slowly, slowly, spring creeps in, the sun tickles the earth awake again, its warmth thaws the soil, and your coat, which has protected you from the winter frosts, now begins to crack. Oh, so tentatively you send a threadlike root to plumb the ground below, while overhead your pale shoot pushes up through the sedentary mineral elements (the silt, the sand, the clay), through the teeming community of microfauna (bacteria and fungi, the algae and the nematodes), past curious macrofauna (blind moles, furry voles, and soft, squirming earthworms).[38]

This novelistic opening dramatizes the germination of reader-as-seed to convey an intimate understanding of the complex intricacies and precarious circumstances at play for such a delicate unfolding. These descriptions almost romanticize the seed's development (a sun-tickled earth, a tentative plumbing root, curious and furry critters) rendering the immersive narrative experience pleasurable and inspiring—hopefully, in a way that produces a lasting effect.

Unlike *AOC*, *TSK* does not simply and overtly invite the reader to share a seed's perspective. Before even its title page, the novel opens with a lyrical poem that grounds its narrative in the long histories of "Seeds" and their relationship with "Humans."[39] Titled "The Seeds Speak," this prefatory invocation is told in the collective "we" of Seeds as a whole, a collective which the reader joins by the very act of reading:

> We are hungry, but the sleep is upon us.
> We are thirsty, but the mother has instructed us
> not to waken too early.
> We are restless, chafing against this thin membrane,
> pushing back against the
> dark that bids us to lie still, suspended in a near-death
> that is not dying.
> We hold time in this space, we hold a thread to
> infinity that reaches to the stars.[40]

The reader here shares the perspective of the Seeds not as a thought experiment but as an incarnation—to occupy the perspective of "we" is to become Seeds, to experience and articulate their existence. Seeds in Wilson's story claim their own voice, their own agency; and though the language of the poem is lilting and beautiful, it is also remote and serious. Both the introduction

to *AOC* and this incantation-like prelude to *TSK* focus on the material transformations and physical circumstances of germination, but Ozeki describes a much more passive process: "your coat … begins to crack," "your pale shoot pushes up." Wilson's seed worlding, meanwhile, invokes an active, willful collective: Seeds are not subject to their development, but have urges and desires, hunger and thirst; they. "[chafe] against [their] thin membrane, [push] back against the dark." Here Seeds are not just processes, they are persons, and powerful ones at that—ones who "hold time" and boast an ancient cosmological connection.

The stanzas that follow describes the cycle of the Seeds, their connection with "the realm of dream and spirit, the song that "all of the world" once had "to speak to all beings in their own language," and how "the land told stories." When the poem—or, rather, the Seeds—introduce the arrival of "the Humans," these new protagonists are treated as a collective "they" that generate a defamiliarizing gaze for the reader, who is forced to conceive of Humans as others, through the Seeds' alienating perspective. The Seeds take pity on the Humans and make "an Agreement" to "live in partnership"—an arrangement that was honored for centuries before the "time of darkness" brought about by Indigenous genocide. The poem ends with the Seeds' warning: "Now our time is almost gone; / the pulse of life flickers, dims as the heartbeat slows. We cannot wait much longer."[41] At first glance, this lyrical poem—with its lofty, mystical expressions, its primordial and otherworldly timescales, and of course its acknowledgement of Seeds as vocal beings—would hardly qualify as literary realism (according to Western standards and belief systems); but the central tenet of Wilson's novel, and of traditional Indigenous knowledge systems broadly, is that recognizing Seeds as people and as relatives is not only *a* reality, but *the* reality that undergirds our entire collective existence. Where *AOC*'s thought experiment felt safe and curious, *TSK* takes Seeds and their long existence seriously, insisting on

a kinship engagement borne out of respect and accountability. Readers are compelled to experience the pain and tragedy of the Seeds' history, and to feel their own responsibility in honoring the Agreement. This opening invocation makes evident that this is as much the Seeds' story as it is the Human characters'—if not more so: narrative is as much the purview and the medium of Seeds as it is that of Humans. Whereas in *AOC*, "every seed has a story," one that demands a human companion to witness and communicate it, in *TSK* Seeds tell their story: yes, "seeds are very much like books," and this analogy is helpful in formulating a more nuanced way of approaching and understanding seeds; but as Wilson shows, Seeds are also narrators in their own right.

In 1990, when the words "global warming" contentiously began to pepper the press and "climate change" remained a concept for scientific disciplines, philosopher Michel Serres published a short manifesto called *The Natural Contract*. In it, he argues that the social contract by which all of civilization inherently behaves, and without which abject violence would reign, is a model that can and should be extended to a natural contract—one that takes seriously the position of the environment, and articulates a mutual responsibility of deep respect and care wherein "each of the partners in symbiosis … owes, by rights, life to the other, on pain of death."[42] While Serres' argument does more to reify the nature-culture binary than to dissolve it, and proposes a decidedly anthropocentric model for such a problem, his articulation of a natural contract involves an extreme concern for language that is still relevant today, especially in a literary context. His dilemma comprises the lack of a universal language by which to ratify such a contract, for "What language do the things of the world speak, that we might come to an understanding with them, contractually?" Furthermore, who or what would or could sign such a contract? Serres questions whether language is even necessary ("after all, the old social contract,

too, was unspoken and unwritten: no one has ever read the original, or even a copy") and concludes that although "we don't know the world's language … but the Earth speaks to us in terms of forces, bonds, and interactions, and that's enough to make a contract."[43] More than thirty years later, this question of language, of understanding and communing with the environment and its more-than-human inhabitants is more urgent than ever, but Serres was hardly the first thinker to call for, or recognize the importance of, a natural contract. The "Agreement" at the heart of Wilson's introductory invocation describes the origins of such a pact, wherein the seeds "surrendered [their] wildness to live in partnership … Because [they] cared for each other, the People and the Seeds survived."[44] Not only is this the moment when the "Humans" become "People," it is also the only instance in the poem when the Seeds speak of (and thus conceive of) themselves in the third person—as an autonomous collective capable of entering into a mutual pact. The signature is written into the Seeds themselves, the history of our symbiotic existence comprises their DNA and determines their experience; but it is written into us in the same way: our physiologies have evolved to process such food, and our behaviors and practices have developed in tandem with such agricultural relationships. To quote Marini again, "what we need to bring to light is the idea that close reading is not simply a practice of being close to the text, but of *allowing the text to be close to us*. Close reading is just as much a matter of the text reading me, as it is one of me reading the text."[45] Even though the language used to convey the Seeds' perspective is Human—and that of the colonizer, to boot—the reciprocal concepts brought into being by the poem, and actualized in the engaged act of reading, exemplify the emergent, relational power of narrative as a medium.

The existential exchange that happens at the level of narrative occurs at in a second strategy of narrative perspective: the dynamic shift between first- and second-person points of

view. In *AOC*, this oscillation generates a resonant dialectic that knits an intimate experience between reader and narrator. As *AOC*'s protagonist and primary narrator, Yumi represents a semantically rich site of inquiry: her name, her complex seed analogy, and her function at the formal level together undergird the novel's chief concerns and generate a meta-fictional sense of identification between text and reader. To produce this engagement, Ozeki's prose style conflates narrator and reader in proliferative and sometimes disorienting ways. Because Yumi alternates her narration from first to second person across the novel's different sections, the reading experience dances between a personal, empathic connection with Yumi's autobiographical first-person perspective (I understand my "I" self as aligned with her "I" self, but maintain my subjective distance), and an imposed, immersed, and sometimes uncomfortable position as Yumi's second-person self (I am the subject of Yumi's narration, her "you" compels my involvement and enmeshes our experiences). This narrative dialectic is inscribed in, and thus compounded by, Yumi's name, which comprises a phonetic oscillation between you and me. A flashback conversation between Yumi and Elliot, only 27 pages into the novel, establishes this phenomenon for the reader:

> "Yummy?"
> You snatched your hand away. "Don't call me that."
> He was surprised. "Why not? It's your name. . . ."
> "My name is *Yumi*."
> "Yummi?"
> "No. Not like *gummy*. Like *you*. And *me*."
> "You-me."
> "Say it quicker."
> "Yumi."
> "If you can't pronounce it right, don't say it at all."

Yumi represents the nexus of you and me, narrative and reader, thus enacting the phenomenon W.J.T. Mitchell describes when he argues that "if media are middles, they are ever-elastic middles that expand to include what look at first like their outer boundaries. The medium does

not lie between sender and receiver; it includes and constitutes them."[46] Yumi performs the subjective dissolution between you and me, regardless of which position narrator and reader occupy.

Unsurprisingly, Elliot's mispronunciation singles him out as incapable of this kind of subjective empathy, thus excluding him from this experience of mutual actualization. Nevertheless, Elliot's distortion of Yumi's name still mediates his relationship with her, wherein she is an exoticized object of, in this case, sexual consumption. Yumi is referred to as Yummy throughout the novel, filtered through the third-person perspectives of other supporting characters (namely, her father Lloyd, her friend Cass, and of course, Elliot). In fact, she introduces herself as Yummy in her expository introduction, in the context of her father Lloyd's story: "and I was Yummy, his only child." When she eventually provides her phonetically correct name, it is with the caveat that "nobody in Liberty Falls could say it right. *Yummy, yummy, yummy, I got love in my tummy*." Yumi's denominational misrecognition marks her otherness in a predominantly white community. The interchangeability of the two pronunciations throughout the narrative denotes the state of hybridity that defines her identity. Her singsong afterthought is likely a nod to her father's adoration for her, but it also reifies Yumi's association with food—and by extension, with seeds.

Seed and/as Character

The meandering analogy that conflates seeds with language, and thus with media/text/narrative (whether within the story or at the level of form), occurs perhaps most fruitfully in the symbolically resonant depictions of *AOC*'s characters, who are themselves equated to seeds, real and figurative. As Yumi's mother Momoko proclaims, "Everyone gonna be seeds."[47] Ursula K. Heise and other critics have noted how, "Through a multitude of details as

well as a few climactic scenes … the novel encourages readers to think of plants as humans and humans as plants," but the one-to-one comparison has not been expanded to consider the equally prevalent and multifarious associations with media.[48] Parsing these configurations exposes both fertile implications and generative contradictions that animate dilemmas of sovereignty, cultural identity, and subjecthood.

Yumi's seedlike associations—both analogous and metaphorical—index her complex experience as a transplanted, cultural hybrid, with the potato standing in for her earliest attempts at self-recognition. Potatoes, the novel explains, are not planted or grown from seed; rather, they are propagated by cloning. The planted eyes of a potato

> grow into identical replicas of the parent, bearing their bundles of tubers, some of which you eat or sell, others you cut up to clone again. It's pretty foolproof. The reason you clone rather than plant from seed is because potatoes, like human children, are wildly heterozygous [which] means that if you try to propagate a domesticated potato using seed, sexually, chances are it will not grow true to type. Instead it will regress, displaying a haphazard variety of characteristics, reminiscent of its uncultivated potato progenitors.[49]

This propagation process is why potatoes are the control crop par excellence, which will be discussed further in the following paragraph. When Lloyd teaches Yummy[50] the lesson whereby "every potato [is] capable of creating endless offspring out of chunks of its living flesh, [she feels] so proud, like [she is] a little chunk of his."[51] If Lloyd stands in for the potato, which the novel seems very intentionally to suggest, and Momoko aligns with the diverse collection of heirloom seeds that she has tended her whole life, then Yumi is part cloned, and part seeded. But because of her mother's foreignness, Yumi's identity is framed through racist concepts of exotics and invasives. To her chagrin, as she grows into her own hybrid person, Yumi cannot claim replicated continuity with her father—she cannot remain Yummy: as a Japanese American, she is a foreigner in an otherwise culturally uniform environment. When Yumi the narrator asks the reader to empathize with the burgeoning volunteer seedling in a monocrop field only to be

weeded out—uprooted just as they are beginning to flourish, she indirectly curates a commiserative relationship with her own experience: "That's what it felt like when I was growing up, like I was a random fruit in a field of genetically identical potatoes."[52] Monoculture becomes a metaphor for whiteness, prejudice, and intolerance in which nonconformity has no place, no opportunity to grow, let alone to thrive.

When Ozeki set out to write a novel about industrial agriculture—and about the threats of monoculture specifically—she deliberately selected the potato as the novel's central, controversial food-crop because potatoes, according to Michael Pollan's landmark text *The Botany of Desire*, "co-evolved with and enabled our human desire for control."[53] Within the inextricable and dialectic relationship between media and seeds, the control potato and the genetically modified monocultural regime it enables conjure the control society posited by Gilles Deleuze in his famous essay "Postscript on the Societies of Control." In fact, agricultural systems have always figured prevalently in philosophies of biopolitical governance (sovereign society and the peasant class, disciplinary society and the nuclear family farm). The hyper-mediated age of the control society extends to the world of big ag—like with big data, society is targeted by mass informational programs that define and influence our foodways, down to our own so-called preferences. To theorize this process, Deleuze proposes that technological age of computers and the society of control that governs it have induced a form of subjecthood that is dividual rather than individual: "We no longer find ourselves dealing with the mass/individual pair. Individuals have become '*dividuals*,' and masses, samples, data, markets, or '*banks*.'"[54] One person's identity is subdivided into quantifiable characteristics, or data, that are targeted and manipulated across populations for neoliberal, capitalist interests. Among the many mechanisms "slated to enter into the new process" of societies of control, Deleuze lists "molecular engineering" and

"genetic manipulations," both of which have come to define corporate agriculture all the way down—including the substances that enter and manipulate our bodies.[55] The stakes of this agricultural hegemony are high—processed sugar, for instance, has recently been found to be as addictive as cocaine, while processed meats have been proven to be as cancer-causing as smoking and asbestos. But as Deleuze reminds us, "within [this regime] liberating and enslaving forces confront one another," and the purpose of diagnosing its conditions is "to look for new weapons."[56] *AOC* and *TSK* deploys the stakes of both these liberating and enslaving forces: rather than rejecting the concept of the dividual, both novels reframe this state of being and expose new, radical possibilities inherent in such a state.

In contrast to the formulation of the dividual in Deleuze's political theory, *AOC* and *TSK* offer models for dividual thinking that align with the use of the term in anthropological approaches, and thus model the protean and alternative modes of possibility inherent in dividual subjecthood. In anthropological discourse, the concept of the dividual is framed not as a vulnerability, but rather as a mode of being undefined by the dualisms of Western philosophy: members of a society—whether human or more-than-human—cannot be conceived as distinct from their relational contexts. The Seeds that herald Wilson's story with their age-old lessons and wisdom, despite being many, share a united heartbeat—a single, precarious pulse of life; individual survival is not only impossible but inconceivable, their collective wellbeing fundamentally co-constitutive. This anthropologically theorized mode of being extends back into the political: "Who are we if we can't even feed ourselves?" Marie Blackbird's mother proclaims in *TSK*.[57] Food sovereignty scholar Christina Gish Hill puts plainly that "nations are not truly politically autonomous without the ability to shape their food system," a fact that exposes global agricultural regimes in all their neocolonial glory.[58] Autonomy comes from more that control in

this case, however: food is inherently a relationship, a relative. Marie recalls her mother's ambivalence regarding the food being distributed by colonizing soldiers: "But she was afraid of the food they handed out. She worried about what would happen when the women no longer knew where to find medicines… She said our food was sacred because it made life. 'This food has no spirit,' Iná had told me, dipping her hand into a sack of flour. 'What will become of us when this is all we have?"[59] Nourishment is about way more than calories—it defines cultural identity and enables personhood. "The seeds Darlene had given me," Rosalie explains, "were saved by generations of women who believed their work was essential to their families' survival. Not just as food, but as an expression of who they were."[60] As environmental anthropologist Anna Tsing reminds us in her critical manifesto,

> *Human nature is an interspecies relationship.* Far from challenging genetics, an interspecies frame for our species opens possibilities for biological as well as cultural research trajectories. We might understand more, for example, about the various webs of domestication in which we humans have entangled ourselves. Domestication is ordinarily understood as human control over other species. That such relations might also change humans is generally ignored.[61]

As Michael Pollan insists about crop plants, "they domesticated us as much as we domesticated them." Wilson's Indigenous philosophy of symbiosis reflects this: "I thought about teosintes," Rosalie muses, "and how that grass had collaborated with human beings to become maize, a sacred food for so many tribes."[62] Grass boasts the syntactic prime of place in this sentence construction, with its active and agential collaboration inverting how we typically conceive of crop-human relationships and co-evolution. More than just co-domesticated, *TSK* insists on seeds as relatives, even comparing a playfully discarded ear of corn to the grandmother figure to hammer the point home for the mischievous children: "Would you throw Khúŋši in the field?"[63] In *AOC*, Geek explains this relationship using the metaphor of the pea, which has already been shown to stand in for media ("a pea is a program"):

> The pea trains the farmer, and the farmer trains the pea. The pea has learned to taste sweet, so that the farmer will plant more of it. Vegetables are like a genetic map, unfolding through time, tracing the paths that human appetites and desires have taken throughout our evolution. It's the coolest thing. And as their human symbionts, we service their DNA … We depend on plants. They depend on us. It's called mutualism.[64]

Through these different modes of storytelling, *AOC* and *TSK* model and extend the potentially radical modes of existing and thriving in dividual configurations based not in control but in continuous reciprocity. Engaging in seed media means inhabiting this dividual status and becoming culturally continuous in both senses of the term.

Names and Seeds

If seed media teach readers how to parse narrative in *AOC*, the importance of names—and of remembering and attending to those names—is certainly one of their chief lessons. The story's primary setting—Fuller Farms, located in the small town of Liberty Falls in Power County, Idaho—is semantically charged with the novel's overarching cautionary message: the emperor wears no clothes, the tenets at the heart of the American Dream ("life, liberty, and the pursuit of happiness") have been exposed for their excess and hubris (not *full* but *fuller—more* full), and the inevitable outcome is the collapse of freedom both financial and personal.[65] But more pronounced and more nuanced than these location names, characters' names—first, last, nicknames chosen or imposed—mean a great deal, and the novel seems almost obsessively to stress the importance of these meanings. I read this at times overly direct strategy to be an entertaining tactic, wherein the gratifying recognition of characters and their punny names will prompt the reader to seek out more such connotations, and to distinguish how they mediate synergistically with other seed-like dynamics woven into the characters' identities and interpersonal relationships. Some character names are almost didactically straightforward: Frank Perdue (whose last name means "lost" in French) is a wayward orphan looking for adventure and

trying—rather nonchalantly at first—to find purpose. He often acts as a stand-in for the ignorant reader, allowing expository and educational conversations about seeds and agriculture to unfold between him and the novel's intellectual anarchist, Geek. The group of quirky anti-GMO activists to which Geek belongs, called the "Seeds of Resistance," also includes the philosophical poet Y (short for last name Yeats), the sexually holistic hippie Lilith (in some religious traditions, Adam's first wife, Eve's rival, and the goddess of women's liberation), and the whimsically dramatic Charmey (a character both charming and tragic—her name is often abbreviated to Char, which foreshadows her eventual death [and probable murder] in a fire). This assemblage of "Seeds" represents the complementary cultural characteristics—wayward, academic, metaphysical, spiritual, artistic—so often overlooked in seed considerations.

One of the more complex intersections of name and seed association occurs in the character Momoko. As the narrative informs us, "Momo means 'peach' in Japanese," but the diminutive "ko" often stands in for offshoot or child.[66] Momoko is the child of the peach, and the peach tree that she plants with a pit from Japan is her tether to home and heritage. Peach imagery likewise inflects the story's originating invitation to "Imagine the planet like a split peach, whose pit forms the core, whose flesh its mantle, and whose fuzzy skin its crust." Meanwhile the seed with which we share perspective as readers is "the pit of a peach—spit from the lips of one of Lloyd's crossbred grandchildren"—themselves also the progeniture of Momoko.[67] As narrator and as Momoko's own daughter, Yumi can shirk the weighty analogies of potato and invasive that characterize her upbringing and stunt her flourishing; instead she can embrace her role in the peach's nourishing cycle. The peach is earth, mother, offspring, story, and reader, and the mutualism it embodies occurs at the interspecies level as well as at the narrative level.[68]

But this triangulated connection is vulnerable, and the novel's chief purpose is to compel readers to understand and take responsibility for its maintenance, and to recognize the threats rallying against it. The name of the story's chief antagonist, Elliot Rhodes, is almost cringingly on the nose, as one of the characters helpfully points out: "His name is Elliot Rhodes. E. Rhodes. Is that perfect or what? … Erodes!"[69] But the implications of Elliot's erosive status are far more extensive than they may at first appear. Elliot's role in the narrative is twofold, and sinister on both counts. As Yumi's flashbacks reveal, Elliot was once her high school teacher and abuser, having seduced her into statutory rape, gotten her pregnant, and supervised (if not enforced) her abortion before skipping town. Elliot returns to the narrative's contemporary storyline as the PR representative for Cynaco, the corporation promoting the genetically modified NuLife potatoes around which the plot revolves (and which articulate a thinly veiled critique of Monsanto's New Leaf potatoes, the topic of scrutiny in Michael Pollan's 1998 *New York Times* article "Playing God in the Garden" that is directly referenced in the novel). His participation in the erosion of genetic diversity as an agent of mass monoculture is reified in his own seedy association: his reappearance in Yumi's life coincides with the section heading "bad seed," and he is dubbed "the Terminator" by Lloyd, a nickname that derives from one of Cynaco's bioengineered technologies. In Lloyd's proselytizing words, this "patent permits its owners to create a sterile seed by cleverly programming a plant's DNA to kill its own embryos. This technology, nicknamed the Terminator, can be applied to plants and seeds of all species, including food crops, thereby, and in one ungodly stroke, breaking the sacred cycle of life itself."[70] Though Lloyd's religiously inflected rhetoric frames the threat of the Terminator technology in terms that are uncomfortably pro-life, it also reinforces Elliot's semantic alignment with the label, given his part in terminating Yumi's pregnancy.

Against Monoculture

Compounding these analogies, the danger represented in Elliot's erosive function extends to the domain of language, wherein censorship and suppression produce an impoverishment of cultural diversity and a stunting of critical thinking. The PR firm for which he works "specialize[s] in damage control and crisis management, only they call it 'solution imaging' and 'media intervention' and 'constituency building.' Obfuscating crap."[71] The manipulative and oppressive tactics that constitute the control society and fuel the capitalist machine both benefit from and perpetuate stagnant behavior and creatively vacuous modes of being. They take control of the narrative, and in doing so they quash its animacy. As Geek exclaims,

> Picture the whole planet as a garden, teeming with millions upon millions of flowers and trees and fruits and vegetables and insects and birds and animals and weevils and us. And then, instead of all that magnificent, chaotic profusion, picture a few thousand genetically mutated, impoverished, barren, patented forms of corporately controlled germplasm … This is how diminished, how pathetic the planet has become … Like a logo or a fucking brand! Is this progress? I don't think so. It's bullshit, but that's all we hear—the same old stories, justifying the same old bad, exploitative, greedy, fucked-up behaviors. The same old excuses about why it's okay—no, it's economically beneficial—to raze the land and destroy animal habitat and exploit people.[72]

Alongside many such political outbursts in the novel, this passage highlights the power of stories, and particularly the danger in telling "the same old story"—abiding by the imposed rules of patent and property and thereby both preserving and reinforcing the status quo. Ozeki herself, in an introduction to a public reading, offers a formidable example of the threat language is facing against the machinations of commodity culture:

> I'm an opponent of censorship, willful or constructed ignorance, and the abuse or impoverishment of language. And I'll close with a quick example of what I mean. When I was writing *All Over Creation*, I learned that the phrase "Idaho potato" is a registered trademark, and as such, technically speaking, if I wanted to use that phrase in my novel about potatoes growing in Idaho, I would need to capitalize both the Idaho and the Potato—and possibly even display the registered TM mark next to every occurrence of the phrase—or risk being sued for trademark infringement.[73]

Ozeki's very lexicon—and by extension that of all writers and authors—is slowly being chipped away at as the ever-proliferating patent system funnels words into the exclusive realm of intellectual property. The trademarking of plant names as linguistic/narrative censorship is analogous to the patenting of plant genetic material as a threat to food sovereignty. Ironically, the logic that underpins intellectual property exposes the fungibility of seeds as informational or textual media: as lawyer and anthropologist Rosemary J Coombe explains, the enclosure of the public domain by means of intellectual property is "not limited to control over *textual* resources—all resources have the capacity to become informational and thus to be *textualized* under contemporary technological and legal conditions."[74] She elaborates, "as a consequence of technological advances in genetic sequencing all flora, fauna, microbes, plant germplasm, cultural knowledge, and even human cells are now, potentially, informational goods."[75]

AOC's concern with character names intersects with this discourse of property to raise questions of autonomy and self-determination. Upon first meeting his granddaughter Ocean, Lloyd declares, "That's not a proper name. An ocean is a thing, not a person." Regarding Lloyd's own name, Ocean's challenges in turn: "How come it doesn't mean anything?" to which her grandfather replies, "Because it's a proper name."[76] Lloyd's circular logic echoes early Millian theories of proper names, which argued that proper names were purely denotative, devoid of semantic content beyond the identification of the referent, and that even the process of something becoming a proper name inherently comprises the evacuation of connotative value.[77] Though Lloyd's pronouncement seems to strip Ocean of her subjecthood in favor of objecthood ("a thing, not a person"), this purist, analytic framework, taken in tandem with the novel's overt concern with commodification and ownership, highlights the proprietary aspect of the proper name. As such, Ocean has the potential to slip the reigns of property and instead inhabit a realm

of thingness and meaning that exists beyond the reaches of capitalist interests—an ephemerality and intangibility that are unsurprisingly reflected in her so-called improper name. Lloyd's identity, meanwhile, semantically vacuous and thus properly named, is fair game for commodification, as evinced in Lloyd's increasingly deteriorating character arc of market reverence, financial success, hubristic excess, and near-total ruin.

Ocean's state of exceptionalism as well as that of her siblings (whose names likewise would not qualify as "proper" in Lloyd's opinion) is confirmed and compounded by the seed-to-character analogy that inflects Yumi's children (who are literally referred to as Yumi's "little seedlings")[78]: when presented with "mutant squashes" and asked to identify them, Momoko replies that she does not know what they are, then jokes to herself, "Uri wa iyarashii no yo." Yumi asks what she means, to which Momoko replies that they are "a little bit" of many varieties—"zuke," "Delicata," "Sweet Pumpkin"—before gesturing at Ocean and Phoenix with the comment, "Like them. All mixed up."[79] Yumi's children are dividual, comprised of many "bits" and thus impossible to circumscribe. Momoko's aside (untranslated like much of the Japanese in the novel), harbors a dual meaning: it translates roughly to "obscene for sale," and to "sly/cunning," a double-entendre that suggests a shifty state of alterity, a mysterious unknowability that inherently renders both children and squashes indefinable—at least according to standard labels and categories—unfit for and thus exempt from capitalist hegemonies. Lloyd's initial, outraged exclamation upon being introduced to his brethren, followed by Ocean's emphatic response, further exemplify this denominational alterity: "What kind of children have names like that?" Lloyd snaps, implying a failure to categorize and classify, to make sense in a patriarchal tradition of propriety-cum-property. Ocean's emphatic response, "We're *good* children … That's what kind"[80] reaffirms the children's status in moral terms that resist

commodification–not *goods* but *good*. This ethical edict is reiterated at the end of the novel, when the members of the Seeds of Resistance offer to set up an online seed library so that Momoko's seeds can be disbursed and shared: Lloyd exclaims , "Momoko, they want to give away all our seeds!" to which she replies magnanimously, "It is good way." Lloyds further protests—"But they're ours. We have to keep them safe!"—are once again dispelled by Momoko, who understands that the seeds will proliferate and flourish in the commons: "No. Keeping is not safe. Keeping is danger. Only safe way is letting go. Giving everything away. Freely. Freely."

But just as seeds mediate their own paradoxes, ideological binaries are hardly so stark in Ozeki's conception of identity. Yumi herself throws a wrench in Lloyd's logic, informing him that "actually [his name] does mean something … It means 'gray-haired' … In Welsh. Or something."[81] Importantly, Lloyd only comes into the knowledge of his name's significance when he is literally grey-haired, a revelation that perhaps marks his moment of self-recognition and thus self-determination after all—the name Lloyd also means "wise," the symbolic connotation of grey-haired or elder. A poststructuralist approach to proper names makes more sense here, wherein proper names, as Derrida reminds us, are not exempt from "the system of differences and metaphors" that comprise their social and historical context.[82] Moreover, "the proper name is embedded in the sense of self of the bearer of the proper name," which raises "questions of subjectivity and consciousness"—one's identity or sense of self is never sovereign nor static; rather, it coalesces at a tense nexus of self-determination/actualization, social opinion and judgement, familial/ancestral history, cultural/political/environmental conditions, etc.[83] Indeed, as the argument unfolds between Lloyd and Ocean, seemingly positioning them at opposite ends of a semantic spectrum, these characters-at-odds are descriptively yoked together:

"Lloyd and Ocean both turned to stare, and the resemblance was stunning. The stubborn blue eyes and the broad forehead. The set of the jaw. The same irritation at being interrupted." The intimate genetic connection that undergirds this familial relationship, mediated phenotypically and narratively, reminds the reader that identity is also the purview of heredity—an inevitable affinity more pronounced precisely because Lloyd and Ocean would clearly resent it. Like all characters and, in essence, all dividual subjects, Ocean only has so much sovereign control over her identity: despite her, it meshes genetically with her grandfather's, it gets reduced and mocked by her brother's nickname for her, "Puddle," and it reflects the changing circumstances and relationships that constitute the ecosystem of her existence.

In contrast, veiling, distorting, and prescriptive forces that enable corporate structures to thrive under neoliberalism go hand in hand with the need to oversimplify and standardize for maximal market efficiency. As Geek succinctly explains, "potatoes all have to be the same size. Diversity is inconvenient to mechanized farming. This is what happens when agriculture becomes agribusiness. When engineers replace poets, and corporations gain total domination over all our food and all our poems. … Monoculture … has a sad and hollow ring to it."[84] Geek articulates the inextricable link between food diversity and cultural diversity, between seeds and art—"monoculture" conveys both a uniform crop and a single culture, and the direct correlation of one with the other—what many food sovereignty movements have dubbed a "monoculture of the mind."[85] Ozeki makes this parallel explicitly: "As a writer, language is my field, and *words are the seeds I work with*. As such, I feel that it's part of my job to help keep language from becoming insipid and barren, and words from losing their diversity and vitality. I feel it's my job to fight linguistic monoculture and extinction" (emphasis mine).[86] The novel's chief warning is that the threat to biodiversity and the threat to language (and by extension, culture) are

inextricable from one another—media censorship both indexes and perpetuates biogenetic erosion and vice versa, and *AOC* itself is an example of precisely this kind of suppression. Ozeki's own father was a linguist who studied endangered and disappearing Indigenous languages, and she emphasizes the tragedy of his passing as a loss of "the specialized repository of his expert's brain" and the "wealth of irreplaceable information" it contained. This experience greatly influenced her writing of *AOC*: "This idea of the erosion of diversity—linguistic and semantic, of language and of seeds—was, to me, one of the saddest metaphors to underscore the story I was trying to write."[87]

Via seed media, both *AOC* and *TSK* are deeply invested in their own role in resisting the erosion of language and disseminating diversity in the form of knowledge and story (a project in which this dissertation likewise participates). "Did you know that the Aymara of Peru have hundreds of different kinds of potatoes, and they can tell them apart by taste, and they have names for each one?"[88] Geek's collective lessons comprise a curriculum for the reader and highlight the novel's central thematic throughlines: unlike the Idaho potato that epitomizes the control society, these Indigenous potato varietals *and* their names resist homogenization, reduction, and commodification. The names are as important as the taste are as important as the diversity—all of which co-constitute the Aymara culture. More than any other character, Geek understands the stakes of this responsibility, and articulates them in terms that demand a humanistic, media-centric methodology, rather than a scientific one. Commenting on the Fullers' seed collection, he urgently explains that "Their storage system is a mess … They've got thousands of different kinds of seeds in shoe boxes and envelopes and canning jars. A lot of them are unmarked. It's an archival nightmare … [Momoko]'s forgetting the names … If no one knows what they are, and if no one plants them, the seeds and their stories will die."[89] Seeds can

die, stories can die; by reverse logic, both are alive, and their survival must be protected. In *AOC*, Seed stewardship is as much a matter of "storage" and "archival" work; knowing is as crucial as planting for the conservation of seeds *and* their stories. Recognizing the gravity of this situation, Yumi at last understands that "this [isn't] just rhetoric"—Geek is not speaking figuratively, but diagnosing an actual, urgent problem.[90] To help mitigate this potential disaster, Geek "follow[s] Momoko around with a video camera, filming an inventory of the seeds and plants, trying to help her identify them."[91] Geek is invested in an archival project that harnesses the potential of media frameworks to reinscribe seed meaning.

TSK participates in this archival project in an adjacent, complementary way: it integrates lessons on seed care and gardening practices—both traditional Indigenous wisdom and common botanical techniques—directly into its pages. "Keep the seeds from the center of each cob for planting," Marie Blackbird instructs her grandchildren, "the seeds near the tip can be used for cooking; seeds from the other end, share with the animals. Keep a sharp eye open for any kernels with a black heart. Those cobs were picked too early and will not grow."[92] The novel also depicts the process of trial and error, as well as what it looks like to fail, when planting a garden: Rosalie arbitrarily scatters various seeds in her very first attempt at planting, with chaotic results. Near the end of the novel, she plants nearly all of Darlene's remaining heirloom corn, only to have her seed first plundered by squirrels, and then her crop destroyed by a freak hailstorm. In both cases, she has help—kin who gently show her the way forward, a model for the communities of care that seeds and people both need. Some of the teachings are so descriptive as to be instruction manuals in their own right, such as the segment on how to save tomato seed:

> First, I learned to ferment them to remove the film that prevents growth … I sliced a heavy ripe tomato and squeezed the inner gel that help the seeds into a five-gallon bucket. When it was full, I covered the bucket with its lid. Three days later, I poured off the pulpy water, leaving the seeds at the bottom of the container. After a thorough rinse, I

> spread the seeds onto a clean screen, where they dried for about a week. It was satisfying to fill a clean white envelope with them, labeling it with my name and the date.

This passage exemplifies the affordances of literary realism, a genre that makes room for and even celebrates the inclusion of the mundane, the painstaking, and—equally importantly—the experience of gratification and personal investment that arises from such common and overlooked practices. The vast majority of readers have likely never considered the many meticulous steps involved in saving even the most commonplace seed. As Rosalie continues to plant her garden from the seed she herself saves, she "[begins] to see that when we save these seeds, when we select which ones will be planted again, our lives become braided into the life stories of these plants."[93]

In *AOC*, this message of reciprocal accountability is reinforced through its character relationships, as well as at the formal level for the reader, especially in the face of loss. Staging a tragic moment of memory deterioration, a passage describes how Momoko fails to recall the name of a pea ("What is name? What is name?") and hurts herself in frustration until Yumi physically restrains her: "She looked at me with tears in her eyes. Her white hair was smeared with mud. 'What is *your* name?' she said. 'Cut it out, Mom.' I thought she was joking."[94] Alzheimer's disease stands in for cultural amnesia, but the choice of the pea as the forgotten, unidentifiable specimen, coupled with Momoko's confusion about her daughter Yumi's name and identity, make this scene resonate across larger registers. The pea is, once again, Geek's chosen emblem for his articulation of seed media frameworks ("a pea is a program") while Yumi's identity is bound up with Lloyd's through Momoko's own affirmation that father and daughter are "two peas in a pod." If Momoko cannot remember the pea, she cannot remember Yumi, and vice-versa. This responsibility is instead transferred to the reader: as Yumi begins to recount her childhood story, her second person narrative voice challenges the reader to take on

the recollective role: “Two peas in a pod. You remember how that went?”[95] *AOC* thus participates in the project of linguistic and narrative preservation and dissemination.

Languages proliferate quite literally in both *AOC and TSK*. Though *AOC* does this to a lesser extent, both novels practice a multilingual style that reinforces the importance of close reading—specifically with regard to translation. As many of the excerpts and examples have already demonstrated, translations of non-English dialogue and terminology often produce more than one meaning, exemplifying the diverse and remarkable power of language. Momoko’s occasional Japanese adages and asides in *AOC* are sometimes translated, sometimes left to the reader to decode, if they so wish. *TSK* on the other hand is peppered with expressions and vocabulary in the Dakhóta language (a printed and widely circulated record that in-and-of-itself is helping to keep the dialect alive). Many of these inclusions are immediately translated for the reader, and then oft repeated (“we gathered čhaŋšáša, red willow, to make the traditional tobacco”; “He bit into the fruit and said, ‘Waštḗ.’ Good”; “Your grandmother, your Khúŋši”), an iterative structure that embeds an educational process within the narrative: the (non-Native-speaking) reader comes to recognize and understand these otherwise unfamiliar words, in essence learning—and helping to keep alive—an endangered language.[96] For the most part, terms that are not translated come gilded with enough situational or conversational context that their meaning is apprehensible and sometimes quite clear (“thakóža” for relative/child, “wašíču” for white person or non-Indian, “tiospaye” for community), an interpretive process that generates its own engaging moment of recognition. For those terms that are not so easily parsed, the research onus is on the reader—a task not always so straightforward, given that most of the accents are absent from convenient keyboard shortcuts, but one that is all the more wondrous for the effort, as the translation of “wačhékiye” (all creation as relatives) illustrates. Besides covertly

introducing readers to the Dakhóta dialect, Wilson overtly invites them to "join the joyful, life-affirming work of protecting our seeds."[97] In an author's note that closes the novel, she outlines the real-world threats that comprise corporate agriculture and reminds readers of the "original Agreement with the many beings who share this planet with us."[98] She then provides a list of resources, and names organizations that support the work of stewarding heirloom and Indigenous seeds. For Wilson, the responsibility of saving seed and thus conserving diversity—linguistic and biological—through reciprocity and dissemination is an activism in which her novel directly participates.

What is at once absolutely remarkable and also hardly surprising is that this message is not just political, nor is its central analogy purely figurative; rather, the correlation is real and documented: according to a recent article published in *Conservation Biology*, "Regions of the world with greatest biodiversity are shown to exhibit greatest linguistic diversity, strongly suggesting that the relationship between Language and Nature is both symbiotic and spatially and temporally determined."[99] This mind-blowing phenomenon, called biolinguistic diversity, quite literally demonstrates that more language means more life, and vice-versa. Both *All Over Creation* and *The Seed Keeper* perform and celebrate this real-world correlation, one that humanists must take seriously as threats to biodiversity directly translate to threats to language and culture. Seed media are the fulcrum the of this dynamic: "this is what planting is all about—the ancient human impulse to harness that miracle and … tease forth a new crop of stories from the earth."[100] Whether organic or artistic, seeds mediate in, through, and all over creation.

As these two novels in comparison demonstrate, understanding seeds as texts cannot come at the expense of understanding them as alive, dynamic, and a part of us. The concept of seed media is a tool, a useful humanistic framework, but it only truly works if we recognize

seeds—in the proper sense of recognition that involves respect, understanding, and dignity—as living, relational beings. Reading these novels alongside one another exposes this tension, and its dangers. Ozeki's text offers the analogies for how seed media operate in literary realism, and both novels perform these models to generate a more intimate and emergent perspective in their readers. In essence, what these novels teach us is that seed media depend on an engagement with the seeds themselves—certainly in the fictional sense, but also, hopefully, in the material sense as well. Climate realism, fully realized, entails and includes transformed readers in the real world. Wilson insists as much in her closing author's note, and I cannot find better words than hers to conclude this chapter:

> The answer is as close as the nearest garden. We keep our seeds safe by growing them, cooking with them, and sharing them with friends, family, and community. When we reestablish a relationship based in reciprocity, when we nurture the soil and protect the water that, in turn, grows healthy seeds, we are reclaiming an indigenous connection to the earth. These seeds carry our stories; they are witnesses to their own long history on this land. Seeds and our indigenous foods are central to our cultures, reminding us of our ancient relationship with the natural world around us. Mitakuye Owasin, we are all related.[101]

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[1] Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable*, University of Chicago Press, 26.
[2] Pieter, Vermeulen, *Literature of the Anthropocene*, Routledge, 2020, 64.
[3] There are many defining factors to climate opinion in America, including human influence (which generally mirrors political partisanship) and degree of severity, but a significant portion of the population—77%, as of 2023—not only believes in climate change but also in its harmful and worsening effects. See Alec Tyson and Brian Kennedy's *Pew Research Center* article "How Americans View Future Harms From Climate Change in Their Community and Around the U.S." October 25, 2023. "https://www.pewresearch.org/science/2023/10/25/how-americans-view-future-harms-from-climate-change-in-their-community-and-around-the-u-s/
[4] Stephanie LeMenager, "Climate Change and the Struggle for Genre" in *Anthropocene Reading: Literary History in Geologic Times* edited by Tobias Menely and Jesse Oak Taylor, Pennsylvania State University Press, 2017, 225.
[5] LeMenager, 225.
[6] Ibid., 226.
[7] Carolyn Levine, "Realism for Sustainability" in *Realism: Aesthetics, Experiments, Politics*, edited by Jens Elze, Bloomsbury, 2022, 195.
[8] Levine, 194
[9] LeMenager, 225.
[10] Levine, 201.
[11] Jens Elze, *Realism: Aesthetics, Experiments, Politics*, Bloomsbury Academic, 2022, 8.
[12] Kyle Powys Whyte, "Indigenous Realism and Climate Change," *Climate Realism: The Aesthetics of Weather and Atmosphere in the Anthropocene*, Edited by Lynn Badia, Marija Cetinić, and Jeff Diamanti, Routledge, 2020, 71.
[13] Ibid., 70.

[14] LeMenager, 236.
[15] For a detailed history and overview of Midwestern agricultural systems, see J. L. Anderson's edited collection *The Rural Midwest Since World War II* (Northern Illinois University Press, 2014), and specifically Kendra Smith-Howard's chapter "Ecology, Economy, Labor: The Midwestern Farm Landscape since 1945."
[16] John Steinbeck's 1939 novel *The Grapes of Wrath* is arguably the most famous early example of realist fiction's attention to men and farming; some other cases include *Red Earth, White Earth* (1986) by Will Weaver**,** *That They May Face the Rising Sun* (2002) by John McGahern, and *On the Black Hill* (1982) by Bruce Chatwin
[17] LeMenager, 226.
[18] Ruth Ozeki, *All Over Creation*, Penguin, 2002, 171.
[19] Amelia Marini, "Inhabiting Words, Inhabiting Worlds: A Case for Pragmatist Close Reading," *Close Reading the Anthropocene*, edited by Helena Feder, Routledge, 2021, 20.
[20] Ibid., 16.
[21] Ruth Ozeki, (2008) "The Seeds of Our Stories," Moebius: Vol. 6: No. 1, Article 5. 13-14.
Available at: http://digitalcommons.calpoly.edu/moebius/vol6/iss1/5
[22] Marini, 20.
[23] Mary Ann Grossman, "Readers and Writers: Diane Wilson says 'The Seed Keeper' grew out of Dakota heritage and devotion to seeds," Interview with Twin Cities Pioneer Press, April 17, 2021.
https://www.twincities.com/2021/04/17/diane-wilson-seed-keeper-dakota-native-american-heritage/
[24] Ibid.
[25] According to Anishinaabe cultural theorist Gerald Vizenor, "survivance is an active sense of presence, the continuance of native stories, not a mere reaction, or a survivable name. Native survivance stories are renunciations of dominance, tragedy and victimry." See his 1999 book *Manifest Manners: Narratives on Postindian Survivance* for a full theorization.
[26] Ozeki, 124-5.
[27] Ibid., 131.
[28] Elze, 10.
[29] Ozeki, 171.
[30] Diane Wilson, *The Seed Keeper*, Milkweed Editions, 2021, 348.
[31] Ibid., 2.
[32] Ibid., 4.
[33] Ibid., 348.
[34] Albert White Hat, Jael Kampfe, and Vine Deloria. *Reading and writing the Lakota language*, University of Utah Press, 1999, 47.
[35] Ozeki, 161.
[36] Courtney Fullilove, *The Profit of the Earth: The Global Seeds of American Agriculture*, University of Chicago Press, 2017, 11.
[37] Ozeki, 3.
[38] Ibid., 4-5.
[39] I capitalize Seeds and Humans here to reflect the use of such a rhetorical strategy in the poem.
[40] Wilson, i.
[41] Ibid., ii.
[42] Serres, 39.
[43] Michel Serres, *The Natural Contract*, University of Michigan Press, 1990, 39.
[44] Wilson, ii.
[45] Marini, 23.
[46] W.J.T. Mitchell, *What do Pictures Want?: The Lives and Loves of Images*, University of Chicago Press, 2004, 201.
[47] Ozeki, 332.
[48] Ursula K. Heise, "Ecocriticism and the Transnational Turn in American Studies," *American Literary History*, Volume 20, Issue 1-2 (Spring-Summer 2008), 398.
[49] Ozeki, 57.
[50] I employ the mispronunciation here both to reflect the narrative and to indicate her own yearning for this facet of her identity.
[51] Ozeki, 124.
[52] Ibid., 4.
[53] Ozeki, "Seeds," 20.

[54] Gilles Deleuze, "Postscript on the Societies of Control," *October*, vol. 59, 1992, 5.
[55] Ibid., 4.
[56] Ibid., 4.
[57] Wilson, 120.
[58] Christina Gish Hill, "Seeds as Ancestors, Seeds as Archives: Seed Sovereignty and the Politics of Repatriation to Native Peoples," *American Indian Culture and Research Journal*, vol. 4, no. 3 (2017), 94.
[59] Wilson, 126.
[60] Ibid., 335.
[61] Anna Tsing, "Unruly Edges," *Environmental Humanities 1* (2012), 144.
[62] Wilson, 343.
[63] Ibid., 250.
[64] Ozeki, 125.
[65] There is no such place, but there *is* an American Falls in Power County, Idaho.
[66] Ozeki, 18.
[67] Ibid., 3.
[68] In *The Senses Still* (University of Chicago Press, 1994, page 2), C. Nadia Seremetakis invokes the now extinct peach of her youth to describe how sense memory can resurrect and preserve experience and culture through narrative and language: "the absent peach became narrative. It was as if when something leaves, it only goes externally, for its body persists within persons. The peach was its memory, and as if both had gone underground, they waited to be named. My naming of its absence resurrected observations, commentaries, stories, some of which encapsulated whole epochs marked by their own sensibilities … The younger generation, whenever present, heard these stories as if listening to a captivating fairy tale. For me the peach had been both eaten and remembered, but for the younger generation it was now digested through memory and language."
[69] Ozeki, 179.
[70] Ibid., 301. The terminator technology was in fact invented and patented by Monsanto, but was never implemented.
[71] Ibid., 179.
[72] Ibid., 409.
[73] Ozeki "Seeds," 25.
[74] Rosemary J Coombe, "Commodity Culture, Private Censorship, Branded Environments, and Global Trade Politics: Intellectual Property as a Topic of Law and Society Research*," The Blackwell Companion to Law and Society*, edited by Austin Sarat, Blackwell, 2004, 386.
[75] Coombe, 376.
[76] Ozeki, 73.
[77] *Stanford Encyclopedia of Philosophy – Names*. Metaphysics Research Lab, Stanford University. 2019.
[78] Ozeki, 172.
[79] Ibid., 118.
[80] Ibid., 73.
[81] Ibid., 74
[82] Jacques Derrida, *Of Grammatology*, edited and translated by Gayatri Chakravorty Spivak, Motilal Banarsidass Publishing, 2002, 89.
[83] Barry Stocker, *Routledge Philosophy Guidebook to Derrida on Deconstruction*, Routledge, 2006, 56.
[84] Ozeki, 125.
[85] See Vandana Shiva's *Monocultures of the Mind: Perspectives on Biodiversity and Biotechnology*, Bloomsbury, 1993.
[86] Ozeki, "Seeds," 24.
[87] Ibid., 24.
[88] Ozeki, 125.
[89] Ibid., 162.
[90] Ibid.
[91] Ibid., 174.
[92] Wilson, 245.
[93] Ibid., 239.
[94] Ozeki, 174.
[95] Ibid., 19.
[96] Wilson, 24, 32, 129.

[97] Ibid., 363.
[98] Ibid., 362.
[99] https://lahri.leeds.ac.uk/projects/sadler-seminar-series/sadler-seminars-2017-18/language-and-nature-biolinguistic-diversity-across-the-continents/
[100] Ozeki, 171.
[101] Wilson, 363.

CHAPTER FIVE | GAMER GARDENERS

Representations of seeds across media tend to mirror both formal and figurative aspects of those media in which they appear; if seeds are media co-constituted with humans, then videogames—as sites of engaged, interactive, and co-creative experience between player and game world—offer phenomenologically fitting media forms through which to consider seeds. Though still largely underrecognized for their cultural significance and only recently taken seriously in academic contexts, videogames hold pride of place as the dominant media form of our contemporary moment.[1] Once relegated to the insular spaces of backstreet arcades and darkened bedrooms, videogames now constitute ubiquitous phenomena, deploying play spaces that bleed into realities both domestic and public and representing an economic market that exceeds the film and music industries combined.[2] Since the advent of commercial videogames in the early 1970s, the cumulative hours of gameplay alone logged by billions of players across the globe is astonishing to fathom and impossible to calculate—as Patrick Jagoda notes in *Experimental Games*, "in the first forty-five days after its release, *Call of Duty Black Ops* (2010) gamers logged approximately 600 million hours of gameplay (the equivalent of over 68,000 years)."[3] But the critical importance of videogames is not simply a matter of their diverse reach and considerable popularity; as contemporary game scholars argue, games represent crucial, active, and deeply enmeshed sites of cultural and political production. Jagoda contends that games "serve as an experimental form that has the potential to alter the conditions of the historical present";[4] Alenda Y. Chang, in *Playing Nature*, similarly articulates that "games are intermediary objects through which swirl both imaginative fantasy and real activity and places, with real, if not directly predictable effects";[5] Ian Bogost claims that "videogames can also disrupt and change fundamental attitudes and beliefs about the world, leading to significant long-

term social change."[6] Given that the global industrial food system is responsible for an estimated 44% to 57% of greenhouse gas emissions, with farming taking a significant slice of that pie at 11% to 15% (second only to deforestation at 15% to 18%), it follows that videogames about farming should figure prominently in the critical conversation on climate change.[7]

Farming games have found fertile pasture in—and have exerted a defining influence on—the videogame industry. Despite its seemingly simple core mechanic, the farming theme in videogames boasts surprising breadth and variety. Though farming-related activities appeared in earlier videogames, the first farming game is widely recognized to be simulator *Harvest Moon* (牧場物語, *Bokujō Monogatari*, lit. "Farm Story"), designed and produced by Yasuriho Wada and released in 1996 in Japan, 1997 in North America, and 1998 in Europe. Wada developed the game as a more soothing alternative to what he perceived to be the dominant genre on the market at the time: the first-person shooter. The game was profitable across all markets and was lauded as original and fun despite early critics' skeptical attitudes toward farming games as "hard sells." As casual games like *Diner Dash* (2004) and *Bejeweled Blitz* (2008) gained exponential traction in the late aughts, farming games rose to astounding popularity. In 2009, Zynga's *FarmVille* reportedly prompted millions to join Facebook simply in order to play.[8] Chris Kohler, writer for *Wired* games, suggests that not only was farming a dominant theme, but that it also constituted its own unique design formula with lasting repercussions to game mechanics.[9] Even in games that are not primarily or ostensibly about farming, "planting, growing, and harvesting crops" comprise a set of directives that show up as common components of gameplay: both Bethesda flagship franchises, *Fallout* and *Skyrim*, feature options to tend gardens and croplands for character sustenance, crafting ingredients, and financial profit; Nintendo's wildly popular *Animal Crossing* series likewise includes farming among its many pursuits. Farming games are now so

numerous across consoles, PCs, and mobile devices that thorough consideration of the category is beyond the scope of this chapter. Though largely pegged as casual or idle games and marketed for stress relief and light play, farming games overlap with and integrate elements from genres such as simulations, survival games, role-playing games, action-adventures, sandbox games, and management games. Many incorporate narrative frameworks, the gist of which generally hinges on the romantic trope of starting a new life, whether on an inherited, disused farm or an unpopulated, alien planet. If farming constitutes its own constellation of game mechanics, then seeds necessarily figure at the heart said formula: from procuring them to planting them, to watering and tending their offshoots, to harvesting and selling their crops, and finally to saving a new generation (when possible), seeds comprise the essence of farming games.

Bogost, in his seminal text *Persuasive Games*, contends that "videogames open a new domain for persuasion, thanks to their core representational mode, procedurality," a claim from which he develops the concept of "procedural rhetoric, the art of persuasion through rule-based representations and interactions rather than the spoken word, writing, images, or moving pictures."[10] Videogames influence and model by means of executed laws and interactive processes: they offer an experience of engaged ongoingness that is transformative for the player—much like the practice of gardening. Almost as an afterthought, Bogost slips an invitation into his explication of procedural rhetoric, noting that he "intend[s] the reader to see procedural rhetoric as a domain much broader than that of videogames, encompassing any medium—computational or not—that accomplishes its inscription via processes."[11] If seeds are not a medium that "accomplish [their] inscription via processes," I do not know what is. Borrowing the concept of procedural rhetoric from game theory to think about seeds alongside and within games exposes the procedural rhetoric of seeds and exemplifies how it is deployed.

In the case of both seeds and videogames, procedural rhetoric occurs on the spectrum between formula and narrative: the higher the tension on that spectrum, the more engaged and interpellated the gardener/player. To put it more plainly, a story about a hypothetical seed compels the imagination but yields no flora (narrative), while an actual seed without a story produces a plant but fails to inspire (formula). But growing a seed that has a story does both: it "us[es] processes persuasively," to coopt Bogost's definition. Heirloom seeds—seeds that exist in cultural relationship with people—deploy a powerful procedural rhetoric, whereas purely theoretical treatments of seeds (narrative) and genetically engineered monocrop seeds (formula) fall short. As Bogost elaborates, "the values common to virtual reality and computer graphics assume that the closer we get to real experience, the better … But meaning in videogames is constructed not through a re-creation of the world, but through selectively modeling appropriate elements of that world."[12] Too-accurate representations foreclose critical thinking, whereas total abstraction departs too radically from immediate relevance; rather, a model that incorporates aspects of both experiences allows each synergistically to inflect the other.

To illustrate this claim, this chapter first briefly discusses how seeds mediate—or fail to mediate—in videogames at the outer edges of the story-to-formula spectrum: aptly named simulation game *Farming Simulator* and narrative-heavy adventure game *Mutazione*. With these contrasting games in mind, I then turn to sandbox videogame *Stardew Valley*. Close reading *Stardew Valley* against the foils of *Farming Simulator* on the one hand and *Mutazione* on the other exhibits how procedural rhetoric peaks at the synergistic intersection of formula and narrative. A simulation too exacting and close to reality negates imaginative alternatives, self-imposed challenges, and experimentation: *Farming Simulator*'s playing experience produces an almost brainwashed, automaton subjectivity, and leaves little room for critical thinking or

inventive questioning. On the other hand, adventure games, with their rather rigid play conditions and teleological structure, ultimately restrict the player to a predetermined narrative trajectory: *Mutazione*'s abstract world compels community feeling and empathetic engagement, but lacks the relevance and immediacy of this, our earth. Between these two extremes, the sandbox game demands a significant level of interactivity and affords myriad forms of creative freedom: boasting both formulaic elements from the simulation genre and narrative elements from the adventure game, *Stardew Valley* induces critical engagement and compels players to play differently.

Formally, videogames are unique: as interactive, immersive, and co-constitutive sites of engagement and expression, videogames exceed representation and compel experiment. The critical lenses of the environmental humanities remind us that videogames are part of an ecosystem in which media and culture exist symbiotically, and as such offer emergent modes of possibility. As Chang explains,

> Even as many designers and critics emphasize the immersive qualities of virtual experiences and our propensity to forget their outer limits, we ought to attend simultaneously to these limits as a way of thinking through what games are and how they relate to nongame contexts. To characterize games as having both distinct and indistinct edges is to inadvertently assess the benefits and drawbacks of ludic environmental simulation. Seen one way, games can only be impoverished shadows of the real. Unlike the edges spoken of in new media theory (abstract lines that connect nodes on a network diagram) or game studies (the spatially and temporally demarcated "magic circle" in which play occurs), ecological edges are by definition untidy and can be places of increased contest and attrition as well as greater productivity.[13]

This chapter takes seriously this attention to edges and their potential: my discussions of the games' verisimilitude and accuracy aim not to criticize but rather to examine how each case generates alternative modes of critique, playfulness, and invention. This argument coalesces in the claim that the more effective a farming game's procedural rhetoric, the more prevalent and vibrant its metagame. From condition-based runs to player-generated mods to exhaustive online

wikis to deliberate "random seed" inputs, *Stardew Valley* makes possible a second-order form of engagement for its players—a system of games about the game, or a metagame. This phenomenon in turn elucidates how assessing seed media enables critical concepts to translate across seeds and media both: the metagame offers a new and potent framework for conceptualizing the metaseed. In the context of seed media, the metagame begs the question—is there a second-order seed? A seed about a seed? If seeds mediate across material, symbolic, and ideological registers, perhaps the metaseed describes what we have been discussing all along—the dialectical property of seeds, their time-traveling capacities, their inextricability from culture and the human.

Formulaic Seeds | *Farming Simulator*

The simulation genre is difficult to circumscribe. To set up this argument's comparative lens, I have thus far suggested that sandbox games exist in a category apart from simulation games, when in fact gaming culture often conflates the two genres. Simulation games characteristically exhibit the same open-ended structure that defines the sandbox game—why classic games like *SimCity* (Maxis, 1989) and *Civilization* (Microprose, 1991) tend to fall into the simulation category, even though their narrative possibilities allow for significant player invention. In a sense, as many game scholars have argued, all games are simulations of a sort.[14] For the purpose of this discussion, I refine the category of simulation game to its purest form—games that go to great lengths accurately to depict and animate the experiences and features of their real-world subject matter, such as *Flight Simulator* (Microsoft Studios, 1982), *EuroTruck Simulator* (SCS Software, 2008), and other games that strive to recreate authentic situations for their players. When it comes to farming games, the behemoth of pure simulation is inarguably GIANTS Software's aptly named *Farming Simulator*. Retailing for $49.99USD with 13 series

titles, over 40 million copies sold, and 115 million mobile downloads, the *Farming Simulator* franchise has quietly dominated the scene since its 2008 debut; its most recent, November 2024 release, *Farming Simulator 25*, sold 2 million copies in a single week. The series boasts highly detailed, realistic 3D graphics and a country-rock soundtrack. Stripped to the very basics of the farming formula, the game is comprised solely of agricultural tasks and financially incentivized win conditions. Though the player can choose to customize an avatar (a feature only introduced in the most recent releases), the game operates from a first-person viewpoint (save when operating a vehicle) with the player's "body" offscreen—a design reminiscent of first-person shooter games. There is no in-game narrative. Seeds are universalized defaults, purchased in Seed BigBags, which prominently feature the logos of real-world seed companies such as Pioneer and Frontier. The mechanic that dictates which crop type will grow is based on how the player goes about planting the seed—how and where they prepare the soil, and which machines, fertilizers, and techniques they deploy during planting. The game features 25 crop types, a remarkably accurate representation of large-scale farming endeavors, which typically limit production to one or two monocrops the better to maximize on investments in specialized machinery and implements. Unsurprisingly, canola is one of the cheapest crops to grow.

Over 400 vehicles and myriad pieces of equipment and machinery from over 150 different manufacturers—including well-known brands like John Deere, Ford, and JCB—are available for in-game purchase and operation. This aspect is more than just in-game advertising: the development of the *Farming Simulator* franchise has depended heavily on partnerships and licensing agreements between GIANTS and farming equipment companies all over the world, with a view to designing the most faithful representation possible. The variety and technical specificity of these machines are extensive: harvesters, mulchers, weeders, seeders, trailers,

fertilizer spreaders, and subsoilers are just some examples of the many vehicles available, not to mention the various attachments, upgrades, and implements proper to each. GIANTS even sends representatives to agricultural trade fairs, the better to forge and maintain business partnerships and to promote the game. Trade show Agritectnica now hosts "the Farming Simulator League" as an eSport Farming competition.

Farming Simulator not only embraces the accuracies and difficulties of agrarian pursuits, but incorporates them deliberately as part of an educational strategy to introduce its players—many of whom are agricultural workers—to new, real-world farming technologies and products. GIANTS released a free Precision Farming DLC (short for downloadable content pack) in November of 2022. Precision farming, also commonly referred to as precision agriculture, is essentially a management model to optimize production and minimize waste through a series of high-tech observational assessments (including GPS). Rather ironically, the USDA compares precision farming to "traditional agricultural practices, wherein small-scale, non-mechanized farming permitted spatially variable treatments. Farmers, at that time, possessed intimate knowledge of each small corner of each field and, because agronomic practices were primarily manual, could readily translate that knowledge into location-specific cultural practices."[15] The precision farming DLC for *Farming Simulator* was initiated by John Deere and developed in partnership with EIT Food, the European Institute of Innovation and Technology. The expansion almost laughably touts the environmental aspect of its purpose, encouraging players to make their farm "eco-friendlier and more sustainable," all the while couching such a motive in financial concerns and the rhetorics of profit: "Crop sensors and various mechanics for dynamic yield improvement and crop care help you to save seeds, time, fertilizer, herbicide, fuel and, in

the end, money. All while reducing the environmental impact of your operation."[16] In the end, money.

Gamification as a strategy to introduce players to real-world agricultural techniques and innovations is hardly limited to the *Farming Simulator* franchise. Another such example is the GATES project: an acronym for "*Applying GAming TEchnologies for training professionals in Smart Farming*," GATES was a two-year initiative supported by the European Union's Horizon 2020 Research and Innovation Programme. From their website, "the objective of GATES is to develop a serious game-based training platform, making use of different gaming technologies, in order to train professionals across the agricultural value chain on the use of Smart Farming Technology, thus allowing deploying its full economic and environmental potential in European agriculture."[17] Funded under the bracket of "Industrial Leadership," the project received over 1.25 million euro in grants. GATES is a prime example of how the agro-industrial complex deploys gamification strategies to educate the player-public; it follows that, especially as such games corner the market, public perception of farming and food production will align with the philosophies and practices of big ag. In a review of previous version *Farming Simulator 22*, YouTuber and avid gamer RedcoatViking asserts that the game "provid[es] an authentic experience to players across the globe," "does such a great job of capturing the nuances of farming," and is thus "the perfect game to educate anyone on where their food comes from."[18] "Less than 2% of the world's population are farmers," he continues, "that means 98% of people do not understand even the most simple aspects of modern day agriculture. *Farming Simulator* does a perfect job of providing accurate information while ensuring its easily digestible to the average player … This game succeeds at being educational while still providing plenty of time to relax."[19] It goes without saying that this venue of education is rife with bias and misinformation,

presenting the public with a thoroughly limited and grossly naive understanding of our food system without any transparency regarding its deeply exploitative tenets, unsustainable practices, and destructive consequences. Jagoda argues that gamification "operates as a formal and cultural counterpart to neoliberalism."[20] In developing this polemic, Jagoda notes the concurrent rise of the neoliberal political form and the videogame as dominant cultural form in the 1970s; I cannot help but to weave into these trends the simultaneous development of large-scale, industrial agriculture and the Green Revolution, and *Farming Simulator*, as a strict model for the darker, industrial side of farming, leaves few—if any—tools to destroy said master's house.

Narrative Seeds | *Mutazione*

At the opposite end of the spectrum, adventure game *Mutazione* offers an experience that captivates the imagination and compels community consciousness, but with its highly narrativized and structurally rigid play conditions, it lacks the flexibility and real-world groundedness to generate a holistic procedural rhetoric. Adventure games were originally text-based, with the genre taking its name from Will Crowther's interactive fiction game *Adventure* (1976-1977).[21] The genre began incorporating complementary graphics in 1980 with *Mystery House* (On-Line Systems) and soon developed interactive visual features to generate a more contextually relevant interface. By the release of *Myst* (Cyan) in 1993, adventure games had coalesced into a set of play conditions that still define the genre today (though contemporary game design has exploded with interactive possibilities): a "story-driven nature, having a player character who carries out the commands of the player, encouragement of exploration, gameplay focused on puzzle-solving, and interaction based mainly on object manipulation and spatial navigation."[22] *Mutazione* incorporates these elements to great effect, especially with regard to its treatment of seeds.

Developed by independent Danish game company Die Gute Fabrik and published by Akupara Games in 2019, the award-winning videogame sells for $19.99 on Steam.[23] *Mutazione* is a relatively short adventure game (taking from 5 to 11 hours to complete), in which the player—via the game's avatar, Kai—travels to the small, isolated island-town of Mutazione and eventually helps to heal both its environment and community through a combination of social interactions and gardening endeavors. The game's stunning, hand-illustrated graphics arrayed in a 2.5D platform-esque style fashion a richly imaginative, collage-like world of outlandish locations and excentric humanoid characters—an aesthetic that renders visually *Mutazione*'s departure from realism. Playthrough is heavily plot-based, and while the player is encouraged to explore without time constraints or threatening challenges, they also ultimately must progress through a single narrative thread to complete the game. *Mutazione*'s central game mechanic hinges on puzzle solving through planting and tending of a series of gardens, each of which is accomplished via the collection of wild plant and fungi seeds from surrounding milieux and the strategic selection of specimens that coordinate with the "mood" of the garden in question—moods that translate into one of the game's most unique attributes: music. From Melancholia, to Spooky, to Euphoria, the seven gardens of *Mutazione*, once grown, produce melodies according to their composition—each plant emits the sound of a specific instrument—resulting in botanical orchestras. The player is taught the "growth songs" of each vacant, fertile patch, and must play them to encourage the plants to develop to maturity. Tending the gardens occurs concurrently with tending the community: to learn about the island's unique horticultural dynamics, the player inadvertently must help to manage and reconcile the social and interpersonal dramas at play among Mutazione's inhabitants. The successful soundscaping of each garden unlocks the game's next chapter, formally enmeshing this particular mechanic within the game's narrative structure.

It is possible to completing these garden puzzles using different floral arrangements within the same mood group, but ultimately the solution strategy is a simple one, increasingly easier to repeat with each compounding challenge. The story advances along a single, predetermined branch, without possible deviations or alternative endings. The player's influence on the game is thus highly limited.

Unlike the seeds in *Farming Simulator*, seeds in *Mutazione* are inextricable from story: the town in which the game takes place, along with its inhabitants and ecosystems, are characterized by strange mutations resulting from a meteor that destroyed much of the area over 100 years prior. Its flora therefore bears little to no resemblance to actual, real-life specimens, belonging instead to the imaginative world of the game. This representational exceptionalism produces two noteworthy, but somewhat contradictory effects. Divorced from familiar systems of knowledge, *Mutazione*'s seeds also escape the commodifying binds of financially incentivized commerce: they are either collected by or gifted to the player, with no economic mechanic at play either in their planting or in their harvesting. As if to reify this point, the seeds are graphically rendered as seeds, rather than in the form of packets or bundles, as is the case in both *Farming Simulator* and, as we shall see, *Stardew Valley*. Moreover, with their otherworldly musical attributes, these seeds exceed material and commodity registers to resonate more closely with cultural and artistic phenomena. Seeds and people are biologically and spiritually conjoined in the healing of Mutazione's environment and its harmonious cycles of death and rebirth. At the same time, the estrangement of *Mutazione* seeds from recognizable, real-world catalogues causes a disassociation in the playing experience that reduces them to mere tools for the successful completion of the game's musical gardening mechanic. The seeds themselves are hardly memorable and difficult to differentiate; in fact, though the player initially receives an extensive

encyclopedia, *Flora of Mutazione*, they never once need to refer to its elaborate entries while collecting or planting seeds, limiting any actual incentive to learn about the intricacies of Mutazione's botanical populations. The game's many gardens, once planted and musically coaxed to maturity, require no tending—no watering, weeding, pruning, or harvesting. The specimens of Mutazione, once artfully composed, exist independently from their gardener.

Mutazione immerses us into the philosophical and spiritual importance of cultivating the environment as a continuum with interpersonal relationships. And yet formally, the game does not compel renewed or inventive engagement—it hardly motivates more than one playthrough, and limits players to repeating solutions and an undeviating resolution. In terms of content, the game lacks the tangible, real-world stakes that might translate to an immediate critical awareness and behavioral shift in the player. The game's ethos may be at the polar opposite of *Farming Simulator*'s, but its procedural rhetoric is similarly weak.

Seeds in the Sandbox | *Stardew Valley*

Sandbox games boast an open-ended structure that promotes player-driven strategies and objectives, allows a certain amount of imaginative agency in the manipulation of their worlds and settings, and encourages an active, non-linear narrative entanglement between player and game. In short, a sandbox game is procedurally generated: it incorporates the best of both simulation and adventure genres while giving the player the reigns to create, modify, and even break its play conditions. *Minecraft* (Mojang, 2011) is the sandbox game par excellence, with infinite possibilities for play experience. *Stardew Valley*, this chapter's main case study, is a largely open-ended, role-playing sandbox game created by independent game designer Eric Barone, also known by the handle ConcernedApe. A loose farming simulator with a heavy narrative inflection, *Stardew Valley* is neither a model of real-life practices nor a purely

imaginative experience. As such, it leaves room for alternative modes of engagement and emergent critical perspectives, and highlights the conceptual concerns that run through this dissertation: the relationship between seeds and people, the narrative capacities of seeds, and the importance of gardening and seed saving.

Stardew Valley was first released in 2016 for Microsoft Windows through online distribution service Steam with a purchase price of $14.99USD. The game has received critical acclaim and experienced widespread popularity and commercial success since its debut: it is now available in 12 languages across the major gaming consoles and on both iOS and Android mobile platforms. Barone announced on January 23rd, 2020 that the game had sold its 10 millionth copy. The ensuing COVID-19 pandemic triggered an unprecedented surge in the popularity of videogames broadly as quarantine measures and social distancing guidelines redirected cultural practices into at-home entertainment and virtual communities. As Jagoda notes, this behavioral adaptation also prompted a shift in cultural perspective:

> During the 2020 pandemic, video games have also gained cultural legitimacy as socially-oriented media and art. Consider that, in May 2019, the WHO established video game addiction as an official mental health disorder. Less than a year later, on March 28, 2020, the U.S. Ambassador to the World Health Organization (WHO) tweeted, with the hashtag #PlayApartTogether, that playing video games is an effective way of facilitating "social distancing."[24]

Even with the pandemic boost, it is remarkable that the independent, single-handedly developed *Stardew Valley* has, as of December 2024, exceeded 40 million copies in sales—and it still sells for $14.99USD.

Stardew Valley presents a charming, pixelized world with a cheerful color palette, lilting soundtrack, and 2.5D perspective reminiscent of classic videogame styles. As per its introductory cut scene, *Stardew*'s central narrative is one of bucolic escape and community participation (not dissimilar to the rural exodus of many disillusioned urbanites during the pandemic): the player

inherits the deed to their recently deceased grandfather's farm, a turn of events which allows them to leave their mundane, cubicle-enclosed city life and retreat to the idyllic setting of Pelican Town. Once arrived, the player is charged first with getting the derelict property back into shape (clearing the grounds and simultaneously collecting resources, planting crops for eventual harvesting and selling, and making the acquaintance of the town's population. Other tasks such as fishing and mining are quickly introduced as additional resource venues, as is the construction of farm buildings such as coops and barns for the breeding of livestock for eggs, milk, and wool (though never for direct consumption, in keeping with Barone's vegetarian beliefs). Developing relationships with the townsfolk is encouraged throughout gameplay and eventually rewarded with gifts and additional quests, as well as options to marry and have children (resulting in helpful family farmhands). Pelican Town's community members, known in game jargon as "non-player-characters" or "NPCs," boast individual backstories and curated dialogue scripts that the player can discover with consistent interaction and personalized gift-giving. For the first year or so, gameplay is fairly consistent in terms of tasks and expectations, with most players experiencing similar developments and advancements—save for one definitive choice. As the game progresses, the player is presented with two major narrative arcs: they can choose to help restore the Community Center through the donation of myriad, hard-earned and expensive items, or they can purchase a membership at corporate superstore JojaMart. Completing the former challenge prompts the communal ousting of Morris, the JojaCorp's henchman and the failure of the JojaMart business, while taking the latter route forecloses the Community Center option by turning the derelict building into a Joja Warehouse. This didactic binary is in line with the game's overt anticapitalist ethos, but though the JojaMart option is heavily morally inflected

with negative connotations of consumerist greed, either choice allows the player to continue the game without significant consequence.

Before embarking on this quaint agrarian journey, the player must first name and customize their avatar with a variety of characteristics, including 24 skin colors (as eclectic as green and purple), 74 hairs styles, and myriad accessories, accents, and clothing options—all of which are available regardless of gender selection (which can be altered at any point during the game), though pronouns remain strictly binary. A selection of farm types offers various opportunities for strategizing development and extraction, though all options offer comparable chances of success. A choice of animal companion (dog or cat) rounds off the game's preliminary customization prompts. Gameplay occurs in accelerated linear time with four, 28-day seasons per year, in which a 'day' lasts about 13 minutes in real time. Though these years are a way of marking progress, *Stardew* does not incorporate levels or point systems that determine a player's success or advancement and does not have a winning state. An energy bar in the lower right-hand corner of the screen limits the amount of labor the player can perform on any given day—everything from chopping wood, watering crops, fishing, and fighting in the mines depletes the measure, while eating positive-energy food items replenishes it; if a player drains the bar completely, they become exhausted and risk fainting—an outcome which effectively ends the day and causes the player to lose a negligeable amount of in-game currency (gold, abbreviated in the game menu to "g") along with a random selection of objects in their inventory. These mild consequences amount to the harshest negative outcome in the world of *Stardew Valley*—unlike in most games, the player is never faced with the risks of losing lives, starting levels over, or being terminated. Financial precarity is also a non-issue: abundant resources are regularly available through foraging, fishing, and mining, and can be sold at the General Store or

deposited in the Shipping Bin for overnight compensation—making it effectively impossible to run out of money.

For good reason, *Stardew Valley* has received a somewhat lukewarm critical reception with regard to its environmental politics: from farming to resource management to community interaction, the game's mechanics are fraught with ideological contradictions. My intention is not to redeem *Stardew* from these particular assessments; in fact, in attending to the game's seeds, I add many observations to this ecopolitical tension. But while these inconsistencies are worth highlighting, they also present crucial loci for player interaction and critical reflection. Game studies scholars such as Patrick Jagoda and Lee-Ann Sutherland have criticized the game's effectiveness in conveying its anticapitalist ethos, arguing that despite its celebration of small-town, agrarian values, it ultimately plays back into and reifies neoliberal social structures. The moral imperative at the heart of *Stardew Valley*'s narrative is arguably more compelling than its economic one: players experience a common reticence toward the JojaMart playthrough even though said option offers significant financial advantages and despite the absence of in-game consequences either way.[25] Given the narrative framework that hinges on the rejection of cubicle culture in favor of bucolic fulfilment, choosing to assist in the corporate take-over of Pelican Town hardly seems in keeping with the gaming experience. But even making "the right choice" does not, in and of itself, translate to a playthrough that truly celebrates small community values or engenders radical politics—if anything, because it satisfies and even flatters a player's ethical experience, restoring the Community Center might dampen further critical thinking. As Jagoda contends, "at a narrative level, *Stardew Valley* may appear anticapitalist and environmentalist in its invocation of a slow and community-oriented life that leaves the office cubicle behind. The gameplay, however, though open-ended and inviting of multiple modes of engagement, suggests

a different attitude that guides the player toward fashioning a neoliberal self."[26] Though this argument is undeniable, I would suggest that it (along with many of the game's less favorable reviews) applies most poignantly to the early play experience—specifically to the first two or three in-game years. Players who remain committed for longer periods of time, on the other hand, shift into a mode of engagement that dilutes if not transcends the sociopolitical conditions that come under fire in *Stardew*'s preliminary stages. Longterm play renders financial incentives utterly obsolete; goal-oriented gameplay thus reconfigures around the many possible and diversely motivated achievement awards, side-quests, and collectible items *as well as* the pure joy of farm design/decor and the narrative evolution of relationships with NPCs. Essentially, the neoliberal self begins to lose shape in the service of creative worldbuilding.

From Community Center restoration to developing friendships with NPCs through conversation, gifts, and quests to the many town-wide events, *Stardew Valley* puts a heavy emphasis on the importance of mutual care and community building. Unfortunately, this otherwise politically potent aspect of the game rarely overlaps with its farming elements, and almost never with seeds per se. One of the major differences between Pelican Town and many municipalities with small-scale farming initiatives is the lack of an established, recurring farmer's market—a place of gathering that fosters community relationships alongside horticultural learning and food experiences, thus braiding connections between people, their local produce, and the land. The lack of such a social and cultural component in *Stardew* reinforces the game's emphasis on growing food as a means of production rather than growing community through food: as Sutherland points out, "there is no option in the game for local residents to purchase produce directly from the farm. The game thus positions local production as an amenity and opportunity for income generation, rather than a critical practice."[27] I would

complicate this statement somewhat by pointing out that the need for crops as bundle completion items in the Community Center means they do serve a narrative function beyond the purely financial, but the general argument stands. Moreover, though in-game correspondence (the player receives frequent mail deliveries) indicates that at least three NPCs have gardens (Caroline occasionally sends produce, Jodi sends fertilizer, and Evelyn sends gardening advice), none of these spaces exist on the game map. In Pelican Town, the player is the only farmer. Furthermore, not only does the act of sharing seeds not figure into the game's exchanges and progress, but also it is actively discouraged: a gift of any seed is universally disliked by NPCs, decreasing friendship by 20 points.

In relation to its political agenda, *Stardew Valley*'s eco-consciousness has come under critical scrutiny, and been found wanting. *Stardew Valley* succeeds in producing an enemy in conglomerates but fails to represent the actual hardships and complexities of small-scale, sustainable farming; "game dynamics do not allow farming to be undertaken as a political action."[28] Game scholars have identified the many oversimplifications and failings of *Stardew Valley*'s conservational ethos and argued that the player ultimately has no effect—positive or negative—on the in-game environment.[29] Sydney Crowley illustrates how the game "falsely represents resource sustainability," citing the indefinite, undepleted potential of the farmland's nutrients, the lack of air pollution from smelting and other transformative practices, and the unlimited availability of water. "These impossibly renewable resources," Crawley argues, perpetuate an "anthropocentric perspective of dominance over the natural environment"[30] that "is detrimental to the players' sense of responsibility." In keeping with its regular and hardly cumbersome weather and seasonal cycles, *Stardew* also fails to incorporate any stakes related to

climate change—the consequences of which have been impacting farmers and growers in the real world to exponential degrees.

With so many marks against it, *Stardew Valley* seems an unlikely candidate for inclusion in a critical discussion on environmentally radical texts. But though the game's politically progressive aspirations fall short, scholars agree that the affordances of its ludic parameters allow for "experimental modes of play" that open up alternative attitudes of being.[31] This phenomenon is particularly visible in *Stardew Valley*'s treatment of seeds: while seeds index *Stardew*'s ambiguous and ultimately lackluster politics, they also present catalysts for alternative modes of critical play. From their role in the game's overall farming mechanic, their aesthetic representations, and their individual narrative and algorithmic characteristics, *Stardew*'s seeds figure at the core of potential strategies to disrupt precisely the environmental quandaries into which the game seems to have mired itself.

Like the overwhelming majority of farming simulators (indeed, I have yet to encounter an example in which this is not the case), the dominant agricultural mechanic in *Stardew Valley* hinges on the purchasing of seeds for planting, growing, and harvesting, resulting in a profit that allows for the procurement of more, often increasingly lucrative, seeds.[32] The game renders this commodification graphically: seeds appear in inventory slots as seed packets rather than as material kernels, with the shiny promise of an eventual crop adorning their commercial packaging. *Stardew*'s roster of crops is expansive, though some crop types only become available in subsequent years of gameplay. *Stardew*'s agrarian model undoubtedly aligns with small-scale, local farming and gardening practices, eschewing the mechanization and biotechnology that define industrial agriculture. Many of the details proper to *Stardew*'s farming formula do loosely reflect agricultural factors in the real world: seasonality as a condition for

crop availability and growth, tilling and fertilizing as soil preparation practices, daily watering as necessary maintenance, different grow times, and even varying crop qualities (from regular to iridium, indicated by colored stars). Ultimately, though, *Stardew* does not aspire to realism, and for good reason: a casual game bent on creating an experience of whimsy and delight, *Stardew* necessarily oversimplifies actual farming practices to make its mechanics accessible to the common player.

Some examples of these generalizations are worth noting, if only because they highlight the intricacies of farming that the general population tends to overlook. For instance, the game fails to differentiate between how the crops themselves develop and grow. Corn crops are pollinated by wind, a trait that requires the cultivation of many plants in relatively close proximity—otherwise the kernels on a cob (each individual one of which must be pollinated) will be unevenly-, under-, or wholly undeveloped. In *Stardew*, a single corn plant, if watered regularly, invariably grows to maturity. Grapevines, meanwhile, are not planted from seed but grafted to climate-adapted root stock, a practice that depends on considerable skill and a keen understanding of horticulture. The importance of pollinators is likewise largely disregarded: butterflies can be seen whimsically adorning the skies while the existence of bees is implied by the option of building a honey house, but their crucial role in crop development is absent from gameplay. With this past winter now recognized as the deadliest on record for commercial honeybees in the U.S., with 60% of colonies eradicated, attention to pollinators has perhaps never been more pressing.[33] One other glaring difference—especially obvious to anyone familiar with small growing initiatives—is the lack of variety among the crop types themselves: players are limited to one kind of tomato, one kind of eggplant, etc. This distilled representation of species variation participates in the game's general oversimplification of the values at the heart

of small-scale agriculture. Heirloom seeds do not exist in *Stardew*, even though the entire game is narratively predicated on the inheritance of a farming legacy; for that matter, despite the fact that the farm has been passed down to the player by their grandfather, there seem to be no stories or teachings about the grandfather's own farming experience.

Surprisingly, *Stardew* does incorporate the possibility of converting harvested crops into seeds, though I would hesitate to call this practice seed saving. The mechanic hinges on a piece of refining equipment called the Seed Maker, the recipe for which is rewarded upon achieving Farming level 9.[34] The Seed Maker exemplifies the black box process, with its aesthetics betraying nothing about its operation or functioning. The labor and specialization required to process seeds from various plant types is completely flattened in this representation. Whereas real-world fruits, vegetables, and flowers boast a wide range of seeds per single item (a cob of corn yields hundreds of kernels, an avocado shelters a single seed), the Seed Maker reduces this difference to a constant: inputting a crop—any kind of crop—yields 1 to 3 seeds of the same variety, with a consistent average of 2. Many seed savers take great pains to single out only a crop's most exemplary produce from which to save seed, the better to select for its ideal characteristics and propagate them during the next growing cycle; *Stardew* farming mechanics do not integrate such logics of symbiotic inheritance. The Seed Maker does not discriminate between crop quality—whether regular or iridium, a crop's output is always 1 to 3 seeds, and the quality of the subsequent generation is unaffected by the parent plant's. The Seed Maker takes 20 in-game minutes to turn a crop item into a seed packet, and though this processing time is considerably shorter than other pieces of refining equipment such as furnaces or tappers, the overall strategy is far too inconvenient, time-consuming, and financially unmotivating to be worth a player's effort, unless they are multiplying highly lucrative crops.

A closer look at the distinctive mechanics and aesthetics of individual seeds, however, reveals kernels of critical potential. Compared to the game's catalogue of predictable crops, Sunflowers and Coffee are exceptional. A Sunflower crop, when harvested, produces one Sunflower *and* drops between 0 and 2 Sunflower Seeds, which can be replanted to generate more Sunflower crops over their standard eight-day cycle. Though the return in Sunflower Seeds does not quite allow a player to break even—the total seed yield is approximately 75% to 90% of flowers harvested—this unique mechanic intimates an awareness of real-world seed saving practices, even if it does not directly encourage them. Mature Coffee Crops, meanwhile, produce 4 Beans every 2 days, a yield that can quickly translate into a veritable field. Sunflower Seeds and Coffee Beans are also the only two cases in which seeds are graphically rendered *as seeds* in the game—as mentioned above, all other representations of grains are in the form of seed packets and bundles. This exception may be a factor of recognition—the black, flat, elongated shards of sunflower seeds are familiar to most, as are our habitually encountered coffee beans—but it also bears noting that these seeds are the only crops allowed to behave as seeds in a non-commodified way—both mechanically and visually.

Zooming in on specific seed types also highlights how the game's complicated and sometimes contradictory political and moral stances inflect the seeds themselves. If any seed in *Stardew Valley* articulates the commodity fetish, it is the Rare Seed. As its very designation indicates, the Rare Seed is a highly desirable and uncommon item. It can only be found at the Traveling Cart, a shop that visits the Cindersnap Forest on Fridays and Sundays, and even then, is only guaranteed to appear during the Spring and Summer seasons. The Traveling Merchant typically carries but a single Rare Seed in stock at a time, with only a 1.26% chance of higher inventory—up to 5. The Seed is priced at 1000g, but its crop (at regular quality) sells for 3000g,

making it the most profitable harvest in the game, by far (the runner-up, Starfruit, can be purchased at the Oasis for 400g and sells for 750g). Though its crop is called the Sweet Gem Berry, it is inedible—classified neither as a fruit nor a vegetable; it cannot be processed into artisanal products (wine or preserves) of any kind, nor is it a component in any recipes, used in any quests, or required to complete any standard Community Center Bundles;[35] it is thus the crop that allows the least interaction with the player, beyond the added detour involved in the shopping effort. The Sweet Gem Berry's description reads "*It's by far the sweetest thing you've ever smelled*," imparting an ethereal, unattainable aspect to the item—temptation made flesh, if indeed the Berry is flesh at all. The incorporation of the word "gem" in its name, alongside its inedible, unprocessable nature, intimate a mineral composition and recall the artificially-ascribed value of gemstones—a value derived specifically from rarity, to come full circle. The packet in which the Rare Seed comes is shaped like a pouch, deep red in color and reminiscent of the kind of rich velvet purse that one might find at a jeweler's—an aesthetic complicit in the plant's objectification. Misinformation in the Rare Seed's description further participates in the crop's aggrandizement: it claims that the seed "takes all season to grow" when in fact the plant fully matures in only 24 days… in a game packed to the brim with helpful and accurate tips and tricks available from an abundance of sources (NPCs, library books, the player's own television), this piece of misleading intel stands out suspiciously as the only instance of deception in the game—almost as though the player is being discouraged or alienated from engaging with the seed itself. In the world of *Stardew Valley*, farming the glorified Rare Seed and its precious crop ultimately produces play conditions that are purely and disturbingly transactional—so much so that I cannot help but to read this on-the-nose game element as an implicit and self-reflexive critique.

In complete contrast to the commodity-coded Rare Seeds, *Stardew* does incorporate seeds of a more whimsical nature. Fairy Seeds are perhaps the game's most overtly magical seeds, producing "a mysterious flower [in] assorted colors." Profit margins when growing Fairy Roses are, notably, in the red: the seed costs 200g while the flower only sells for 100g. What perhaps offsets this negative investment is the slight increase—from a 1% chance to a 1.7% chance—of a Fairy event, which involves the nocturnal visit of the Crop Fairy and the overnight maturation of all crops within a 5x5 area. This advantage might sound like promising compensation, but given the almost-negligeable statistics and the varied values of the fully matured crops, growing Fairy seeds truly does come down to the experience of delightful gameplay. Certain aesthetically driven players even resent the appearance of the Fairy for the disruption it causes in their otherwise symmetrical crop development. Despite its highly lucrative nature, the Starfruit Seed likewise denotes an element of playfulness worth noting: its produce, Starfruit, is an unmistakable ode to classic videogames, and to *Super Mario Bros* specifically. Its appearance highly resembles the star rewards that pepper the routes of 2D platformers, performing how videogames crosspollinate one another.

Of all the noteworthy seeds that comprise *Stardew*'s farming matrix, the Ancient Seed best indexes the contradictions at the heart of the game's ethos: though woven into the game world with a potent mythology, the Ancient Seed's narrative significance (and thus, more-than-economical relationship with the player/farmer) arguably becomes overshadowed by its commodity value. The first characteristic that sets the Ancient Seed apart is its introduction into gameplay: the Ancient Seed originally appears to the player not in the form of a sow-ready, growable seed, but rather as an artifact to be donated to the Museum (one of the game's reward-based pursuits).[36] The seed thus cannot be purchased from a vendor or received as a gift but

rather must be obtained by persistence and chance (by excavating artifact spots, successfully securing treasure chests while fishing, or breaking open artifact troves). Once handed over to Gunther, the artifact description reads: "*It's a dry old seed from some ancient plant. By all appearances it's long since dead...*" The Ancient Seed Artifact in *Stardew*'s narrative reflects contemporary society's very real fascination with unearthed objects from the distant past—from the relics and fossils that populate history museums the world over to the popular fields of archeology and anthropology, ancient artifacts have always been uniquely captivating in both fact and fiction. As discussed in this dissertation's second chapter, ancient seeds are exceptionally intriguing for their inherent potential for resurrection and growth—a phenomenon that seems almost magically to bring the dead past back to life. These instances are especially potent when the plant in question boasts a historical past that intersects with human culture; take the recently revived, 1000-year-old seed discovered in the Judean Desert and thought to be an extinct tree species that provided "a healing balm mentioned in the Bible and other ancient texts."[37] The Artifact's graphic rendering evokes a sense of understated gravitas: it appears as a small, glinting kernel that casts an improbably large shadow, arousing a prickling feeling of something more than what meets the eye. Once the Artifact is donated to the Museum, the player receives one viable Ancient Seed as well as the recipe to convert any additional artifacts into the growable seed. Though hardly indicative of the expertise proper to real-world paleobotany, the gamified and thus, oversimplified recipe nevertheless implies that some form of specialized processing is required to revive the seed from its dormant state in preparation for germination and planting. It is worth noting that even once the Artifact is resurrected into a viable seed, the plant remains known simply by the name Ancient—Ancient Seed growing into Ancient Fruit. The specimen is thus fundamentally defined by its archaic temporality. Its Fruit, vivid aqua in

color and lushly foliaged, eschews any overt resemblance to real-world counterparts, imbuing it with both a "specialty item" sheen specific to videogame aesthetics and an enchanting outlandishness. Amplifying this allure is the message displayed when attempting to plant the Ancient Seed in a Garden Pot: "Her roots grow very deep... She wouldn't be happy in there." Given that of *Stardew*'s other crops can be grown in Garden Pots, this deliberate exception lends the Ancient Seed a quasi-mystical aura—with her now-gendered, emotionally attuned, and thus personified presence, complete with symbolically resonant, significant root depth, the Ancient Seed seems almost an NPC in her own right.

Though this introductory narrative framework seems geared toward a more-than-commodified conception of the Ancient Seed, the crop's eventual, highly remunerative function in gameplay complicates this exception. The Ancient Seed's mythos—the thrill of her discovery, the fascinating mystery of her origins, and the respect for/recognition of her as a complex, sovereign entity—affectively competes with the crop's unparalleled economic potential. Not only is Ancient Fruit the third-most profitable crop in the game, but also, unlike *Stardew*'s other top lucrative crops (Sweet Gem Berries and Starfruit), mature Ancient Plants continue to produce after harvest, yielding one fruit every seven days. Fruit from a single plant can thus relatively quickly produce (via Seed Maker) enough seed for a profitable, premium monoculture—first in the Greenhouse, which allows for year-round growing, and especially once the player has unlocked the seasonally-stable and arably-abundant farmland on Ginger Island. Though it can be made into wine or preserves to increase its sale price, the Ancient Fruit itself is inedible, suggesting that the relationship between player/farmer and plant is purely commercial, rather than potentially one of mutual, embodied sustenance. As if to reify this commodified status graphically, the plantable Ancient Seed is rendered in packet form once processed from the

Artifact. If the player has obtained an Ancient Seed packet by random chance whilst using the Seed Maker, they can input it into a Deconstructor to obtain the Artifact, which in turn can be donated to the Museum collection, reducing the Ancient Seed's deep time mysteries to a black-box transaction. Ultimately, the Ancient Seed mediates both formulaic and narrative mechanics and exemplifies the complex ideological stakes at play in *Stardew*.

As these close readings show, farming in *Stardew* is at least as motivated by financial incentives as community development, a tension that manifests in one the game's play tactics: monoculture. Though early game parameters encourage the player to grow a variety of crops to complete quests and Community Center bundles, gameplay eventually trends toward monocultural farming strategies. Whereas a community-based food network such as a farmer's market would incentivize the player to grow a range of crops to satisfy demand and stimulate interest, the overnight Shipping Bin does not discriminate for variety. As Crowley points out, to deploy the most remunerative strategy, "there are no consequences for filling the farm's space with massive monocultures of the most expensive crop on the market."[38] Meanwhile, monocultured fields are easier to manage and harvest, with crops all maturing simultaneously—art imitates life keenly in this example. The game even implements an additional, desirable outcome when farming uniform crops: the possible spawning of a Giant Crop on a 3x3 grid planted with the same crop type. Giant Crops survive through all seasons and yield double the produce of all nine regular crops combined. Two Achievement Awards relate to crop sales: Monoculture, bestowed for shipping 300 units of a single crop type, and Polyculture, conferred for shipping 15 units each of the 28, seasonally specific crops; it goes without saying that the former Award is far more easily obtained than the later (though a long-form playthrough would effectively reverse this incentive, making the harder-to-get milestone more rewarding). Coupled

with the implementation of resource-rich technologies such as iridium sprinklers and forever fertilizers, the game's inevitable promotion of monoculture divorces the farmer-player from any working relationship with the land. And yet, once again, the discrepancies between this loose representation and real-world monocropping strategies are telling: *Stardew* does not incorporate different or desirable high-yielding hybrid seeds, implements such as pesticides or herbicides, or highly mechanized machinery typical of modern agriculture's toxic and extractive models. Like many of the game's ostensible ecopolitical shortcomings, the monocultural mindset only takes the game so far, eventually prompting the player to break new ground elsewhere.

Out of the Sandbox | The Metagame

The seeds of *Stardew Valley* both reify and resist its neoliberal politics, generating a procedural rhetoric that almost begs for player intervention. In contrast to this chapter's opening case studies, the conjunction of narrative and formula in *Stardew* raises the critical questions: what would it mean to resist the neoliberal, capitalist conditions taken to the extreme by *Farming Simulator* to produce alternative modes of being-in-play? How can a playing experience be both personally moving in the mode of *Mutazione* while also being grounded in relevant earthly concerns? By design, games operate through dopamine-inducing objectives and satisfactions, making radical or counterproductive modes of play difficult to fabulate or execute. As Jagoda contends, "one has the option of playing *Stardew Valley* in a relaxed or open-ended way, but everything in the world promotes instrumental actions and tight self-management."[39] Nevertheless, as a sandbox game, *Stardew Valley* offers some freedom to play, succeed, or fail as the player desires, and as such players have devised and continue to develop strategies to push the game to its limits. Most of these practices occur in the form of what gamers call a condition-based run, a challenging, predetermined set of self-imposed rules for a particular playthrough.

Relevant to this discussion is the no-seed-buying run, in which players endeavor to complete the Community Center without ever purchasing seeds of any kind (this does not take Remixed Bundles into consideration). Having not attempted this particular run myself, I have relied on the *Stardew* Wiki and various blogs and threads to compile a general description of what such a playthrough might entail. Firstly, and most importantly, it *is* possible—which for many condition-based runs, is hardly a given. Though dependent on the selection of certain options (the fruit bat cave is a must), success relies heavily on time, patience, and luck: without the immediate revenue from commercial seed farming, amassing enough capital to construct a coop and barn takes considerably longer, while clearing weeds for Mixed Seeds—and crossing one's fingers that said seeds will grow into the desired plant—is a monotonous and often disappointing process. Given that the Seed Maker only becomes available to craft at farming level 9, growing enough produce to complete the Quality Crops Bundle is likewise a daunting task. It is worth noting that the player will be forced to purchase at least a few crop items (*not* their seed, but their mature produce) at the Traveling Cart, since Mixed Seeds will never grow into Green Beans, Blueberries, Red Cabbage, or Tomatoes—items which may take years to grace the Merchant's inventory. All in all, such a run incorporates many of the challenges that real-world, small-scale farmers and gardeners face: trial, error, and failure, tedious and repetitive labor, and significant time investment. Perhaps most importantly, such a playthrough develops a keen, critical awareness—and with it, a healthy skepticism—of the comparative ease of commercial farming. As Jagoda reminds us, "the limits of videogame form and its history do not necessarily foreclose experimental modes of play."[40]

Though designed to test and even to break down traditional parameters of play, condition-based runs are ultimately bounded by what is possible in the game, and as such the

master's tools win out. And yet, such exercises also make visible tools that may otherwise have been underestimated or unrecognized. Approaching seeds in *Stardew Valley* with a political, counter-capitalist agenda highlights the many, subtle ways in which the game incorporates and thus instills ecoconscious logics. Foraging, a somewhat overlooked, or at least, under-considered, element of gameplay exemplifies this potential. At first glance, foraging is a rather simple operation in the game's overall set of tasks. Foraged goods are crucial to a brand-new player's early success and advancement: they are by far the fastest and easiest way to complete Community Center Bundles at the start of every season, and to make a little extra cash when gold is tight. As one of the game's proficiency skills, meanwhile, foraging confers upon the player various crafting recipes and potential bonuses as their level increases. But foraging becomes increasingly less profitable as the game progresses. As Jagoda explains, "min-maxing" becomes the strategy par excellence for effective advancement in *Stardew*:

> In video game culture, this term describes a process by which the player seeks to derive an equation or algorithm to minimize inefficiency and maximize the acquisition of points and skills (or to turn to crowdsourced online wikis that accumulate shared knowledge about the most efficient modes of gameplay). Especially once one has settled into its world, rules, and range of minigames, *Stardew Valley* invites optimization at every turn. Given the limited time that makes up each day in the game, it is to the player's advantage to chart their daily path, save and reinvest earnings, and plan ahead to complete the maximum number of objectives.[41]

With their low sell price and generally unpopular gift value, foraged goods are hardly worth going out of one's way to collect, even when they appear nearby onscreen: most players simply ignore the item rather than diverting course when the clock is ticking and inventory slots are dear. Increasing one's foraging skill level is accomplished by other, more lucrative activities, such as chopping trees for wood—an activity that produces resources far more valuable for game advancement.

Even though efficient gameplay fails to promote foraging as a worthwhile activity, the potential inherent in *Stardew*'s foraging logic—and particularly indexed in the existence of Wild Seeds—conveys one of the game's more politically radical and environmentally conscious modes of being. Wild Seeds are packets of seasonally specific seeds that grow into foraged goods within 7 days of planting; harvesting the mature crops adds experience points not to Farming but to the Foraging Skill. Packets of 30 Wild Seeds are the rewards for completing the Community Center's Foraging Bundles, which offers a nice boost to a player's cropland. But what sets Wild Seeds apart is their status as the only craftable seeds in the game. As the player reaches higher skill levels in Foraging, they learn the crafting recipes for Spring, Summer, Fall, and Winter Wild Seeds: combining four (three, in Summer) specific foraged items results in ten Wild Seeds. Not only does this represent a much higher produce-to-seed return than Seed Maker outputs, but also the player is able to craft the Seeds themselves, without the need for additional refining equipment. This practice offers a representation of how acquired skills and knowledge come from hard work and experience: the crafting recipe comes with increased foraging skill, while the process is hands on—a learned art—rather than machine dependent. The recipe requires a combination of different plants, and though this can be chalked down to challenging game mechanics, it also mirrors the crucial and very real species diversity that undergird wild ecosystems, and the symbiotic relationships that must be nourished and maintained to propagate them. Moreover, Wild Winter Seeds are the only crops (besides the recently introduced Powdermelon) that can be grown outside during the otherwise barren season, a characteristic that showcases the importance of climate-adaption and highlights the Winter hardiness of wild, edible plants. For dedicated gardeners and homesteaders, and for seed savers especially, foraging practices represent not just a complement to organic food sources but also a deep relationship

with and carefully acquired understanding of prairie and wooded environments. In the face of higher maintenance costs and destructive landscaping chemicals, more and more efforts are being made to rewild extensive areas of manicured lawn both public and private—an environmental transformation grounded in the specialized knowledge of foragers and land stewards. While sowing a *Stardew* farm with foraged, Wild Seed may not directly deploy these politics, the inherent logics of Foraging practices in the game convey many of the concerns at the heart of climate care in real world setting, and exemplify Chang's imperative to consider the messy, indistinct edges of gameworld dynamics.

Stardew Valley activates the tension between formula and narrative by mingling recognizable systems and immersive storytelling, and interpellates players and their environment while also deploying the flexibility to criticize failings, to challenge existing paradigms, and to do things differently. As Bogost contends, "if persuasive games are videogames that mount meaningful procedural rhetorics, and if procedural rhetorics facilitate dialectical interrogation of process-based claims about how real-world processes do, could, or should work, then persuasive games can also make claims that speak past or against the fixed worldviews of institutions like governments or corporations."[42] This dynamic emulates what it means to conceive alternative modes being in relationship and mimics how seeds invite alteration, play, iteration, creation, critique, and community. This is the procedural rhetoric of seeds.

These instances of procedural rhetoric reflect the myriad ways in which play and gardening are entwined *within* the game world of *Stardew Valley*. But panning out to consider the affordances of the videogame form exposes a metagame parallel between gardening and gaming. All media comprise unique narrative paradigms, but games boast one dynamic that is exceptional: their very structure is subject to manipulation by the player. I am not referring, in

this statement, to the process by which players develop unique game worlds and narrative progressions through their cumulative in-game choices; rather I wish to highlight the practice, employed by certain dedicated gamers, of generating specific events and desired narrative trajectories through the pre-selection of "random seeds." These players, I argue, are the game's true gardeners: they have learned how to cultivate the gaming experience of their choosing through considerable time commitment and in-depth attention as well as community-based exchange of information and mutual assistance. These gardener-players grow not the seeds in the game, but the seeds of the game itself.

Though fairly ubiquitous and certainly old hat for programmers, random seeds are an unfamiliar concept to most people. Informatics comprise the bulk of our world systems. This infrastructure of code and formulae executes various functions, some of which necessitate random values to perform effectively—security and encryption being the most salient examples. But computational systems are deterministic—structured according to a set of rules—and thus cannot generate true randomness; instead, programs mimic randomness by imputing a specific number—the seed—into algorithms that yield sequences complex enough to do the job. The resultant numbers are almost impossible to predict or decode, unless the seed itself is known.

In gaming, random seeds generate the seemingly infinite possible events and elements that make up a player's experience. According to game forums, there are four billion possible game seeds in *Stardew Valley*—and thus four billion possible combinations of generated circumstances;[43] this translates to the quality and frequency of mineable and forageable items on various tiles throughout the map, the location of ladders, ore, and prized items in the mines, the contents of mystery boxes and geodes when broken open at the blacksmith's, the presence of bubbles (which indicate prime fishing spots) in various bodies of water, items found in

trashcans… the list is practically endless. As these examples indicate, random seeds articulate the lattice of variation that underlies and produces the rewarding gaming experience at the intersection of luck and perseverance. They make it worthwhile not only for a player to engage in long-term gameplay, but also for them to play the game again and again from the outset, with the promise of diverse outcomes. But *Stardew Valley* comprises a handful or so of events and items that are both truly rare and precious, both financially and phenomenologically: the arrival, following a meteor event, of an iridium meteorite on the farm (which yields ore upon opening), the availability of certain rare items for sale at the Traveling Cart (the purchasing of which hastens Community Center restoration), nocturnal visits from the Crop Fairy (whose dust causes crops to mature overnight) or the Witch (who may deposit a void egg in the coop), the sudden appearance of the Stone Owl (which serves absolutely no function besides adding whimsy and mystery to the game), and the possible early acquisition of Ancient Seeds (which, as already discussed in this chapter, is both satisfying and remunerative). For some dedicated gamers, these highly sought-after experiences are too important to leave to chance; instead, talented programmers amongst the game's afficionados have dug down into the source code to unearth the seeds that generate these unique possibilities, circumstances that said gamers can cultivate and exploit into the game of their deliberate and careful choosing. Specific world seeds for all the above occurrences have been identified and widely shared; for instance, imputing seed code 281191250 results in the presence of Ancient Seed artifacts buried around Linus' tent early in the game.[44] *Stardew Valley* speedrunner Bla_De[45] has even developed an RNG (random number generator) prediction tool that allows players to input their own game seed and obtain a complete projection of randomly generated elements in their game.

The practice of playing *Stardew Valley* from the origin point of a selected world seed mimics the practice of gardening: it involves community sharing of seeds, attention to and recognition of the specific characteristics of unique seeds, the integration of reproducibility and iteration. Digging through databanks to find the perfect world seed becomes akin to digging through seed banks to find the ideal variety. I do not mean to suggest that this particular approach to gameplay is superior; I personally shy away from such practices, preferring to enjoy play within the set game parameters (or as gamers call this, playing vanilla-style). But with an axis on informed precision and community collaboration, the practice of selecting and sharing seeds to curate specific and sought-after experiences of gameplay is a potent model for heirloom seed cultivation and stewardship. Like gardening, gaming represents a synergistic relationship between program and player. If mindless media consumption is akin to thoughtless food consumption, engaged play better mirrors intentional and reciprocal relationships with food.

Some may argue that this strategy is a form of cheating, but there is no such thing, especially with a game like *Stardew Valley*, as playing the game *as intended*: creator/developer Eric Barone has made the source code freely available and has encouraged alternative modes of play. Indeed, this play tactic is but one of many community-developed strategies, such as the already-discussed condition-based run and the creation and use of mods. Videogame modding involves the practice of rewriting or editing sections of the game's code to modify certain aspects of gameplay—its aesthetics, rules, map regions, components, characters, etc. These mods are often created by players or fans and downloaded and integrated to enhance or alter the playing experience. There are over 20,000 *Stardew Valley* mods currently in existence.[46] Some noteworthy ones for this discussion include the integration of a weekly farmer's market, the addition of a tractor, the extensive expansion of the game's crop and flower catalogues

(reflecting international cuisine preferences), and a greenhouse upgrade.[47] Along with an unimaginably comprehensive compendium of information for the basic game of *Stardew Valley*, the above-mentioned, player-generated enhancements, modifications, challenges, and conditions are exhaustively recorded and continuously updated on the official *Stardew Valley Wiki:* https://stardewvalleywiki.com/Stardew_Valley_Wiki. This extensive online encyclopedia along with its player community, their many derivative discussion forums, and the ever-expanding web of activity thus enabled comprise *Stardew Valley*'s metagame.

As game scholars Stephanie Boluk and Patrick Lemieux theorize in their landmark text, *Metagaming*, the concept of the metagame comprises everything that emerges into being when games are played:

> From the position in front of the television, posture on the couch, and proprioception of the controller to the most elaborate player-created constraints, fan practices, and party games, metagames are the games created with videogames. From popular mods to ironic parodies and from fan fiction and forum discussion to the latest trends made famous by professional players, metagaming functions as a broad discourse, a way of playing, thinking, and making that transforms autonomous and abstract pieces of software into games and turns players into game designers.[48]

Boluk and LeMieux articulate the metagame as a way to resist the "widely held, naturalized system of beliefs that conflates the fantasy of escapism with the commodity form and encloses play within the magic circle of neoliberal capital."[49] As they explain, "in the same way that the British land enclosure of the eighteenth century transformed public land into private property, so too has the videogame industry worked to privatize the culture of games and play"—an equivalence that mirrors the commodification of seeds through industrial agriculture.[50] If the metagame can eschew the constraints of such market logics through unprofitable practices, independent communities, and experimental modes of play, perhaps this model can offer a similar alternative for theorizing seed media. At its most basic level, a seed is a material,

biological complex of processes-yet-to-unfold; in our current era of proprietary farming, it is also primarily a commodity—much like the reduction of videogames to products under neoliberal capitalism. Juxtapose the metagame, however, and gamers become gardeners: the extensive *Stardew* Wiki becomes analogous to the farmer's almanac and the seed catalogue; gaming forums and discussion boards mirror the stories and conversations shared among gardeners and farmers both in the present day and throughout history; fan art echoes seed art; LAN parties and gaming gatherings parallel seed swaps, farmers' convergences, and gardening socials; gaming conventions correspond to farming conventions, etc. etc. The use of "meta" in this argument brushes up against the category of "para" in literary theory, wherein a paratext indicates anything adjacent, contextual, or contiguous to a text—in narratologist Gerard Genette's terms, "on the threshold"—rather than a second-order reflexivity. The key difference arises from the videogame form and, I argue, the seed media form, in that both phenomena are inherently interactive processes all the way down—in a sense, the videogame always already interpellates the metagame, or it would not be playable, just like a seed (material or symbolic) is ontologically bound up in its potential for growth.

Each in their own way, this dissertation's media-specific chapters borrow from media models to expand and redefine conceptual frameworks for seeds; perhaps no chapter is as successful in this transference as this one, wherein the metagame interpellates the metaseed. What is a metaseed? If a metafilm is a film about a film and a metagame is a game about a game, what is a seed about a seed? As this dissertation has argued, seeds are not just seeds, but rather a nexus of material, historical, political, geographical, and cultural conditions and relationships coalescing in dialectic process. Seeds, as has been exhaustively demonstrated, operate ideologically concurrently with their biological functions: the material processes of suspended

stasis, dissemination, growth, renewal, symbiosis, that comprise a seed's earthly experience are all reflected by and enhanced through its symbolic and rhetorical significance. If a metagame is "a signifier for everything occurring before, aft er, between, and during games as well as everything located in, on, around, and beyond games … anchor[ing] the game in time and space," the metaseed likewise articulates the temporal and spatial context in which a seed exists.[51] In fact, the term meta, by definition, resembles much of the critical discourse surrounding both media and environmental relationships that have coursed through these discussion: "Based on the ancient Greek preposition μετά, meaning 'with,' 'after,' 'between,' or 'beyond,' the prepositional origin of the prefix meta- continues to characterize its modern use."[52] Thinking with seeds has opened up new approaches to thinking about videogames, while concepts from videogame studies—compounded in the metagame—provide the critical gateway to conceptualize the metaseed, and model how the structures and contexts that surround seeds are inextricable from the seeds themselves. A metaseed is what emerges from "being with" and "becoming with" a seed in the world: an idea, a movement, a mode of existence full of seedlike promise and potential.[53] The metaseed comprises the farmer's almanac, the seed catalogue, the communities of growers across generations that have and continue to share seeds and their stories, and many more radical lifeworlds and critical discourses—including, I hope, this dissertation.

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[1] Though the field of videogame studies has ballooned since the millennium, the first academic publications to take the form seriously date from as recently as the late 1990s, with Espen Aarseth's *Cybertext: Perspectives on Ergodic Literature* (1997) and Janet Murray's *Hamlet on the Holodeck: The Future of Narrative in Cyberspace* (1998) often credited as foundational texts.
[2] Krishan Arora, "The Gaming Industry: A Behemoth with Unprecedented Global Reach," *Forbes*, Nov. 17, 2023. https://www.forbes.com/councils/forbesagencycouncil/2023/11/17/the-gaming-industry-a-behemoth-with-unprecedented-global-reach/
[3] Patrick Jagoda, *Experimental Games: Critique, Play, and Design in the Age of Gamification*, University of Chicago Press, 2020, 4.
[4] Ibid., xi.
[5] Alenda Chang, *Playing Nature: Ecology in Video Games*, University of Minnesota Press, 2019, 4.

[6] Ian Bogost, *Persuasive Games: The Expressive Power of Videogames*, MIT Press, 2007, ix.
[7] https://navdanyainternational.org/what-is-missing-from-the-climate-debate/
[8] Ibid., 159.
[9] Kohler, Chris, "The 15 Most Influential Games of the Decade," *WIRED*, Dec, 24, 2009. https://www.wired.com/2009/12/the-15-most-influential-games-of-the-decade/
[10] Ibid., 2.
[11] Bogost, 46.
[12] Ibid., 45-6.
[13] Chang, 14.
[14] Seth Giddings, "Simulation," *The Routledge Companion to Video Game Studies*, Edited by Mark J.P. Wolf and Bernard Perron, Routledge, 2014, 259.
[15] https://www.nifa.usda.gov/grants/programs/precision-geospatial-sensor-technologies-programs/precision-agriculture-crop-production
[16] https://farming-simulator.com/mod.php?mod_id=238269
[17] https://www.gates-game.eu/en
[18] Hardly any biographical information is available for this online streamer, and I thus cannot say whether he (male voice, British accent) has any first-hand farming experience or background to back up this statement; if he does not, then this review testifies to the fallacy of immediacy that rigid simulators tend to instill in their players.
[19] RedcoatViking, "Review of *Farming Simulator 22*," YouTube, Accessed 18 March 2023. https://www.youtube.com/watch?v=O4eikzmaY8w
[20] Jagoda, 9.
[21] Clara Fernández-Vara, "Adventure," *The Routledge Companion to Video Game Studies*, Edited by Mark J.P. Wolf and Bernard Perron, Routledge, 2014, 232.
[22] Ibid., 233.
[23] https://store.steampowered.com/app/1080750/Mutazione/
[24] Patrick Jagoda, "Playing Through a Serious Crisis: On the Neoliberal Art of Videogames," *Post45*, March 2020. https://post45.org/2020/08/playing-through-a-serious-crisis-on-the-neoliberal-art-of-video-games/
[25] https://screenrant.com/stardew-valley-joja-co-member-year-achievement/
[26] Jagoda, *Experimental Games*, 68
[27] Ibid., 1163.
[28] Lee-Ann Sutherland, "Virtualizing the 'good life': reworking narratives of agrarianism and the rural idyll in a computer game," *Agriculture and Human Values* vol. 37 (2020), 1168.
[29] Laura op de Beke, "Pastoral Videogames: Industry, Entropy, Elegy," *Ecocene: Cappadocia Journal of Environmental Humanities 2*, no. 2 (December 2021): 177-91.
[30] Sydney Crowley, "Playing farmer: At the intersections of neo-liberal capitalism and ecocriticism in *Stardew Valley*." *Journal of Gaming & Virtual Worlds* vol. 15, no. 1 (2023), 31.
[31] Jagoda, 71.
[32] With a few exceptions: seed packets are occasionally gifted or rewarded, and Mixed Seeds, which grow into a random assortment of seasonal crops, will sometimes spawn whilst clearing weeds
[33] Kerry Klein, "What we know about the big bee die-off this year," *NPR*, April 7, 2025. https://www.npr.org/2025/04/07/nx-s1-5345855/what-we-know-about-the-big-bee-die-off-this-year
[34] The Seed Maker is also the reward for completing the Dye Bundle and occasionally appears in the Skull Cavern.
[35] As of update 1.5, players can opt to remix the Community Center Bundles at the beginning of play; one of these remixed bundles—the Rare Crops Bundle—lists the Sweet Gem Berry as one of two options to complete, the other being the Ancient Fruit.
[36] The exception to this rule is a 0.5% chance of an Ancient Seed being produced in a seed maker, regardless of the input crop.
[37] https://www.cnn.com/2024/10/03/science/biblical-tree-ancient-seed-tsori/index.html
[38] Crowley, 31.
[39] Jagoda, 70.
[40] Jagoda, 71.
[41] Jagoda, 70.
[42] Bogost, 57.
[43] https://forums.stardewvalley.net/threads/expanding-game-seed.5733/#:~:text=Farmer-,Feb%2020%2C%202021,game%20seed%20can%20cause%20issues.
[44] https://gamerant.com/stardew-valley-best-world-seeds/

[45] (https://www.twitch.tv/bla_de)
[46] https://www.nexusmods.com/stardewvalley/mods/?BH=0
[47] Farmer's market: https://www.nexusmods.com/stardewvalley/mods/11617; tractor: https://www.nexusmods.com/stardewvalley/mods/1401; crop expansion: https://www.nexusmods.com/stardewvalley/mods/19508/; greenhouse upgrade: https://www.nexusmods.com/stardewvalley/mods/30219
[48] Stephanie Boluk and Patrick LeMieux, *Metagaming: Playing, Competing, Spectating, Cheating, Trading, Making, and Breaking Videogames*. University of Minnesota Press, 2017, 9.
[49] Ibid., 8.
[50] Ibid., 8.
[51] Ibid., 11.
[52] Ibid., 9.
[53] For more theorizing of the concept of "being with" see Alexis Pauline Gumbs on citing Black feminist scholars: https://www.youtube.com/watch?v=JNf8XMg2a7Q (minute 14:40) and Robin Wall Kimmerer on "being with" as a mode of reciprocity in *Braiding Sweetgrass.* For more on "becoming-with" see Donna Haraway's *Staying with the Trouble* Chapter 1.

CODA | FURTHER SEEDING

Among its many scattered arguments and dispersed readings, this dissertation advances three central claims: 1) seeds are cultural objects—texts worthy of humanistic consideration—and scholarship that attends to them as such complements incomplete seed archives in a time of climate crisis; 2) representations of seeds resemble the media in which they are embedded, and vice-versa: seeds are screened, read, and played; such critical assessments expose untapped affordances of said forms, while media-specific concepts applied to seeds offer new frameworks for understanding seeds in turn; and 3) the concept of seed media comprises a methodology, a dialectic, and an emergent form—an engaged research practice and relational process in which this project participates. Though not referenced outright across the chapters, said methodology also integrates a material practice: much of this dissertation is heavily inflected by my fieldwork at Seed Savers Exchange in Decorah, Iowa.

Seed Savers Exchange (SSE) is a nonprofit organization dedicated to the preservation, stewardship, regeneration, and distribution of heirloom and rare seed varietals in the United States; it is one of the largest non-governmental seedbanks in the country. With a mission dedicated as much to environmental conservation as to socio-cultural engagement, SSE is an important model to follow in a time of climate crisis. In the Summer of 2022, I spent three transformative months delving into heirloom seed archives and learning how to grow out a selection of said seeds for posterity (preparing garden beds, starting sprouts, weeding, mulching, hand pollinating, watering, harvesting, among so many other, seemingly insignificant but crucial tasks). Many of the close readings that pepper these pages would have been impossible without the knowledge and perspectives I gained from this experience. But more than that, my thinking about seeds changed—or more specifically, it evolved into a relationship. Akin to an intensive

language immersion, my internship at SSE expanded my ability to read seeds in their environment(s), whether mediated or real-world. It became clear that, though critically fruitful, a strictly theoretical consideration of seeds amounted to an incomplete approach, and getting my hands dirty continues to be a crucial component of my research. As W.J.T. Mitchell argues, "no theory of media can rise above the media themselves … what is required are forms of vernacular theory, embedded in media practices."[1] This drastic shift in perspective—toward an integrative practice *of* the humanities rather than *about* the humanities—would not have been possible without the incomparable generosity, expertise, patience, and enthusiasm of those seed historians, experienced farmers and growers, and environmental educators with whom I worked. Decorah is home not only to SSE but also to several local farming initiatives that mobilize alternative and queer strategies to carve out radical possibilities for small-scale, sustainable agriculture and community food networks. Elevating and disseminating the cultural legacies and traditions of these seeds and their stewards, especially in a time of climate crisis, is a necessary practice in the context of environmental justice and food sovereignty.

I have been lucky in my chosen dissertation topic for another noteworthy reason: it turns out that most people—regardless of background or profession—have something to say about seeds. The unexpected (at least at first) engagement and keen interest of my interlocutors has resulted in a lengthy catalogue of seed-related case studies, artworks, scientific achievements, and cultural interventions that far exceed the scope of this dissertation, but that have nevertheless catalyzed my thinking and heightened my wonder about seeds as this project progressed. As suggested further reading, this coda offers a series of seed media vignettes that take up some of these seed histories, creative endeavors, and personal experiences to showcase the emergent potential of humanistic encounters with seeds in the real world. To kick us off, a story.

Once upon a time (sometime in the early 1800s), in a land far, far away (the Appalachian Mountains of Lee County, Virginia), a man named Absalom Hobbs came upon a goose trapped in his barn and shot it. While preparing the fowl for dinner Hobbs noticed the bird's enlarged crop (a muscular pouch on its throat) and proceeded to discover a handful of strange beans therein. Fairly small, creamy white with a deep burgundy blemish, the beans were unknown to Hobbs or the neighboring farmers. He planted these treasures the following season and reaped a harvest of buttery beans that soon became a family and community favorite. The bean was passed down through generations of Hobbs gardeners and currently is stewarded and sold by a handful of heirloom growers and small-scale companies in the United States, including Seed Savers Exchange.

The story of the Hobbs Goose Bean resonates with a certain magical quality, perhaps because we are no strangers to the idea of beans as enchanted objects. "Jack and the Beanstalk" is a prime example of beans appearing in traditional folklore.[2] The story of "Jack and the Beanstalk" has manifested in several formats and versions over time; it first appeared in print in 1734, in the form of an English skit called "The Story of Jack Spriggins and the Enchanted Bean." As with much folklore, early iterations of the tale are said to be less moralizing and less suited to children. Though with variations on motifs and plot points, the basic narrative arc of "Jack and the Beanstalk" involves an impoverished young male protagonist who gains access to a giant or ogre's abode, followed by the thrilling trials against and eventual triumph over said villain. Jack's series of thefts from the giant and his eventual assistance from and marriage to the ogre's female counterpart (servant/wife/daughter) are the developments of later accounts. No matter the story's evolution or alternations, the magic beanstalk features as a prominent narrative element. Colossal and fast-growing, the beanstalk is an unexpected and fortunate twist after a

moment of poor decision-making—Jack's foolish acceptance of beans as payment for the family's last cow. Penniless and out of options, Jack's next move—and the only action that might drive the tale forward—is to plant the beans in question. And lo, the magic beanstalk grows, offering a path upward to another realm, thus developing the plot both toward its peripeteia and its fairy tale genre.

Interestingly however, the beanstalk is never considered for the abundant potential of its harvest, despite the fact that hunger and food scarcity are at the heart of the main characters' plight. Of course, were Jack simply to collect the beans for consumption and/or sale, there would be no narrative arc, no rising action, no denouement, no tale whatsoever. It is no wonder, then, that the protagonist engages the beanstalk solely as a means of otherworldly access—not as food source but as vector for storytelling. Though the magic beans at the heart of the tale did not originate from the gullet of a goose, the phenomenon of the Goose Bean—and the oral and written lore that necessarily contextualizes it—derives and reinscribes a similar sense of narrative wonderment. The Hobbs Goose Bean is special, but hardly unique: it is but one instance among many that involved the salvage of beans from the crops of bagged geese. The Mostoller Wild Goose Bean, the Goose Gullet Bean, Goose Cranberry, Canadian Wild Goose, Goose Pole… these beans are all different in size, appearance, and taste, but they have in common the enchanting lore of their discovery—it is their origin stories that make them exceptional. None of these beans, it should be noted, were ever traced back to their so-called "natural" habitats—where the geese foraged and fed remains a mystery. Fairy tales, like Goose Beans, are transgenerational by design—structurally and morally enmeshed in an active tradition of storytelling and stewarding.

The Soldier Bean offers an adjacent case study that exemplifies how seeds both index and produce culture. The Soldier Bean is an heirloom bush bean of European origins cultivated in New England since the 17th century. They are white with a Rorschach-like saddle (the term for a colored marking) that resembles an antique toy soldier, and as such these beans became associated with American patriotism during the Revolution. But despite its national significance, the soldier beans of New England have many a doppelganger around the globe. The Polska fasola z orzełkiem, or Polish Eagle Bean, played a significant role in the country's history under Russian domination: with its distinctive eagle-like marking and red-on-white color scheme, the bean became a powerful symbol of Polish patriotism and resistance, so much so that its cultivation was prohibited by Russian invaders; it was grown clandestinely among potato plants, and survives to this day. In Italy, a white bean with a red blotch in the shape of the Virgin Mary is a celebrated addition to many a local dish. Brazilian cuisine likewise counts among its beans a white specimen with a red image, recognized and revered as the likeness of the Holy Ghost. According to Seed Savers Exchange's Seed Historian Eduardo Fernandez, these are all, in fact, the same bean. Through centuries of stewardship and migration, these beans have come to mean very different things for different peoples: they are cultural media par excellence, signifying symbolically according to national and religious contexts around the world. Soldier Bean, Eagle Bean, Virgin Mary Bean, Holy Ghost Bean—though this bean may be the same varietal with the same genetic and growth characteristics, it is not the same bean across these different cultural contexts: biologically identical, phenomenologically distinct.

Artists and designer have both recognized and reckoned with this potential of seeds as storytellers and historical records. Sculptor-miniaturist Sergey Jivetin's *Furrow* project, underway since 2016, is an endeavor to memorialize the stories of seeds by etching miniature

hand engravings into the seeds themselves.[3] Jivetin has carved minute designs into hundreds of seeds and seed pods to enrich the strength of domesticated plant relations and to commemorate the efforts and histories of seed stewards and growers, which he believes are embedded in every seed. Honoring and preserving biodiversity by unearthing these relations and stories and making them visible are the purpose of his project.

Jivetin's art occurs at the intersection of performance, materiality, and philosophy. He engages in active dialogue with his audience and develops the designs and compositions as the stories and meanings unfold through conversation and connection. Jivetin cites people's "deep, subconscious connection to seeds" and describes this process not as an artificial imposition of stories unto seeds but rather as an organic revelation of the stories the seeds are manifesting. For Jivetin, seeds are not merely a canvas—they are "a living medium."[4] As such, an important dimension of his work is the continued viability of the seeds themselves: taking inspiration from stratification and scarification techniques used for centuries by farmers and growers to speed up and increase germination rates, Jivetin presumed correctly that etching images into seed coats would not only leave the seeds unharmed but also promote their eventual sprouting. He describes this aspect of his project as a conceptual and physical anchor of his intervention within the life cycle of the plant, extending farming practices into artistic practices. He encourages the planting of these minutely-motiffed kernels, such that their stories can continue—quite literally—to proliferate.

An etching done for the Staten Island Museum in 2019 exemplifies this philosophy; it was executed on a Pin Oak Acorn collected from a rare hybrid oak that has stood on the grounds of the museum since its establishment. This oak holds particular significance to the museum curators for the connection it embodies to the institution's founders—a group of 14 naturalists

who, in 1881, began to advocate for environmental preservation long before climate change was on anyone's radar. To tell this seed's story, Jivetin proposed a design of a historical timeline, a series of strata that he describes as "layers that create evidence of what came before." The oldest date, 12,000BC, corresponds to the estimated first appearance of Indigenous settlements on the island. More recent markers denote important dates to the Museum: its establishment, relocation, and the death of its founder.[5] This choice of design activates a sort of genealogical mise-en-abyme, wherein the cumulative ancient history of the earth on which the oak grows now becomes etched into its seed, a process that then precipitates the seed's own growth and entanglement into the soil. Concepts of scale become challenged by the contrast between the vast timelines and deep dimensions of actual geological strata against the ephemeral existence of the all-too-meaningful etching and the actual minute size of the micro-engraving as well as of the seed itself. Jivetin's piece both symbolizes and participates in the ongoing relationship between land, seed, and human.

But Jivetin's depiction of strata in seeds is more on point than perhaps he knew. We think of geological strata as the record par excellence of the earth's long history, wherein mineral layers preserve the evidence of the planet's climate and environment—an index not unlike that of tree rings. But trees have another way of materially anchoring time: seeds. In an attempt to determine the climate of ancient, interglacial summers, award-winning geobiologist Hope Jahren analyzed the composition of a hackberry seed—a hardy tree native to and widely found in North America—in the hopes that some chemical record would provide evidence of environmental conditions of millennia past. What she found is scientifically and, I argue, metaphysically astonishing: one of the rock-hard layers that comprises the inner, protective shell of the seed kernel is, in fact, made of rock—made of opal, to be precise. To be clear, the shell is not just

opal-like, or as hard as an opal—the chemical composition of this lattice is truly that of the mineral opal.[6] Scientists have yet to determine how trees are capable of reproducing geological processes that occur in extreme conditions over several million years, but Jahren is able to mine this stratum for climate data of eons past. This innovative index of deep time expands the ways we might think about sedimentation and where it occurs. Tangentially, the seed opal also subverts commodity culture's ascriptions of monetary worth. Interdisciplinary artists and environmental activist Jenny Kendler poses this challenge with her piece "Heirloom," a Hackberry Opal Necklace that she created in honor of Hope Jahren's discoveries. With this necklace she hopes to ask whether we might "reconsider shifting our systems of value, away from 'precious' gems and metals—traditional markers of capital—to biodiversity itself."[7] These case studies together complicate and expand the paradigms of seed temporalities and offer alternative models for chronopolitics under conditions of neoliberal extraction and climate emergency, from excavated geologies to excised genealogies.

If the abovementioned artists engage in the project of excavating the historical, political, and ideological impacts of seeds, the gardeners and growers who steward and renew seeds co-constitute such paradigms. The practice of seed saving is inextricable from the act of storytelling, and such stories are ripe for dissemination in turn. I recently had the pleasure of meeting Peg Davis, a farmer from Virginia's Shenandoa Valley who has predominantly grown heirloom tomatoes for over 30 years. Her flagship tomato is named after her: called Peg O' My Heart, it is a vibrant red slicer, a mouthwateringly meaty specimen just the right size for a sandwich. Saving seed from tomato is an involved process: the tomato must overripen on the vine such that the gelatinous coating surrounding the seeds begins to break down. Once the tomato is picked, the seeds are fermented, cleaned, dried, and stored for the following year's planting. To ensure the

finest future crop, only the best tomatoes are selected for seed saving. In describing this ritual, Peg notes how "it's really hard because it's always the most beautiful perfect tomato, and you can't eat it, and you can't sell it." Saving seed from tomato is a sacrificial practice: every year, the best tomatoes go untasted in the service of the following year's bounty. While the perfect tomato is thus ever unattainable—a perpetual promise for the future in honor of the past—every year the tomato tastes just a little better, like a game that can never be beaten but is always rewarding to play, and to replay. This model resists the capitalist happy ending, the neoliberal instant gratification, the pure commodification of a tomato: Peg and her tomato comprise a synergistic relationship of mutual reciprocity.

Among the many avid gardeners and growers whom I have had the privilege to encounter in Decorah, none have demonstrated the passion and commitment to the practice of seed saving like David Cavagnaro, SSE's founding Preservation Director. With his perpetual efforts to collect and disperse native prairie seed in the area, both in partnership with local organizations and businesses as well as on his own two, 82-year-old legs, David has quite literally changed the landscape. David once lamented to me that he had been gifted a beautiful landrace that he proceeded, unintentionally, to ruin. The seed was called the Black Mitla Bean and had been grown in Oaxaca for some 10,000 years. Like heirloom seeds, landraces are domesticated and locally adapted. The difference between a landrace and an heirloom (generally speaking—these terms are hardly scientifically enshrined and often used interchangeably) is that an heirloom seed has been bred to be stable or true. In other words, plants grown from heirloom seeds are consistent with previous generations and present a fairly uniform crop. In contrast, landraces are cultivated to retain phenotypic diversity such that a single crop will display myriad characteristics and behaviors, allowing at least some of the crop to withstand the unexpected, to

survive and thrive regardless of environmental conditions. In Oaxaca, seasons vary greatly: very dry to very wet, with fluctuating temperatures and sun exposure, and unpredictable cycles of pests. The Black Mitla Bean in its landrace form is a semi-runner mix (meaning it will climb as well as proliferate near to the ground), with husks that range in texture and thickness. Depending on a season's climate, part of the crop will do well while another part fails; as such, the Black Mitla Bean may not abide by capitalism's optimized models of growth and production, but it will always yield something. When David proceeded to grow out the Mitla Bean, he selected for seed pods that were easily processed and that flourished in his dry California region: eschewing pods from runners, David saved leathery pods from the low-growing, bushier plants. Over time, the Bean produced exclusively such bush plants. In California, this meant a more consistent, productive yield, but David had unwittingly bred out the Bean's ability to adapt to a broad swathe of conditions—essentially and irrevocably diluting it to a varietal that is Black Mitla Bean no longer.

Especially in a time of increasing climate unpredictability, landraces and the genetic potential they represent are crucial to the protection of our food systems. But this story is more than just another argument for agrobiodiversity in a time of environmental crisis. The Black Mitla Bean is a powerful reminder that failure is circumstantial rather than empirical: the part of the crop that does poorly, even year after year, might be the next season's saving grace. This seed lesson teaches us to reassess what appear to be impediments, glitches, collapses—to reconsider our own failures and the standards by which we measure them—and to ask whether these might not be possibilities, breakthroughs, and triumphs in a different light. It is a lesson that finds its echoes in disability studies, game studies, queer theory, and experimental design, in artistic practices, personal relationships, and what it means to be human. Even in such cursory

form, these closing vignettes model the capacious criticalities of a seed media framework and, I hope, gesture toward the potential applications of such an approach. If, borrowing again from Durham Peters, seed media comprise both "dialectic" and "responsibility," then this project does not end here, but necessarily constitutes an ongoing mode of being.

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[1] W.J.T. Mitchell, *What do Pictures Want?: The Lives and Loves of Images*, University of Chicago Press, 2004, 210.
[2] Beans have long histories of symbolic power and superstition. From Christine Goldberg's "The Composition of 'Jack and the Beanstalk.'" In *Marvels & Tales* 15, no. 1 (2001), 16: "Beans are famous for their peculiar place in ancient esoteric philosophies, particularly Pythagoreanism. Adherents were forbidden to eat this food because beans were said to contain the souls of the dead; their vines were supposed to serve as conduits out of Hades (Delatte). In modern lore, bean plants are still disturbing: a white or yellow shoot is an omen of death, and accidents in mines are said to be more common when beans are in flower. Sleeping in a bean field is supposed to cause insanity, and, according to one report from Yorkshire, bean flowers contain the souls of the dead."
[3] Jivetin, Sergey, *Furrow: Seed Engraving Project* https://sergey-jivetin.format.com.
[4] https://www.seedengraving.com/video
[5] Much of these details come from my personal e-mail correspondence with Sergey.
[6] Hope Jahren, *Lab Girl*, Vintage Books, 2016, 70.
[7] Kendler, Jenny, *Heirloom (Hackberry Opal Necklace for Hope Jahren)*, https://jennykendler.com/section/510591-Heirloom%20%28Hackberry%20Opal%20Necklace%20for%20Hope%20Jahren%29.html

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