GEOGRAPHIES OF MOBILITY AND BELONGING

CRITICAL PLANT STUDIES AND HOPEFUL WORLDVIEWS

by

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VITA

Alayna Rasile was born in 1989 in Helena, MT. She earned her undergraduate degree in Geography from the University of Oregon in 2010. Rasile's early career began as a National Science Foundation research fellow on the Fort Apache Indian Reservation. Her contributions to the Atlas of the Western Apache led her to work in Washington, DC for the Native American Grave Protection and Repatriation Act. In 2015 Rasile was a yearlong resident artist at New York City's Textile Arts Center. She has also been awarded residencies at Cabin Time on Sheep Island, ME; the Women's Studio Workshop in Rosendale, NY; and Rockland Woods on the Olympic Peninsula, WA. Selected works in collaborative and individual exhibitions include *NURTUREart* in Brooklyn, NY; *The Center for Craft, Creativity, and Design* in Asheville, NC; the *Anchorage Museum of Art* in Anchorage, AK; and the *Isabella Stewart Gardner Museum* in Boston, MA. Alongside her fine art practice, Rasile founded the boutique apparel brand *Absorka* that specializes in women's apparel made from plant-dyed and recycled materials and was the co-founder and designer for *May West*, a fashion tech startup pioneering the use of milkweed as insulation inside of entirely plant-based winter jackets.

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ABSTRACT

This paper makes a case for the miraculous nature of vegetal life and subverts the cultural failings of western civilization that have omitted ecological literacy and replaced it with ecosystem manipulation. Through examining the resiliency, adaptability, and mobility of plants, this thesis proposes a reconsideration of the idea of vegetal life being 'rooted' or immobile by choosing a posthuman lens that challenges the linear, human-scaled time and the Cartesian split of mind and body. Through my research on textile technology and my conviction for mutualistic co-species relationships, I explore opportunities for humans to use the implicit structure of capitalism with a methodology that is regenerative for landscapes and supportive of diverse vegetal life. These market-based solutions allow for positive material relationships with all aspects of an ecosystem.

INTRODUCTION

> *Our awareness of who we are as humans must grow from a deeply rooted awareness of the larger planetary presence within which (or whom) we dwell, alongside so many other vibrant presences such as salmon, wolf, moose, alder, elm, mountain, river, or thunder.*
>
> — Martin Lee Mueller[1]

I found a lone thistle growing in my garage. Its transparent, fibrous stem heaved itself through a crack in the concrete floor and grew long and lanky parallel to the ground, reaching with desperation towards a hole in the foundation. Throughout my training as an educator, I've been repeatedly instructed to teach resiliency and grit, determination and iteration. I was in awe of this thistle, truly proud of it; but something deeply programmed within my subconscious compelled me to reach down and pull it out. Moments later, with this warrior of a plant dead in my hand, my mind reeled with concepts of belonging and questions of co-species relationships. This gesture is the point of departure for a thesis approached through a posthuman lens and a mindset of the equal ontological relevancy of all living things—between myself (a human) and my subjects (plants), considering our taxonomic closeness in understanding that our similarities far outweigh our differences.[2] My primary argument is posited against historic and influential voices (Linnaeus, Aristotle, Plato, Descartes) and their pejorative perspective

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[1] Mueller, *Being Salmon, Being Human.* p.xiii

[2] Reference the 2018 version of the phylogenetic tree in Figure 1 and note how closely humans and plants are located to each other.

of plant life as subordinate to human existence, a widespread assumption created by hierarchies based on the absence of mobility and agency in plants.

I aim to make a case for the miraculous nature of vegetal life and to subvert the cultural failings of western civilization that have omitted ecological literacy and replaced it with ecosystem manipulation. By considering the importance of vegetal life beyond its contribution to human existence, my research examines the resiliency, adaptability, and mobility of plants in a world without rigid geographical borders or sociocultural notations of value and significance. I propose that we reconsider the idea of vegetal life being 'rooted' or immobile by choosing a lens that challenges the linear, human-scaled time which informs the traditional metaphysics of being and becoming. Through this experimental lens, I will investigate what mobility might mean within a framework that recognizes the anatomical and physiological characteristics of my subjects are not the same as my own.

Acknowledging the temporality of human existence, the final section of this paper presents a counterpoint that emerges from a hopeful worldview and a mindset of adaptation and sustainable co-species living. By way of colonization and capitalism, our culture has minimized or even eliminated non-transactional bonds between humans and plants. Through my research on textile technology and my conviction for mutualistic co-species relationships, I will explore opportunities for humans to use the implicit structure of capitalism with a methodology that is regenerative for diverse vegetal life in order to have positive material relationships with all aspects of an ecosystem.

PLANT MOBILITY

Nothing happens until something moves.

— Albert Einstein

In this paper I use the term 'mobility' in reference to movement perceived through a wide array of scales, both spatial and temporal. Mobility for vegetal life can be observed many ways, including: heliotropism, a plant's daily movement to follow the sun; propagation, a plant's method of dispersal; migration, a plant's relocation over time to an environment that better meets its needs; reproduction, a flowers opening, closing, and bending to allow for pollination; or simply a plant's growth and decay.

The keystone argument against the intelligence and agency of vegetal life points to their rootedness in space and lack of locomotion. In Plato's *Timeaus,* he considers the differences between animals, plants, and humans in a postulation about whether all living beings have minds and souls. He writes of plants: "so it has life and is not some second being other than a living creature, but it stays fixed, rooted, motionless, for it has never been granted movement of its own initiation."[3] Plato eventually concludes that plants do have a specific kind of soul, one that is capable of perception and desire. Aristotle agrees with Plato that plant life is ensouled, but with the lowest form of what he calls the "vegetative soul," one that lacks the faculty of desire that drives locomotion. In *De*

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[3] Plato. *Timaeus*: Cambridge: Harvard University Press, 1929

Anima, Aristotle states that the philosophy of desire is inseparable from motion.[4] He believes that the fundamental purpose of movement lies in the quest to attain something that is desired—and this motion is what vegetative souls lack.

My argument for the recognition of plants as moving bodies has two purposes. The first is to provide a counterargument to those put forth by the dominant thinkers of our past: that the immobility of vegetal life corresponds to a lack of intelligence, sentience, or desire. This repressive sentiment has been dangerous in the ways it has informed human-centric thinking and design, which in turn has significantly contributed to the massive consequences of environmental disasters, our current climate crisis, and impending extinctions.[5] My second purpose is in critiquing the human imposed management and control over the natural dispersal and migration of vegetal life. While measures such as customs checks at international borders have the purpose of minimizing the non-natural, human-aided movement of plants, national and state measures to eradicate populations of migrants who are already established and thriving is counter-intuitive to Darwin's theory of evolution by natural selection.[6] I acknowledge the disruption to ecosystems, ecological communities, and economies that invasive species

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[4] Aristotle *On the Soul; Parva naturalia; On Breath.* Loeb Classical Library, vol.288, rev. ed. Cambridge: Harvard University Press, 1975

[5] Muller *Being Salmon Being Human* and Haraway *Staying With the Trouble*

[6] Darwin's natural selection theorizes that organisms which possess heritable traits that enable them to better adapt to their environment than other members of their species will be more likely to survive, reproduce, and pass on genes to subsequent generations (National Academy of Sciences)

can cause; however, I also believe that it is worth considering a species' ability to adapt, survive, and thrive in a new place as a test of its 'fitness.'

What follows are four short case studies on vegetal species that are exemplary of temporal and spatial mobility. These studies describe my applied understanding of what vegetal movement—in terms of both motility and mobility—can look like, and together they serve as a foundation for my conceptual and philosophical pitch for the importance of non-human scales of time, agency, and movement in considering plant existence.

A Story of Plant Movement in Four Acts

Act One: The Water Lily

The water lily inhales and exhales. Its diurnal rhythm of opening each morning with the sun and closing once the light has dimmed has for centuries been compared to our breath. Aspects of its physiology, habitat, and movement serve as lyrical metaphors for everything from desire to purity, enlightenment to fertility. Beyond its ability to reproduce asexually, live both aquatically and terrestrially, and communicate chemically,[7] the water lily defies numerous limitations that humans have historically understood regarding plant behavior. Returning to *De Anima*, Aristotle defines the four types of movement: the ability to alter one's state, growth, decay, and the ability to change one's position in space. He insists that only three of these modes are employed by vegetal species, thus making them irrelevant or ensouled only in a vegetative state. It

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[7] Gibson and Gagliano, *The Feminist Plant: Changing Relations with the Water Lily*

has been pointed out by numerous literary feminists that the water lily performs all four of these modes; while it remains rooted into the soil, its flowers float on top of the water changing their position throughout the day while chasing the sun.[8]

Act Two: Milkweeds

Levitating on thin air, a nearly translucent wish carries the promise of new life across vast landscapes and bodies of water. Milkweeds have the capacity for far-ranging seed dispersal because of their bodily mechanisms—a hollow fiber attached to a single seed, lightweight enough to be carried away by even the gentlest breeze. First arriving in North America around 15 million years ago from present-day Africa, all 150 species of milkweed on this continent can be traced back to a single point of introduction.[9] In a remarkable demonstration of mobility during a time when modern humans did not yet exist (and thus cannot be blamed for introducing a foreign species), a single milkweed seed used its fluffy parachute to glide through the air to an entirely new landmass where it would continue to propagate. Milkweeds not only spread through their mechanisms of seed dispersal, but also through rhizomes that build horizontal networks underground. In North America, milkweed varieties grow in swaths spanning north-south across the continent, serving as contiguous habitat for the migrating monarch butterfly, an important biological indicator of environmental health. It is imperative for this insect to have unfragmented areas of milkweed all along its yearly migration path from Central Mexico

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[8] Ibid.
[9] Fishbein, *In Defense of Plants* Podcast Ep. 223

to Southern Canada, because it depends on milkweed exclusively to feed its larvae. A monarch's migration happens over the course of four generations, meaning that at three points during her journey, a monarch will need to locate milkweed plants on which to lay her eggs; the continuous availability of this plant is essential for the lifecycle of the butterfly. Milkweed leaves are the food source for the monarch caterpillars while also providing them with their only defense mechanism, a toxic chemical compound. When a caterpillar metamorphoses into a butterfly, the cardenolide chemistry from the milkweed leaves remain in the insects' body, making it repulsive and poisonous to predators. If we consider the thousands of miles that a monarch travels while carrying the chemical compounds of the milkweed plant, the wide-reaching rhizome network of the plants' roots underground, and the distance potential for the fluff inside of the seedpod to travel through the air, claiming that the essence of this plant is one rooted in place is a nearly impossible argument to make.

Act Three: Kudzu

While my description of milkweeds is one that animates its movement over continents and through generations, kudzu is a plant whose movement can be easily observed on a human timescale. Introduced to North America in 1876, kudzu vines can grow up to one foot a day.[10] Leafy vines reach out towards new territory and have the ability to take root wherever they touch soil, eventually forming separate 'selves,' which break off from their host. This type of clonal reproduction involving self-fertilization is

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[10] Finch, *Smithsonian Magazine.*

what allows a vegetal species to travel fast and to thrive even when habitat conditions change. This legume's introduction to America came with urgency and excitement—its promises of sweet-smelling flowers and soil stabilization allowed the plant species a warm welcome. Some might say that it was the genius of the plant that engaged the rest of the system to do its bidding.[11] In the early 1900s, nurseries cultivated seedlings with origins from Korea, Japan, and China—many of which were planted by backyard ornamental gardeners, while most were dispersed by the government as an effort to fight erosion. For this reason, the kudzu found in the southeastern parts of the United States has a wide-ranging genetic diversity, which gives it a notable propensity to adapt to various habitats and climate patterns. This vine has taproots that can travel nine feet down into soil, making it resilient to drought, cold winters and hot wildfires. As climate change raises temperatures across the globe, the habitable environment for kudzu continues to expand, and at the rate of one foot a day, the vine continues its worldwide exploration.

Act Four: Tumbleweeds

As kudzu vines were being purposefully introduced to North America, the Russian thistle's arrival to South Dakota from Ukraine was unexpected and accidental. Although many plants use a similar mechanism for seed dispersal, the Russian thistle remains the iconic tumbleweed: bounding across wind-swept plains, rolling and flying, all the while tossing its seeds out to the fates of chance. The body of the plant forms in a

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[11] Pollan, *The Botany of Desire*

spherical shape, and its woody stalk has special cells at its base that disintegrate annually in the fall, detaching the lightweight, dried-out plant from its roots and sending it adrift in the wind, carrying only its seeds, the bare essentials for beginning a new life elsewhere. A tumbleweed can travel miles before it gets stopped by a barrier of some kind, or before it breaks down entirely. While it tumbles, each impact allows the seeds to be jostled out of their pods and nestle into the ground. Even the smallest amount of precipitation will allow them to germinate in their new home. Tumbleweeds are ramblers; traveling is their main agenda and their most prominent physiological system. They are called 'diaspores' because their entire body becomes their method of seed dispersal. Michael Marder writes about the botanical term diaspore, its explanations of plant motility, and its etymological impact on how we understand human migration through use of the term diaspora:

> Detachment is the intimate possibility of plants, with many of their parts "prosthetic," replaceable, ready to be shed without causing harm to those that tentatively stay behind. Further, scatter is not an accident that only belatedly affects the seed; seed is essentially scatter, still before it reaches the ground, is carried by water, or glides on air. Its division into two (*dia*-) and into an infinity that stirs between two intensifies the dynamics proper to what is internally, congenitally divided. In their hyperbolic, almost tautological reiteration of pre-existing detachment and scatter, diaspores and diasporas make visible those movements that have always traversed, if imperceptibly, plant and human existences.[12]

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[12] Marder, *Diasporic Thoughts on Migration: Of Plants and Places*

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BELONGING

You are only free when you realize you belong no place—you belong every place—no place at all.

— Brené Brown[13]

Whereas *mobility* speaks to the anatomical or physiological changing of one's position in space, *belonging* pertains to that which is emotional, individual, and relating to identity. Belonging is self-imposed while simultaneously being prescribed by outside forces. Humans experience the sense of belonging in the context of geographic, social, cultural, political, religious, and racial identities. Here, I refer to belonging as an aspect of vegetal life that lies within the contexts of mobility and adaptation and which are perceived through human observations of plant movement over time. The clearest example of these human observations is the use of language like 'invasive,' 'non-native,' 'noxious,' 'naturalized,' and 'alien' in identifying plant species. This language could have been derived from the superimposed opinions of colonizers, who have long dictated where species (human or otherwise) do or do not belong geographically. These opinions, however, are strictly based on a human time scale, a capitalist market-driven perspective of value, a history of violent colonization that has led to arbitrary borders, and a misconception that earth's climate and geography are in a state of stasis.

Humans have developed relationships with vegetal life that are predicated on value, consumption, production, and control. In 1958, the well-respected and widely

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[13] *Braving the Wilderness*

published biologist Charles Elton wrote the seminal book on invasion ecology[14]. Elton, heavily influenced by the events of WWII, used militaristic language in his descriptions of species dispersal and transport, threats of plant diversity, and the displacement of native species. The subject didn't catch on in the mainstream conservation community until the 1990s, when suddenly the derogatory and militaristic vernacular around invasive species spread like kudzu, and a strategy of total eradication became prominent.[15] Though the frenzy has somewhat faded, the U.S. government still spends well over three billion dollars a year on the prevention, control, and eradication of invasive plant species—not to mention the time and funding put forth by state governments, non-profit conservation groups, and individual landowners. Interestingly enough, an estimated 98% of the U.S. food system is comprised of introduced, non-native species.[16] As ecosystems are being subjected to dramatic changes in climate and intensive demands of productivity, plants are being forced to rapidly adapt, a process that often involves habitat relocation. How do we decide what varieties of vegetal life receive a green card and are welcomed inside our border as 'naturalized' species and which ones are marginalized and eradicated? This question is what I refer to as the economics of belonging.

My early childhood was spent in the mountains of Montana, the daughter of two earth scientists homesteading on fifty acres of forested land. I have early memories of

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[14] Elton's book is titled *The Ecology of Invasions by Animals and Plants*
[15] Goode, *The New York Times*
[16] Pimentel, *BioScience*

my raw and splintered hands after hikes with my mom—adventures that often turned into knapweed eradication missions. We were always fighting against the spotted knapweed that sprouted up along the dirt roads and foot trails on our property. My folks were dedicated stewards of the land and poured an immense amount of effort into eliminating this unwanted vegetation. I remember the purple, papery flowers buzzing with bees, but I have no recollection of being told why the plant needed to go. Knapweed is native to Europe and Asia but has been thriving in the United States for over 130 years. Its flowers produce nectar that is loved by insects, particularly bees; and as we know, bees are instrumental for the pollination of the crops that produce our food. Yet, in 2016, the state of Montana spent 42 million dollars on the direct and indirect costs of knapweed eradication.[17]

Around the same time that knapweed arrived in North America, the soybean was beginning to be cultivated on a large scale in the American south. It was first introduced in 1765 but took over a century to establish itself and catch on as a desirable plant. As of 2018, the USDA reports that 91 million acres of soybeans are grown in the United States, and the crop has become one of the country's largest exports.[18] Though it may feel illogical to compare a "noxious weed" to one of the country's top ten crops, the purpose of this paper is to argue for equal ontological status among all living organisms. Examining these two vegetal species raises questions around the economics of belonging.

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[17] *Montana Invasive Species Advisory Council Report*, 2016
[18] Webster, *American Soybean Magazine,* 2018

They are both non-native plants that have proven their fitness by successfully adapting to a new homeland, one revered and one reviled, one cultivated and one eradicated. Clearly, perceptions of market demand and commercial value have everything to do with the acceptance and naturalization of a relocated plant species. Thinking about these case studies makes me wonder: is the term *invasion* synonymous for *change*?

Borders, policies, large-scale agriculture, and international economies are not the only ways that humans have intervened in the metaphysics of each individual autonomous species. The current global climate crisis is physically shaping our geographies of belonging. Michael Marder poignantly remarks on how changes in climate will have imminent consequences in determining where we (all living things) can survive and thrive:

> It is, therefore, doubly crucial to contemplate the sense of anthropogenic impact on the environment and how this impact ricochets, hitting both human and non-human populations. On the one hand, climate change means that places are no longer in place; they shift elsewhere, migrate, are displaced, misplaced, or unplaced. [19]

Being Like A Rock

Being like a rock is the most powerful mode of being. As a human I will never know or see or hear or feel the millions upon millions of years that a single boulder of granite will bear witness to. Deep time has a way of putting all of the changes and shifts we experience into perspective. In my lifetime, I've read in the news about bodies of

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[19] Marder, *Diasporic Thoughts on Migration: Of Plants and Places*

water completely drying up, I've seen glaciers melt and disappear, and I've weathered a hurricane that dramatically reshaped a shoreline. I try to find the time to be still and drape my body over a sandstone monolith or a bedrock outcrop and remember continental drift. If we could be more like rocks, we'd understand that the landmasses we live atop have traveled immense distances, that they have split into pieces and are constantly moving through space, redefining their existence. Movement is an essential strategy in self-discovery, in forming communities, in identifying our purpose and finding out where we belong.

I write this paper while isolated in a cabin in the woods during 2020's COVID-19 pandemic, a time when social distancing, isolation, and quarantine have swiftly become the daily reality of the entire global population. All of a sudden, humans have a shared responsibility of staying put, halting all movement and remaining in place as a public health strategy for slowing the spread of an aggressive virus. In the timespan of just one month, the emotional and economic implications of compressing the range of human mobility have been astronomical. The halting of our daily commutes, the pause of international travel and the slowdown of industry have significantly reduced conventional pollutants like soot and smog and is on track to "cut in half this year's addition to the atmosphere's carbon dioxide concentration."[20] This contraction in physical trajectories causes disruptions in individuals finding meaning, purpose, and identity. Who do we become when self-discovery becomes inward-facing and disregards geography?

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[20] Komanoff for The Carbon Tax Center, published in *The Intercept*

The question of belonging is at the core of the human relationship with our non-human neighbors. In *Staying with the Trouble*, Donna Haraway reminds us that the earth's environment has been shaped by its inhabitants far before *Homo sapiens* arrived:

> There is no question that anthropogenic processes have had planetary effects…. From the start the greatest planetary terraformers (and reformers) of all have been and still are bacteria and their kin…The spread of seed-dispersing plants millions of years before human agriculture was a planet-changing development, and so were many other revolutionary evolutionary ecological developmental historical events.[21]

She goes on to suggest that our planet will continue to be shaped in monumental ways by humans, by systems (capitalism), and by technology (cyborgs). While Haraway's outlook on the future survival of the human lifeform on this planet is grim, she does offer a call to action for "multispecies ecojustice." Haraway insists,

> we have a mammalian job to do, with our biotic and abiotic sym-poietic collaborators, co-laborers. We need to make kin…Who and whatever we are, we need to make-with—become-with, compose-with—the earth-bound.[22]

In a world where 'eco-anxiety' is pervasive and alarming, I feel compelled to stand up for myself and humankind as citizens of the earth, particularly at this moment in time. Embracing the philosophy that, by some extraordinary measure of evolutionary chance, we exist as we are on this planet. We belong here. This philosophy, however, comes with a colossal amount of responsibility. How can I respectfully share this planet with its other occupants? How can my needs be met without engaging in exploitation or violence? How do I take care and make kin?

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[21] Haraway, *Staying with the Trouble*, p.159
[22] Ibid, p.163

16

ADAPTATION

We are already remaking ourselves and our world, retracing the steps of the original synthesis – redesigning, recoding, and reinventing nature itself in the process.

— George Church[23]

An important part of both my chosen methodologies and my art practice is a hopeful worldview, an acknowledgment of vegetal and human life and a mindset that a sustainable coexistence can be attained through system design and intentional living. This personal drive for an optimistic future is what drew me to Rosi Bradiotti's book *The Posthuman*. In discussions of Post-Anthropocentrism, Bradiotti maintains a promising tone, advocating for the subject to be "the site for political and ethical accountability, for collective imaginaries and shared aspirations."[24] Bradiotti believes in opening the door to the unexpected possibilities of what 'we' (the "differently located posthuman subjects of the Anthropocene era") are capable of becoming. She uses the term *zoe*-centrism as a way to move past Donna Haraway's cyber studies, to an inclusive term that encompasses all generative life forces including, of course, the non-human. This *zoe*-centered ontology requires a shift away from dominant values and hierarchical relations. This shift is what holds Braidotti's cache of hope for the future, and although she

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[23] *Nature: Collaborations in Design* p..138
[24] Braidotti, p.102

acknowledges that it could be difficult for the dominant party (humans) to find empathy for non-human others, she offers an approach:

> The best method to accomplish this is through the strategy of defamiliarization or critical distance from the dominant vision of the subject. Dis-identification involves the loss of familiar habits of thought and representation in order to pave the way for creative alternatives.[25]

Here, Braidotti is suggesting that, through experimenting with a dis-identification of normative values like representations of gender, constructions of religion or race, the bureaucratic nature of institutions (or formations of national/international borders), we will be able to invent a more productive and ethical way of relating both to our own species and to our non-human co-inhabitants of planet earth.

I envision these creative alternatives emerging from innovation and systems thinking that subverts hierarchies and demands agency for all life forms. Such models have a high level of resonance with the philosophical concept of the Rhizome conceived in Deleuze and Guattari's book, *A Thousand Plateaus*. This concept describes multiplicities, networks, webs, or systems of relation that are without any structure but instead are multiple, dynamic, and interrelated.[26] The rhizome philosophy directly questions the oppressive and damaging hierarchies and binaries pervasive in western thought. Historically, humans have understood structures in arborescent forms that satisfy our desire for order and symmetry, while also accentuating hierarchy and defining status, rights, and privilege. Aristotle's ontology was the first to classify all things known

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[25] Braidotti, p.88
[26] Deleuze and Guattari, *A Thousand Plateaus*

to man and map them into the *Scala Naturae*, The Great Chain of Being, wherein God, angels, and the divine ranked in the top tiers, and humans, animals, plants, and minerals descend to the bottom. For thousands of years, this linear rank of importance was how humans perceived the world, how they organized structures, and how they made decisions. Many other philosophers have come along and caused disruption in the *Scala Naturae,* specifically Linnaeus and Darwin, but still to this day, the dominant system of relations is one wherein humans carry more importance than animals, animals are more relevant than vegetal life, and geological resources are solely acknowledged as objects of exploitation.

The Latin phrase *Primum non nocere* (first, do no harm) is the primary pillar of the medical field, a key principle of ethics, a foundation of sustainable development, and a trending ethos in the new economy. From 2012 to 2019, the outdoor clothing giant Patagonia vowed, through its mission statement, to "cause no unnecessary harm." As a student of the natural sciences and later a product designer working in fashion during the initial main-stream hype of the climate crisis, my formative adult years were saturated with this idea of causing no harm to the environment. As a college student, I was dedicated to a low-impact lifestyle, using only a bike for transportation, eating an entirely local and plant-based diet, and living cooperatively. I lived in an intentional community where we would hitch-hike and dumpster dive and chain ourselves to roadblocks to prevent access for logging trucks. A decade later, I remain an idealist, but one who is choosing to lean-in to the systems that run our world by exploring market-based solutions. My practice creates linkages between art and economics through an

experimental and iterative process determined not only to do no harm, but to find opportunities for restoration, progress, positive change, and paradigm shift.

This paper proceeds with case studies both of my own work, and the projects of my idols and mentors, that I consider to be creative alternatives, that defy historic systems of structure, redefine economic success and replace it with holistic methodologies that are zoe-centric. These are my offerings for how the philosophy of reframing plants as mobile and sentient, and therefore equally important ontologically, can be practically applied in our world today.

PLANT BASED PRACTICES

Whatever the future of our fiber, dye, food, fuel, and flora systems might be, they will surely have the best chance of meeting their intended ecological outcomes when the design is led by those who know and love their connection to a particular place and have equity and access in and to the land to apply their stewardship know-how as part of a consistent and lifelong practice.

– Rebecca Burgess [27]

Approaching creative alternatives in the textile industry is not as niche as it may seem; these fiber and fashion-based innovations have massive potential for positive impact—cloth is pervasive throughout the lifetime of almost every individual on the planet, and it is so intimately connected to our daily lives that it nearly becomes invisible. Between the farming or synthetic production of fiber, the chemical and water intensive dying processes, the colossal labor industry of garment work, the resources required for global transport, the impact of washing textiles, and the issues of post-use textiles in landfills — there are monumental opportunities for humans to find mutualistic collaborations with nature in this industry.

Sally Fox's life work is an iconic case study in mutualism. She is likened to a butterfly or a bee: out in her fields in California, she cross-pollinates cotton plants, selectively breeding naturally colored strains of cotton that are native to South America.[28] These varieties have been around for millions of years but have largely been ignored,

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[27] Burgess, p.171
[28] Ibid p.75

because their fiber was too short to spin. With time and persistence, she has produced seed that grows commercially viable organic cotton with beautiful brown, green, and orange colors. These colored cotton varietals are also pest resistant, making them easy to grow with biodynamic and organic practices. Fox has spent decades creating a system of interrelation between herself, vegetal life, livestock, soil microbiology, the climate, and the local economy.

While Sally Fox is well-known for her experimental work, her colored cotton has not yet gained large-scale commercial traction. In fact, she had been aggressively fought by the conventional cotton growers and an enormous industry afraid of cross-pollination and market disruption. By growing colored cotton, one can entirely eliminate the need for yarn or finished textiles to be dyed, cutting out the most water-intensive and pollutant part of the textile-making process. The prodigious nature of her work cannot be illuminated unless the spotlight is shifted away from cotton and pointed directly on the adjacent industry of fiber colorants. Synthetic dyes are primarily derived from fossil carbon sources; the most common colorants are azo dyes which have been proven to be carcinogenic and mutagenic.[29] Every year, two hundred thousand tons of dye end up as runoff entering waterways.[30] The fact that Fox, without any genetic engineering, has developed a methodology for growing fiber that is already colored is evidence that collaboration with nature has potential to shift an entire industry away from harmful

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[29] Ibid p.23

[30] Ibid p. 23

practices. In the spirit of going beyond the ethics of 'do no harm,' Fox has designed a model for cotton growth that is resilient and regenerative. This system involves rotating her cotton fields with crops of heirloom wheat that, once harvested, is left for grazing by her flock of merino sheep, which in turn "help build the soil biology, sequester atmospheric carbon, and enhance the water-holding capacity of her soils."[31]

The governing principles of regenerative agriculture concern land management practices that restore carbon to soils while increasing productivity. Rebecca Burgess is another pioneer of bringing together fiber farming with Climate Beneficial[32] agricultural practices that sequester greenhouse gasses and mitigate climate change. Her carbon farming projects involve a collaboration between farmers, ranchers, and grazers to renew ecosystems through restoring rangeland, planting hedgerows, and implementing no-till practices. Burgess' contributions to the translation and application of carbon cycling models to the textile economy have been monumental. The Climate Beneficial textile movement has caught the attention of fiber producers, designers, manufacturers, and consumers all across the world from small family farmers to global fashion brands. Part of Burgess' vision is that textiles produced and sold in the new economy have hyperlocal Life Cycle Assessments attached to them, a mechanism of transparency that measures water use and greenhouse gas emissions while also "measuring soil and atmospheric

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[31] Ibid p.141

[32] Climate Beneficial is a trademarked term that applies to verified materials grown in places that implement carbon plans

carbon exchanges of fiber-producing landscapes."[33] Tracking the true footprint of domestically produced textiles can illuminate the possibility of producing garments that have a net negative carbon impact.

Regenerative and restorative agriculture practices, as concepts, have become trendy in the past few years as the climate crisis begins to have tangible economic impacts on our lives and as the *primum non nocere* ethos enters the mainstream. These terms emerge as the concept of 'sustainability' as we know it crumbles – the UN predicts that the world's topsoil will run out in 60 years if we sustain the agricultural practices that are currently in place.[34] Winona LaDuke, a rural development economist and indigenous rights activist reminds us what sustainability looks like at its best – her people, the Ojibwe, have been harvesting rice from the same lake for ten thousand years.[35] LaDuke believes in looking to the past to learn what systems would allow us a balanced co-existence on this earth. In her region of Minnesota, fiber hemp used to grow like a weed and the state was home to 11 mills that processed the fiber into textiles and rope that allowed the state to meet much of its own needs. LaDuke has the mission of bringing fiber hemp farming back to our domestic fibershed[36] and re-inventing the infrastructure

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[33] Ibid p. 102
[34] Arsenault, *Scientific American,* 2014
[35] LaDuke, *Flow Talks,* 2019
[36] Fibershed as defined by Burgess is a place-based textile system focused on the source of raw material

to process it into textiles which can ultimately take the place of cotton and synthetics.[37] LaDuke imagines a future of phytoremediation wherein soils are revitalized through crop rotation, composting, and carbon sequestration; where rural economies (specifically indigenous communities) can have a seat at the table; where the production of goods can be based not on chemicals or slave labor or the exploitation of other countries' resources, but instead on ecologically based industries grown out of a new economy that values collaboration between people and the ecosystems in which we are a part. This future of fiber hemp farming that Winona LaDuke envisions is what she believes to be the return to a thoughtful way of being on this planet, for ourselves and our future generations. Her approach to the cultivation and processing of hemp is far from reducing the plant to its materiality – she practices and teaches the native way of coexistence with vegetal life: "We are responsible for things, we take care of our relatives, we only take what we need and leave the rest, we are not wasteful, and we are grateful."

Growing hemp, for farmers like LaDuke, is an act of collaboration with her immediate natural environment. Since the plant thrives in the climate and soils of Minnesota, she has no need for chemical pesticides or herbicides and can work with the land, not against it. When we exist in an ecosystemic balance- practicing gratitude and humility, taking care and not being wasteful, we begin to notice the enormous potential

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[37] In defense of divesting from fossil fuels and moving to a "post petroleum" textile industry, Winona LaDuke comments on the majority of our clothing being made from polypropylene fibers and from cotton – a crop which uses 24% of the worlds agricultural chemicals on 4% of the worlds land. (*Flow Talks)*

for collaborating with nature. The plant-based commercial textile space has, in the past five years become akin to a fruit salad. Innovative startups have begun processing waste products like orange peels, pineapple leaves, and banana stalks into usable fiber. Seaweed, algae, potato waste and mushrooms are also quickly being proven as chemical and animal-free alternatives to nonwoven textiles like leather. What Fox, Burgess, and LaDuke all share is that they are advocates for the fibers that grow within their specific region and are invested in positioning these fibers as creative alternatives meant to serve their local communities through economic stability and ecosystem health. Braidotti writes: "sustainability does assume faith in a future, and also a sense of responsibility for 'passing on' to future generations a world that is livable and worth living in."[38] As I write this paper in extraordinarily uncertain times, looking towards the work of these women and the abundance and genius of plant life are the things that provide me with hope for the ways we can adapt to live out our time on this planet without destroying it entirely.

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[38] Braidotti, 138

MARKMAKING

What the medium of weaving and other forms of thread interlacing make visible, or rather tangible, in the end is their material stuff, their physicality as evidence of a practice —however inaccessible that practice is in the space of cloth. And yet textiles do, simultaneously, stretch the limits of perception: as we wear or sit on them, we tend to forget they exist.

- T'ai Smith [39]

Over the past four years, my hybrid practice of art, economics, conservation, and design has centered around a single plant: *Asclepias syriaca,* the common milkweed. In addition to exploring the plants' qualities in relation to plant mobility, as previously discussed, I've been innovating various ways to use the floss from the seed pod in commercial textile applications. Channeling Anni Albers' pioneering spirit of fusing a traditional art form with material research and development at the Bauhaus, my intention with the exploration of milkweed floss as a future fiber has been fueled by the vision of market viability. My tactile research has focused on the innovation of a milkweed material that retains the plant's incredible qualities: hypoallergenic, hydrophobic, buoyant, and incredibly insulative, while also being able to perform and withstand use in a commercial clothing or soft goods application. If these applications and performance standards can be proven, milkweed floss has potential to be a key figure in the domestic fibershed and to replace goose down or synthetic fiberfill as insulation inside of outdoor apparel or home goods such as quilts, pillows, and comforters. The benefit of creating a

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[39] Smith, p. 174

market demand for this fiber is threefold. One, the milkweed plant is extraordinarily important for the monarch butterfly, a biological indicator and pollinator species whose population has decreased by 99% since the mid 1980s.[40] By adding a market price to the mature seedpods of the milkweed plant, farmers, ranchers, and landowners would have an incentive to grow large areas of milkweed, thus increasing habitat for monarchs. Two, milkweed does not require much water and thrives in disturbed areas; therefore, it can successfully be grown between fields of staple crops with little additional resources, and the presence of its large nectar-rich flowers would increase pollination of nearby crops. The possibility of milkweed as a low maintenance cash crop would provide important supplemental income for struggling soy, wheat, and corn farmers in rural and economically depressed areas.[41] Third, as more research emerges about the pervasive impact of microplastics on our waterways, in our food, and inside of our own endocrine systems, there is an urgency to find biodegradable alternatives to materials like polyester fabrics, which shed microscopic plastic fibers when worn and washed.

My thesis work and research take on the questions of growth and decay, exploring the objecthood of something undergoing a change of state. My use of plant fibers and natural dyes welcomes presence without permanence: depending on the environmental conditions of their storage, the natural colors will change and fade, and eventually the cellulose structures will begin to break down. Writes Haraway,

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[40] Pelton, *Frontiers in Ecology*
[41] Farmaid, 2019

> The Anthropocene marks severe discontinuities; what comes after will not be like what came before. I think our job is to make the Anthropocene as short/thin as possible and to cultivate with each other in every way imaginable epochs to come that can replenish refuge.[42]

The fragility, or this thinness, is inextricably linked to my femininity and the long history of women's work, which has disappeared due to the preservation challenges of textiles. While I don't aim to be invisible, I don't intend to have the physical marks I make on this earth endure generations beyond my own. The weavings and paintings in this body of work are a continuation of ancient knowledge, the evolution of the event of a thread,[43] and experiments in finding equilibrium.

I think about what it takes for a plant to evolve—so much trial and error, so much time. Adaptation is a slow yet inevitable process. As the climate changes and the landscape morphs, we as a population must come to terms with news ways of being. We might call this growth, or innovation, evolution or adaptation; it is a willingness to embrace change in order to stay alive. But while we all go on changing, what is left behind of our past ways of being? Sometimes I imagine my lifetime as a strata compressed into geological time. It would have fragments of thin film sachets, and colorful plastic fibers from fishing rope; it would have chunks of shoe soles and caviar sized spheres of Styrofoam—compressed together, it would look like colorful carpet cushioning.

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[42] Haraway, *Staying With the Trouble* p.160
[43] Reference to Anni Albers, *On Weaving*

The marks I make are about relationships, about balance, about stillness and time and progress. I believe in the importance of looking back, but only to inform what is coming ahead and to contextualize what is happening now, to "replenish refuge." With a viewshed that is more vast than our individual perspective, one that considers time much deeper than our individual lifetime, we can decenter the human and move into collaborative methods of existence. Sympoiesis is all about togetherness, about 'making-with,' and considering non-human life forms as our absolute equals. I work in small gestures of sympoietic systems, coercing threads to construct cloth; designing and building hopeful models, while holding out for a critical mass of human collaborators who will do the same. I would have thought that such a paradigm shift was idealistic and unlikely, but in 2017, I stood on the side of a highway in Idaho with thousands of strangers with boxes over our heads, cereal cartons held to our faces, and polymer film covering our eyes, waiting in quiet anticipation for the sun to travel behind the moon and back out again. Together, with 215 million people across the country we shared a moment that had nothing to do with humankind. Through the changes of light, we collectively acknowledged movement while we stood still.

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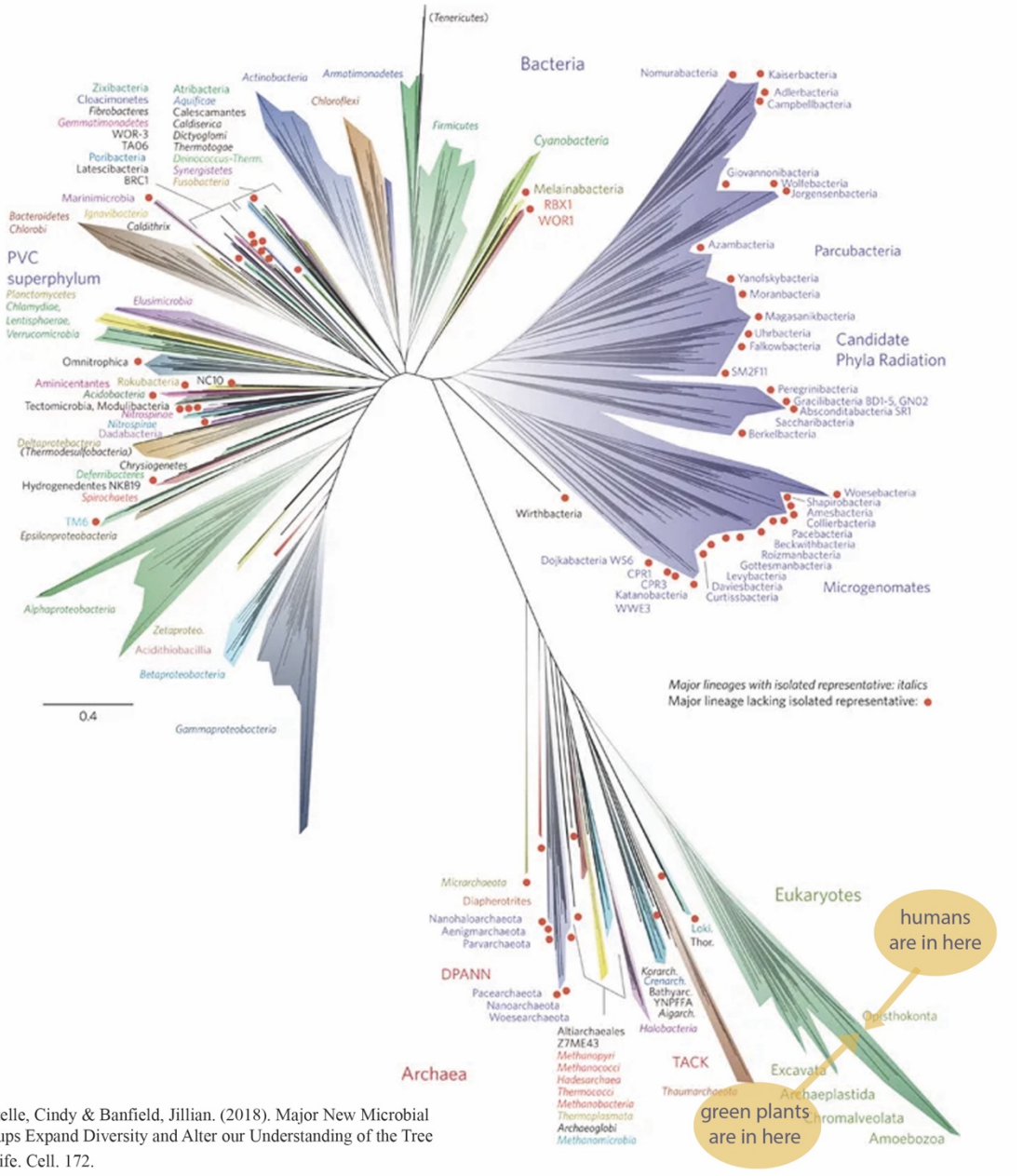

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What's Left Behind



Totality



Totality (Backside)



Togetherness (Alma)



Togetherness (Agnes)



Togetherness (Ardnt)



Togetherness (Ada)



Togetherness (Anni)



I Am Not Where You Are Now



Two Are Now One



String Figuring



Moving Blanket



My Country is Not a Country, It is Winter



Transportation for a Wisher



Flag





Heliotropic Bodies