

ROOTS AND SPIRITS: PRESENTATION, REPRESENTATION, AND VISION

Mila Balzhieva
Registration number: 11841690
Vienna, Summer semester 2023
University of Applied Arts Vienna
Programme number: S 066 776
Study programme: Art & Science
Supervisor: Univ-Prof. Virgil Widrich

Written component of Master Thesis
Submitted in partial fulfilment of the requirements for the degree
of Master of Arts (MA) at the University of Applied Arts Vienna,
Institute of Fine Arts and Media

CONTENTS

Abstract	5
Introduction	7
The green finds everything	9
Who is who	11
Root or a soul	14
On representation	18
Hen and chickens	22
The brain is underground	25
Ami - the soul of the middle world	32

Abstract

I venture into different dimensions and endeavor to communicate with plant organisms. When scientific methods prove unsuccessful and communication is impossible, I rely solely on my intuition and magic.

The purpose of this research is not to discredit the scientific approach or prove the existence of magic. I am not attempting to advocate for an animistic¹ approach to nature and science. Rather, I seek to explore my understanding of both worlds - the rational and magical - while striving to adopt a more compassionate approach to the life of plants.

¹ Animism - magic thinking belief - all humans, animals, and all things in nature have a soul - spirit.

*"Sometimes I wish I could photosynthesize so that just by being, just by shimmering at the meadow's edge or floating lazily on a pond, I could be doing the work of the world while standing silent in the sun."
(Robin Wall Kimmerer, 2013, 218)*

Introduction

We can hardly grasp the life of plants, and in doing so, it is natural to apply our human perspectives on them by focusing solely on their cleverness, metaphorical characteristics, and beauty. But their way of existing on Earth differs significantly from our own, with a timeline that is distinct from ours. Being mostly immobile they have developed their mechanisms slowly but efficiently over millions of years to spread, survive, and thrive in their environments. To truly understand plants is to recognize their complex way of existence. They have found surprising ways of interacting with the world, communicating with each other through chemical signals, and responding to changes in their environment. Plants' functions are not related to organs—which means they breathe without having lungs, nourish themselves without having a mouth or stomach, stand upright without having a skeleton, and make decisions without having a brain (Mancuso and Viola 2015, 42). Instead of objectifying or projecting human qualities onto them, I want to strive to learn from them. By embracing the determination of plants and recognizing their inherent value and agency, perhaps we could deepen our sense of connection to our green companions.

In my research, I am interested in interspecies communication between plants and humans. I entered the world of vegetation with the help of my house plant's presence. I could not have found a simpler yet more complex way to dive into the philosophy of plants. The logic behind my choice of the "Hen and chickens" plant is three-fold: firstly, I keep it in my bedroom, so we coexist in that space and have a sort of symbiotic relationship; secondly, I interact with it daily; and lastly, it is one of the most common houseplants, which means that there are plenty of studies and information about it. Additionally, it is easy to propagate because the plantlings it produces already have roots, and the plant can reproduce asexually, which makes its offspring exact clones of the mother plant. Through this research, my houseplant became my teacher by showing me the complexity of its life and desire to thrive. Its daily reminders of the interconnectedness of living beings influenced my actions and choices in this project.

I wanted to understand plants, not by reducing them to just objects with a glimpse of life, as we often do. Instead, I let these organisms lure me out of my well-worn patterns of thought, to imagine the possibilities they face, let them press against the limits of my comprehension, to give myself permission to be amazed - and

confused - by their lives. I wished to be captivated by their essence and allow them to challenge my conventional ways of thinking. I wanted to envision the experiences they encounter and to stretch my understanding to its limits, giving myself the freedom to be both astounded and perplexed by their existence.

During my investigation, I experimented with a scientific method to explore how plants and humans can communicate. Although I failed to obtain the outcomes I was hoping for, I rediscovered alternative ways to tackle the subject. Eventually, I employed common knowledge and relied on my roots.

In this work, when I refer to “magic,” I want to emphasize that I am using it in a broader sense that encompasses concepts such as shamanism and animism. So, when you come across this term in this paper, please envision forces of nature, powerful entities, the fundamental essence of life, spirits, and alternative realms.

The green finds everything

Western philosophy, and science prioritize logic over intuition. There has been a tendency to view nature as something separate from human beings, something to be controlled or exploited. Even nature in humans had to be tamed.

As an example, let's consider "Sir Gawain and the Green Knight," a canonical poem of the Arthurian cycle, penned by an anonymous author in the late 14th century. While the legends of King Arthur are typically associated with Christianity, the Green Knight exhibits prominent ties to both Christian and pagan mythologies, highlighting the intricate interplay between religious and cultural traditions of the medieval era. (Tracy 2007, 38)

The poem "Sir Gawain and the Green Knight" begins on New Year's Eve when a mysterious green knight arrives at King Arthur's court and challenges the knights to a beheading game. Sir Gawain accepts the rules and kills the green knight with one blow. It seems that with this action, human logic tries to conquer nature, and rejects magic and unknown forces. Nonetheless, the Green Knight retrieves his head and instructs Sir Gawain to seek him out after a year for a repeat of the game. But this time, it will be the Green Knight's turn to strike the first blow.

The Green Knight represents wildness and otherworldliness. His green skin, hair, and garments symbolize his relationship with the natural world and the forest.

Great wonder grew in hall
At his hue most strange to see,
For man and gear and all
Were green as green could be.
(Borroff 1967, 4, line 145)

The idea of the "Green Man" (Figure 1) was a recurring motif in many pagan and Christian cultures across Europe, Islam, South America, and East Asia. This entity was often associated with the natural world, fertility, rebirth, and the cyclical nature of life. In many cultures, the "Green Man" sometimes also called the "Green Wild Man" was incorporated into religious or spiritual practices and festivities. Interestingly, even in Christian churches across Europe, we can still see architectural decorations featuring the figure lavishly covered with leaves.

It is clear that in the past, "The Green" was regarded as a powerful, magical, and mystical aspect of nature. However, as time passed, we slowly moved away from these notions. I cannot help but think about American lawn culture, which could

be an example of our changing perceptions of “The Green.” An ideal lawn is defined by a vibrant green color and a dense, thick texture, signifying wealth and prestige. It requires significant investment in care, including regular mowing, watering, fertilizing, and weed control. It is particularly costly for those living in the southern parts of the United States and Australia due to high weather temperatures. Given the great expectations of having a flawless lawn and the associated expenses, the industry has developed a solution in the form of specialized grass spray paint known as “turf paint.” As a result, individuals can conveniently paint their lawns in the desired perfect shade of green (Figure 2), which I see as a reflection of the changing perceptions of nature and our willingness to modify it at a low cost to meet our expectations.



Figure 1



Figure 2

Most humans no longer fear nature and do not treat it as a magical force. Spirits and more-than-human beings became secondary and often associated with esoteric beliefs. Although, fear of nature can also be a way to respect and recognize its power, rather than just exploiting it for human needs. This kind of fear can arise from reverence rather than the desire to dominate and control. Recognizing the autonomy of nature can enable us to see it as a living entity rather than just a passive backdrop for human activities.

Who is who

While my *Chlorophytum comosum* is just my house plant, I believe it possesses some form of anima or life force. In the following chapter of my thesis, I will delve deeper into the physiology and history of this species. When I talk about the plant, I must liberate it from representative thought since I have no intention of using it as a metaphor for something else or solely for educational purposes. Instead, I want to focus on recognizing and understanding its inherent power as a living entity (Machinic Specters 2022). Through careful observations of the plant, I began to notice changes in my behavior and habits, leading me to question whether I domesticate the plant or if it domesticates me.

The idea of plant domination over humans also appears in the film “Little Joe.” The main protagonist is a plant breeder who develops a new species of flower with a unique quality - it emits a scent that makes those who smell it happy. Initially, it was altered to be infertile, but the plant finds another way to “reproduce.” As people become exposed to the flower scent over extended periods, they become obsessed with the plant and are willing to do whatever it takes to safeguard and reproduce it.

Simply put, the goal of a plant is to survive, reproduce, and expand territories. Plants utilize animals and insects to pollinate them and disperse their seeds. For example, orchids have evolved and adapted in various ways to attract pollinators. They developed specialized structures, such as brightly colored or uniquely shaped flowers, that attract specific insects. Some orchids have evolved to mimic the appearance and scent of female insects to attract males to their flowers. Others have a specialized “landing pad” that makes it easier to land on the flower and access the nectar. Or a specially designed reproductive structure that ensures that the insect comes into contact with the pollen before leaving the flower. And this just a couple of examples, there are plenty of other plant species with ingenious and unpredictable mechanisms (Mancuso and Viola 2015, 117) (Kingdom of Plants 2012).

This remarkable adaptability leads me to question whether humans could also be seen as a species that plants use or attempt to use. To a certain extent, some plants manipulate humans by making us reproduce and spread them across the globe. They give us food, fiber, fuel, etc. In exchange, we nourish them. Perhaps the outcomes of this “utilization” are not always beneficial for the plants. Humans experiment on plants, genetically modify them, make them infertile, generate clones, etc. Scientists employ cutting-edge techniques like CRISPR-Cas9 to modify the DNA of plants and introduce genes that make them more resistant to

pests, diseases, and environmental stress. In terms of infertility induction, hybrid seeds are produced by crossing two different plant varieties to create a new one with desirable traits. Although these hybrid seeds offer benefits, they are typically sterile and cannot be replanted, forcing farmers to buy new seeds every planting season.

Plant organisms have consistently played a crucial role in shaping human culture, society, economy, and politics. For instance, the cultivation of grains such as wheat, rice, and corn allowed the rise of agriculture and permanent settlements. Traditional medicine relies on plant compounds for thousands of years, and many modern medicines are still derived from plants. They also have played a significant role in economic and political systems throughout history, such as the trade of spices like cinnamon, nutmeg, and pepper. This trade drove global exploration and colonization in the 15th and 16th centuries, particularly in the East Indies (modern-day Indonesia), the Indian subcontinent, and East Africa. Or, the extraction of rubber and other natural resources from the colonial territories of South America and Africa fueled industrialization and economic growth in the West (Ross 2017). Examples of plant-related economic phenomena include “the tulip mania,” which occurred in the 17th century in the Netherlands, and the modern-day large-scale illegal logging in the Taiga forest in the Far East of Russia. According to an analysis conducted by WWF on Russian customs data, it was found that in 2010, the amount of Mongolian oak that was harvested for export exceeded the authorized logging volume by 200%. This indicates that at least 50% of the oak being exported to China across the border was illegally obtained (Smirnov et al. 2013).

It is essential to recognize that nearly everything that sustains us, such as food, fiber, shelter, medicine, and fuel, ultimately relies on plants. They play a vital role in maintaining healthy soil, which is crucial for growing crops and ensuring food security by cycling nutrients and improving soil structure. Or, the production of fabric for clothing requires cultivating cotton or hemp plants, processing their fibers, spinning the fibers into thread, weaving the thread into fabric, and sewing the fabric into garments. Without them, our survival would be impossible.

“The plant world alone represents more than 99.5 percent of the biomass of the planet. It’s like saying that if 100 is the total weight of everything alive, according to various estimates, between 99.5 and 99.9 percent is composed of plants. Or to put it the other way around, of all living things, animals-humans included-represent only a trace (a scant 0.1 to 0.5 percent)” (Mancuso and Viola 2015, 46)

Beyond their practical uses, plants have also played a remarkable role in shaping human culture and art. In an article titled “Phytopoetics: Upending the Passive Paradigm with Vegetal Violence and Eroticism,” Joela Jacobs, Assistant Professor of German Studies at the University of Arizona and founder of the Literary and Cultural Plant Studies Network, highlights the social significance of plants during the late 19th and early 20th centuries. That was the time when botany was be-

coming more prominent in various aspects of society, including as a focal point of sensual art nouveau aesthetics and Darwinian discoveries. The association between plants and sexuality caused concerns among Western institutions about the possibility of plant eroticism. This anxiety led to literary and educational restrictions on the subject of plant reproduction in Germany. As a result, the teaching of basic botany in the secondary schools of the German Empire between 1882 and 1908 was prohibited (Jacobs 2019). However, this ban failed to conceal the available knowledge of plants and their reproduction. Instead, it demonstrated the influence of plants on human society. All this challenge the conventional notion that plants are passive and motionless beings with no agency.

A root or a soul

For centuries, plants have often been depicted in literature and art as passive and non-sentient beings, mainly used as decorative elements. They were generally seen as objects of beauty and as symbols of various concepts, such as purity or fertility. The idea that the plant world is composed of sensorily deprived beings came to us from ancient Greece. Aristotle of Stagira thought that the plant world was closer to the inorganic world than to the world of living things. (Mancuso and Viola 2015, 21) It passed unchanged through the Renaissance—as depicted in the famous “Pyramid of Living Things,” in which plants exist but neither feel nor think—as well as through the more exacting screening of the Enlightenment and the Scientific Revolution. (Mancuso and Viola 2015, 51)

In literature, plants have been portrayed usually as symbolic concepts or merely as a part of the scenery. For example, within Greek mythology, when the main protagonist was transformed into a tree (Daphne, Smyrna) or a flower (Narcissus, Crocus) by the Gods, these metamorphoses happen to save innocence by turning the person into something beautiful but immobile and undesirable like a tree. Either to punish or preserve the beauty of a hero in the form of a plant. Although, in some cases, it was also believed that the transformation could serve as a kind of redemption, allowing the individual to escape their human flaws and become part of nature.

Ovid, Apollo and Daphne

‘Help me, Father!’ she pleaded. ‘If
rivers have power over nature, mar the beauty
which made me admired
too well, by changing my form!’ She
had hardly ended her prayer when a
heavy numbness came over her body;
her soft white bosom was ringed in a
layer [550] of bark, her hair was
turned into foliage, her arms into
branches. The feet that had run so
nimble were sunk into sluggish roots;
her head was confined in a treetop;
and all that remained was her beauty.
(Ovid 2004, 19)

Another case is when plants are depicted as background and decoration rather than being the main focus, as seen in Daniel Defoe's 1719 novel *Robinson Crusoe*. In the book, plants are viewed solely as part of the island's landscape rather than living organisms. In the first part of the novel, Robinson searches for living creatures, despite the fact that he is surrounded by plants (Mancuso and Viola 2015, 21).

In the context of medicine, the terms "vegetable" or "plant" are often used to describe patients who have suffered severe brain damage and are in a persistent vegetative state. This condition is defined by a complete loss of awareness and consciousness, but with the preservation of certain basic life functions such as breathing, heartbeat, and digestion. In English and Russian languages, the word *vegetable*, when not referring to a plant, has acquired an offensive connotation: for us, "to be a vegetable" or "to be reduced to a vegetable" means to have lost the entire endowment of sensory and motor faculties that was ours even before birth—in effect, to be merely living. Just like plants. (Mancuso and Viola 2015, 50)

In contrast, the portrayal of nature and the plant world in many ancient indigenous cultures and pre-Christian Pagan mythology is distinct from our contemporary perspective. Vegetation deities or god(dess) associated with plants, trees, and other forms of vegetation were commonly known universally. These deities are often worshiped in agricultural societies and are believed to have the power to control the growth of crops, trees, and other plants. As mentioned in the previous chapter, the "Green Man" was a prevalent symbol in such beliefs, not only in Europe but across the globe. However, there are numerous cultural distinctions in how different societies establish methods to communicate with nature and interpret it.

The article "Sensory Ecologies, Plant-Persons, and Multinatural Landscapes in Amazonia" by Glenn H. Shepard, Jr. and Lewis Daly investigates the connections between humans and plants in the Amazon area. One of the examples discussed in the paper is how the Makushi community views plants as individuals, known as "pemon," with shamanic plants being particularly potent entities. Certain particularly powerful plants are considered "plant-shamans" in their own right, botanical equivalents of their human counterparts. (Shepard Jr and Daly 2021, 87) Food crops like manioc are considered to be children (*imun*) of their gardener "mothers" and appear in myths as familial characters. The concept of "substance sharing" is a common theme in several Amazonian cosmologies. Substances of plant origin play a major role in mediating vital transfers between different bodies and subjectivities. These belief systems involve the share of qualities, capacities, and subjectivities between humans and plants, typically through bodily incorporation. Such interactions blur the distinctions between substance, soul, and body, to the point where they become almost indistinguishable. (Santos-Granero 2012), (Shepard Jr and Daly 2021, 86).

In the article “The Buddhahood of Plants and the Japanese View of Nature” by Fumihiko Sueki, the author discusses how East Asian cultures, particularly the Japanese, recognize the intelligence of plants. According to Taoist philosophy, plants are believed to possess a life force or energy known as qi or chi (氣), which can be utilized for healing and other purposes. In Japan, the concept of nature revolved around plants, and there was a belief that people had a strong connection with them. The fecundity of plants symbolized the evolution of the world. According to the *Nihon shoki* (Chronicle of Japan, eighth century), before Ninigi, the grandson of the sun goddess Amaterasu, descended from the heavenly plain, the land of Japan was where “the standing trees, and even the single blade of grass, uttered words.” This is thought to represent the disordered state of nature that existed before the land was “civilized”. Humankind was referred to as hitogusa (people grass); in other words, the mass of people was understood through the model of grasses and trees (Sueki 2018, 3).

Buddhist teachings describe sentient beings as entities that have a mind, and they are believed to experience rebirth across six realms of existence including hells, hungry spirits, animals, asuras, human beings, and heavenly beings. Buddhism aims to free sentient beings from the suffering associated with rebirth, which is known as liberation and nirvana, or the attainment of Buddhahood in Mahayana. According to Fumihiko Sueki’s article, a distinct feature of Japanese Buddhism is the concept of Buddhahood in plants, known as *sōmoku jōbutsu*. Its origins can be traced back to the ninth century. The Buddhahood of grasses and trees came to be a concern precisely because human beings and plants were thought of as being of the same quality. In the eleventh century, a work called *Sōmoku hosshin shugyō jōbutsu ki* (Discourse on the aspiration to enlightenment, practice, and the attainment of Buddhahood by grasses and trees) was written by Ryōgen (912–85) to put an end to the debate on whether insentient beings could attain Buddhahood through their own efforts. According to the work, the existence, growth, change, and decay of plants are equivalent to their aspiration, practice, and nirvana, and therefore, they do not need to strive for enlightenment. This concept of nature as the realm of the Buddha influenced Japanese culture, leading to the abandonment of artificial efforts and a return to nature, which influenced various aspects of Japanese culture, from literature and art to the tea ceremony and flower arranging. (Sueki 2018, 5)

The perception of the plant world and its relation to humans varies greatly across time and cultures. As it has been highlighted in this chapter, many cultures have always viewed plants as living beings with agency, life force, and spiritual qualities. Even in the early times of Western paganism, similar beliefs existed.

In the modern philosophical tradition, the biological body is seen as a universal structure on which human cultural variations alternate superficially. The shift from seeing nature as a magical being to an object or commodity dates back to the Enlightenment era and beyond. The separation of logic and magic deeply empha-

sizes scientific reasoning and empirical evidence. During this time, superstitions, magic, and religious beliefs were often viewed as irrational, primitive, and unscientific. However, it is important to recognize that there are limitations to purely rational and empirical approaches to understanding the world. There are aspects of human and non-human experience that may be difficult to capture or rationalize. The scientific method itself has limitations and biases, such as the potential for experimental design flaws, and often unnecessary violence toward living beings. It is important to remember that science alone may not provide a complete understanding of the world around us. Rebuilding a connection to what has been cut off by anthropocentrism and the conceptual separation of nature and culture can help us gain a deeper appreciation of the magic that exists in the world.

Books such as “Brilliant Green: The Surprising History and Science of Plant Intelligence” by Stefano Mancuso and Alessandra Viola, “Entangled Life” by Merlin Sheldrake, “Symbiotic Planet” by Lynn Margulis, and many others have shown that plants, trees, fungi, and bacteria possess complex mechanisms of communication, trade nutrients, adaptation, survival, and more. They have uncovered the intelligence and complexity of nature and its magical essence. However, the fact that trees can “talk” to each other, or that plants, fungi, and insects live in an intricate and symbiotic world is not new. For thousands of years, numerous ancient and Indigenous cultures have been aware of this. Our perception of the plant, fungal, and bacterial worlds and their relationship to humans is not static but continually evolving, shaped by cultural and scientific developments. It seems that we are rethinking ancient knowledge and adopting a deeper appreciation of nature as a powerful entity.

On representation

*Not being fish, how do we know their happiness?
We can only take an idea and make it into a painting.
To probe the subtleties of the ordinary,
We must describe the indescribable.
Inscriptions on The Pleasures of Fishes (pl. 83),
Chou Tung-ch'ing*

"We can't just assign plants with human traits (consciousness), we must look even deeper to embrace the plant within us! being vegetal is nourishing and reproducing ourselves"
Michael Marder

Plants are decentralized organisms; they do not have a central nervous system or a centralized control center like a brain (Sheldrake 2021, 50). Control is distributed through many different cells and tissues that work together to carry out various functions like photosynthesis, nutrient absorption, and reproduction. Having complex root networks, stems, and leaves allows them to respond to changes in their environment and communicate with other parts of the plant. For example, if one part of a plant is attacked by insects, animals, or diseases, the plant can release chemical signals to other parts of the plant, triggering a response to defend against the threat.

The complex ways in which plants thrive on our planet should make us question and reconsider the conventional methods of the traditional way of depicting and representing them in artistic media. After all, simplistic or inaccurate representations may fail to capture the complexity and diversity of the plant world and the relationships they form with other organisms. Despite being in a different kingdom, fungi are also often overlooked. However, they are intimately connected to plants in numerous ways, including forming symbiotic relationships with their roots, aiding in nutrient absorption, and even serving as communication networks between plants. As such, the need to creatively represent the complexity of the plant world extends to fungi as well.

In popular culture, plants and fungi are commonly portrayed as anthropomorphic monsters, aliens, or mutants, or are utilized as metaphorical concepts and backgrounds. Another way of depicting their life is through time-lapse sequences, the technique used to convey that they are living entities. Such depictions are great for scientific programs to show the movements, mechanisms, and behavior. While in the artistic field, it could be a visually appealing powerful tool, however, at the same time, it could oversimplify the true essence of plant and fungi life.

For example, the Japanese horror film “Matango” 1963 directed by Ishiro Honda (Figure 3). It tells the story of a group of people who become shipwrecked on a deserted island and are forced to eat a type of mushroom that slowly turns them into mushroom-like creatures. Interestingly, due to the makeup used in Matango resembling the facial deformities caused by the atomic bombings in Hiroshima and Nagasaki, the film was on the verge of being banned in Japan. Another portrayal that I find visually interesting is the villain “Terror Blossom,” (Figure 4) a cherry blossom tree-themed monster who served as the central antagonist of the three-part episode of “The Ninja Encounter, Part III Mighty Morphin” S02, E24. The creature’s appearance is that of a one-eyed, tree-like being with massive cherry blossom branches protruding from its head. While the upper part of the monster is intricate and flamboyant, the lower part is rather underwhelming - just a male body in tights and some sort of 18th-century camisole.

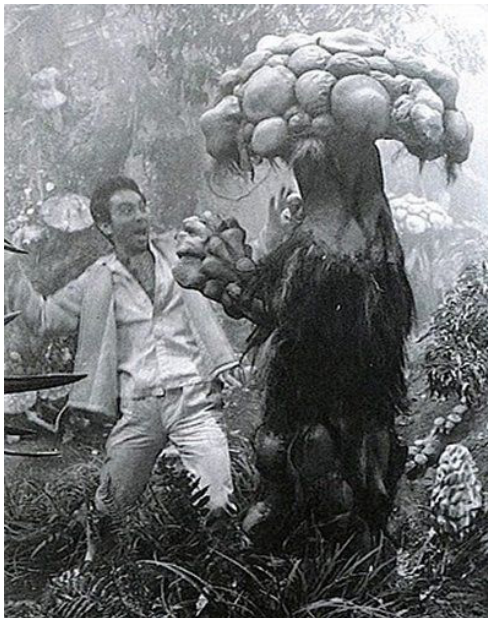


Figure 3



Figure 4

Anthropomorphism has been a creative and valid method of depicting plants and illustrating our connection with them. However, nowadays, it may no longer be considered relevant but outdated.

“Anthropomorphism is usually thought of as an illusion that arises like a blister in soft human minds: untrained, undisciplined, unhardened. There are good reasons for this: When we humanize the world, we may prevent ourselves from understanding the lives of other organisms on their own terms” (Sheldrake 2021, 40).

By recognizing the interdependence and interconnectedness of all living beings, we can move away from anthropocentric views. Turning toward the non-human does not mean reversing the hierarchy between humans and other species. As

humans taking a significant part in the ecosystem. Turning toward the non-human form would mean recognizing nature within ourselves and acknowledging the agency and value of non-human beings in their own right.

We require new perspectives to perceive plants and fungi as powerful beings and appreciate their life. In recent years, there has been a shift in this representation, with plants and fungi being portrayed as more complex and sentient beings, capable of communication and interaction with their environment. This shift has been evident in works of pop culture such as films and video games, where plants and fungi are often portrayed as more than just mere scenery. Instead, they are often depicted as plant or fungi organisms without being just anthropomorphic monsters but also inhabiting intricate mechanisms and abilities. These new perspectives have enabled us to appreciate the beauty and complexity of plants and fungi, and to recognize their intrinsic value as living beings in their own right.

As previously mentioned, "Little Joe" (Figure 6) is a 2019 science fiction drama film directed by Austrian filmmaker Jessica Hausner. The main protagonist is Alice, a single mother and dedicated plant breeder who develops a new species of flower, which she names after her son, Joe. The plant has a special quality - it emits a scent that induces happiness in those who smell it. However, Alice soon realizes that the plant's effect on human behavior is not entirely benign.

"Semiosis" is a science fiction novel written by Sue Burke and published in 2018. The novel is set on a distant planet called Pax, which is inhabited by a group of human colonists who have come to establish a new society. But the planet is also home to a complex ecosystem of sentient plant life that the colonists must learn to coexist with to survive.

"Little Shop of Horrors" 1986 (Figure 5). The film follows a meek floral assistant named Seymour Krelborn, who discovers a strange plant that feeds on human blood and flesh. As the plant, named Audrey II, grows larger and more demanding, Seymour finds himself in a series of increasingly dangerous situations.

"The Last of Us" 2013 (Figure 7) is a post-apocalyptic action-adventure game developed by Naughty Dog. In the game "The Last of Us," the fungal infection that has wiped out most of humanity is caused by a fictional strain of Cordyceps fungus. Cordyceps is a real type of fungus that typically infects insects, taking control of their nervous systems and eventually killing them. In the game's world, the Cordyceps fungus has mutated to infect humans, taking control of their bodies and turning them into zombie-like creatures known as "infected." (I included it even though it is a fungus, still I find it is a good example of representation of nature)

"The Word for World is Forest" by Ursula K. Le Guin is a science fiction novel that takes place on the planet Athshe, inhabited by a small native population of green-



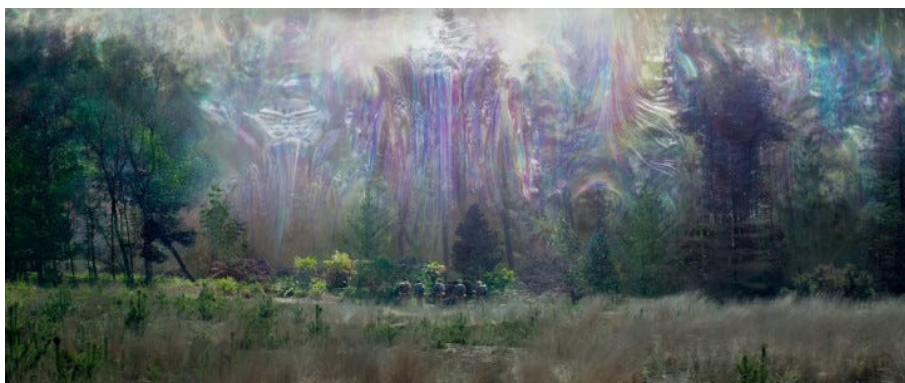
(Figure 5)



(Figure 6)



(Figure 7)



(Figure 8)

furred people called Athsheans. The forests on this planet are home to a species of sentient trees known as “creechies.” These trees possess the ability to communicate telepathically with each other and with the Athsheans, forming a collective consciousness that is revered as a sacred aspect of Athshean culture. When the humans arrive on this planet and begin to destroy the forests, Athsheans, and the sentient forests unite to defend themselves against the invaders.

“Annihilation” 2014 (Figure 8). A science fiction novel by Jeff Vandermeer and a film adaptation, 2018. The story takes place in a mysterious, ever-expanding region called “Area X,” which is home to a variety of strange and mutated plants and animals. The protagonist, a biologist, is part of a team of four scientists sent to explore Area X and uncover its secrets. As they venture deeper into the area, they encounter more and more bizarre and dangerous flora, including plants that emit hypnotic spores. Throughout the novel, the plants are portrayed as both beautiful and deadly, embodying the duality of nature. The biologist, in particular, develops a deep appreciation for the plants and their intricate systems of adaptation and survival, even as she struggles to understand their true nature and purpose.

The given list of books, films, and video games provides a glimpse into the range of a broader trend toward a new wave of plant and fungi representation in popular culture, highlighting their complexity and intrinsic value as living beings and exploring the relationships between humans and these organisms.

Hen and chickens

Chlorophytum comosum

Family: *Asparagaceae*.

Chlorophytum comosum is probably the most cultivated house plant in the world. And that is the main reason I work with it. I needed the most relatable house plant out there, many people have it or at least they saw it at least once. Common names of *Chlorophytum comosum*: in the west Spider Plant, Airplane Plant, spider ivy, ribbon plant, Hen, and chickens in South Africa. Now digging into the origin of the name, I surprisingly found out that it got its name not necessarily because it resembles a spider but because of a mistake. *Anthericum liliago*, a plant native to Europe, was widely believed to have antivenom properties for spider bites. When Carl Peter Thunberg, a Swedish naturalist, formally described *Chlorophytum comosum* in 1794, he classified it as *Anthericum comosum*, assuming it to be a relative of the St. Bernard's lily, also known as southern Europe's "spider plant." *Chlorophytum comosum* (Figure 5) is a plant that is indigenous to the forests of South and West Africa. And indeed, other than St. Bernard's lily being a more upright grower, the two have a lot in common, including grasslike leaves and nearly identical small white flowers (Figure 6). The name *Chlorophytum* it simply means "green plant"; *chlōros* green + *phyton* plant.



Figure 5



Figure 6

Chlorophytum comosum originates from coastal regions of South Africa and in its natural habitat, the plant is not variegated (no mutation in pigment) and is commonly known as the "Green Hen and Chickens". However, it has now spread

and adapted to tropical and sub-tropical areas all around the world, and in many instances, it has become invasive.

When in flower, plant produces long, thin stems up to 60 centimetres with small white flowers and plantlets at the tip of the stem. A single plant with a few of these stems will soon become a mother plant surrounded by a flock of babies - hence the name "Hen and Chickens". I find this name suits the plant perfectly. It is a wonderful association and illustrates its fecundity. From now on, I will refer to *Chlorophytum comosum* as "Hen and Chickens". I find this name suits perfectly the plant. It is such a wonderful association and an illustration of its fecundity. From now on I will refer to *Chlorophytum comosum* as "Hen and Chickens."

Chlorophytum comosum is a well-researched plant. I came across many studies which explored the possibilities of the plant to clean the air and improve mental and physical state of people's health. The 1989 NASA study titled "Interior Landscape Plants for Indoor Air Pollution Abatement" reports on a two-year study of plant phytoremediation to clean air from harmful substances. The purpose of the research was to find a promising approach to reduce levels of air pollutants inside future space habitats using higher plants and their associated soil microorganisms. Studies have shown that the *Chlorophytum comosum* plant is quite effective in cleaning indoor air by absorbing chemicals including formaldehyde, xylene, benzene, and carbon monoxide in homes or offices. However, recent research made by Cummings B.E, and Waring M.S has shown that the NASA studies are not precisely correct. Even though house plants indeed can clean air but proportionally to get clean air in one room we would need a significant number of plants which is not realistic in a real-life scenario. According to their study, the combined VOC-removing ability¹ of plants would require up to 1000 potted plants per square meter to achieve the same removal rate as ventilation systems already provide.

"So, the answer is that plants can clean the air but in ways that are consequential for indoor inhabitation. This does not mean that indoor plants don't have other benefits, but at this time, it does not look like plants sitting passively in a house are effective enough in purifying indoor air quality. Researchers suggest that you'd have to shelter a large number of plants to equal the air purifying efficiency of modern biofilters and other technologies." (Cummings and Waring 2020)

During my research, I stumbled upon a study conducted by Park SH and Mattson RH in hospitals. The study demonstrated that the presence of *Chlorophytum comosum* plants in patients' rooms created a soothing and serene atmosphere, resulting in lower stress levels and promoting better recovery. The researchers observed the impact of these plants on patients' conditions after surgeries and discovered that they assisted in relieving tension, depression, and anxiety while enhancing their overall mood. By alleviating these symptoms, *Chlorophytum comosum* plants may promote the healing process and accelerate recovery.

¹ Volatile Organic Compounds.

“With half the patients, live plants were placed in their rooms during postoperative recovery periods... Viewing plants during the recovery period had a positive influence linking directly to health outcomes of surgical patients. Patients in hospital rooms with plants and flowers had significantly more positive physiologic responses evidenced by lower systolic blood pressure, and lower ratings of pain, anxiety, and fatigue than patients in the control room. Patients with plants also felt more positively about their rooms and evaluated them with higher satisfaction when compared with patients in similar rooms without plants. Based on patients’ comments, plants brightened up the room environment, reduced stress, and also conveyed positive impressions of hospital employees caring for patients.” (Park and Mattson 2009)

For thousands of years, plants have also been given symbolic meanings “Hen and chickens” plant is often associated with prosperity, growth, stability, and resilience. This is because it can reproduce easily and quickly, and its long leaves and many offshoots are seen as symbols of abundance. Their adaptability to different environments is interpreted as a symbol of resilience. Moreover, in Feng Shui, the traditional Chinese practice of arranging living spaces in a harmonious way to balance the energies of the environment and promote good fortune, “Hen and chickens” is believed to attract good luck and positive energy to a living space. According to Feng Shui principles, placing a “Hen and chickens” plant in the far-left corner of a room, known as the wealth corner, can bring prosperity and abundance.

The brain is underground

I began my first attempt to communicate with my houseplant with a dry and calculated approach, on 29 November 2021 hoping to establish a connection. I aimed to detect and record any possible response from the plant. As if I expected it would suddenly start talking to me in an unknown language that I would have to decode. At that time, I believed that a rigorous and systematic scientific investigation would be the most effective way to embark on this exploration, as I had previously encountered numerous scientific articles emphasizing unbiased approaches to experimental subjects.

To ensure accuracy, I sought assistance from Ksenia Khamina, a Ph.D. biologist who was, fortunately, able to help me. Ksenia composed a protocol for a tissue culture medium that would allow me to cultivate the plants in petri dishes. She provided me with a formula for the Murashige growing medium, which is used in micropropagation. This technique involves taking a small piece of plant tissue, such as a leaf, stem, or root, and placing it on a nutrient-rich medium under controlled conditions. It is commonly used for growing disease-free plants and clones in mass production.

I chose to use the tissue culture method for two reasons: first, to achieve a fast-growing root system, and second, based on the experiment performed by Tzer Han Tan titled “How grow-and-switch gravitropism generates root coiling and root waving growth responses in *Medicago truncatula*.”

Plants need to grow downwards to obtain water and nutrients from the soil, but the soil can be a challenging environment. When roots encounter obstacles like rocks, they need to employ root growth behaviors that allow them to explore their surroundings and find a way around these obstacles. In the experimental study, Tzer Han Tan had been particularly interested in understanding how plants grow in rough terrain and how their roots overcome obstacles as they delve deeper into the soil.

One question that has puzzled scientists is what happens when a root comes across a flat or tilted plane. Researcher Tzer Han Tan observed that roots exhibit various morphologies in response to different types of surfaces. Sometimes they grow in circles, other times they wave, and on steep surfaces, they go straight down. Previously, it was believed that these different root morphologies were due

to genetic characteristics of the plant. However, Tzer Han discovered that all of these morphologies actually arose from a search strategy employed by the plant's roots.

Plants rely on their gravitation detection cells to grow their roots straight down toward water and nutrients. However, if the detector is imperfect and the root encounters a surface that is not perpendicular, the root must search for the downward slope. This search strategy involves the root meandering back and forth until it finds the best direction to grow. The root uses a grow-and-switch strategy with 90% accuracy to find the most efficient way down the slope. (Tan et al. 2015, 4) ("How do plant roots find the quickest way down? - Cornell Video" 2015)

Since I did not have any laboratory equipment, I built a small DIY lab in my bedroom to perform the experiment, as it offered the cleanest conditions possible. I had to be creative and use simple things like an Ikea plastic box that I repurposed as a transfer chamber and wax candles to safeguard the air from spores (Figures 7-8). Additionally, I purchased some extra equipment like growing lights, glass petri dishes, and scales. In the end, the final appearance of my "Lab" resembled that of a shrine. To track my progress, I began recording daily observations in a journal, which played a significant role in the development of my project.



Figure 7



Figure 8

With the experiment, I wanted to explore the possibilities of this growing medium. Specifically, I was interested if I could navigate the plants' roots in Petri dishes and 3D-printed molds by using growing nutrients and making coiled and other patterns with the roots. My hypothesis was based on the theory that the roots of plants are the plant's "brains," while the leaves produce food through photosynthesis and the flowers are reproductive organs.

Darwin was the first to observe that the root tip is a highly developed sensory organ capable of sensing and responding to various stimuli. He suggested that signals generated in the root tip induce movement in adjacent parts of the root. In his experiments, he found that removing the tip led to a loss of sensitivity, making the root unable to perceive gravity or differentiate soil density. This led Darwin to propose the “root-brain hypothesis” which initiated the study of root physiology, reflecting the root’s crucial role in the plant’s survival. (Mancuso and Viola 2015, 135)

The concept was to “show” the plant in the space where it lives (my bedroom) and let the roots explore it. To achieve it, I made a rough 3D-printed map of the room that was sized to fit in my palm. It allowed the roots to invade the mold pretty quickly, while also creating a reference to my relation to the plant. In the wild, roots explore underground, meet other plants, trees, fungi, and bacteria, and establish symbiotic relationships. By using their root tips, they delve into the subterranean world, examining rocks and artifacts left by humans and creating networks with other beings. Following this logic in the research, my primary attention was centered on plant roots.

However, my attempt failed on many levels, both practically and conceptually. The experiment ended up being forceful. My plants did not survive during the ten-day experiment because they were contaminated, and the equipment I had was not sufficient to prevent this outcome. On the third day in the growing medium, I noticed slight signs of mold, which continued to grow and eventually killed my plantlings. Frankly, I did not succeed in communicating at all throughout the entire process. I separated the plant from the environment where we exist together in a symbiotic relationship, exchanging air and drinking the same water. It is, as I realized later, a pretty messy life. Here is a citation from my observation journal which was a turning point in my approach to the project:

“I sacrificed my friends for the sake of the experiment. For my curiosity. I relied on the scientific approach. I made a sterile environment for the plants to die. I separated us while in day-to-day life we live in one “petri dish.” I bread in the air it cleans and probably some spores from the soil, we drink the same water and probably many other things connect us but I simply don’t notice them. In a way, we indeed have a symbiotic relationship. It relies on me I must fertilize its soil, clean it, and report it when the time comes. In exchange it gives me the satisfaction of seeing lavash foliage and occasionally flowers, it provides me with clean air. Why then I am tormenting my plant for my project? I should rely on my knowledge the knowledge that we all have. I’m going to use the well-known and successful water culture method.”

Instead of manipulating and forcing my plants to do things I wanted, I decided to find a more compassionate way to exist with my plant. I needed to become a careful observer and enter an open-ended exploratory process.

Protocol

General considerations:

- Handle heated materials with care
- Do not inhale the medium or gellan powder
- The most important part of the work is to avoid contamination with bacteria and fungi. Even one fungal spore or bacterial cell that comes into contact with the growth medium will rapidly reproduce and overtake the Petri dish
- If this procedure results in contamination with bacteria or fungi, it shall be modified
- Consider downscaling the first procedure (e.g., choose 2 plant species to grow and test the procedure on 2-3 sprouts, consider downscaling the volume of medium that will be prepared)

Materials for 1 L medium:

(Could be divided by 5 for 250ml)

- 1) 2.291 grams of Murashige-Skood Basic Medium
- 2) 1 L sterile distilled water
- 3) 4 grams of gellan
- 4) 30 grams sucrose (sugar)
- 5) 1.5 L or 2 L container for the growth medium
- 6) Petri dishes
- 7) 70% alcohol in a spray bottle
- 8) Forceps or tweezers (used to transfer the plant material to the prepared containers with medium)
- 9) Gloves
- 10) Your chosen plants
- 11) Detergent-water mixture (1 ml of detergent (soap) per liter of water)

Procedure:

1. Always wear gloves during the procedure, spray the gloves with a 70% alcohol solution and rub the hands together to spread the alcohol just prior to work
2. Sterilize Petri dishes with 70% alcohol, and leave them to ensure that alcohol evaporated
3. Take a clean beaker and add 800 ml sterile water to it
4. Add 2.291 grams of MS media, 30 grams of sugar
5. When adding the MS media and sugar rapidly stir the mixture to avoid clumping
6. Add 4 grams of gellan and stir it
7. Heat it on medium-low heat while continuously stirring it
8. Turn off the heat when the mixture boils and allow to cool it for 5-6 minutes. Fill Petri dishes 1/3 full. Leave the plates for 2-3 hours

to allow the gellan to cool down and firm.

9. The plant material must be sterilized to remove any bacteria or fungal spores. Wash the prepared plant material in a detergent-water mixture for 10 minutes.

10. Spray the forceps with 70% alcohol. Take a prepared section of plant material with forceps and place it into the medium.

11. Place the Petri dishes containing plant sections in a well-ventilated room area. It will grow more quickly if the plants are placed under the light to provide at least 12 hours of light per day. Ensure that the temperature does not go over 28°C. Check the dishes daily and discard any that show signs of contamination with bacteria or fungi.

Documentation process.

2 different plants for the test

Water- tap water and distilled + murashige for the big plants.

Take the measurements of the plants (photos with a ruler) at the beginning and the end of the experiment

Experiment 1 (documentation)

Spider Plant - *Chlorophytum comosum*

Kalanchoe plant

MS media proportions:

250ml distilled water

0.4582g MS

0.8g Gellan

6g Sugar

☀ 12h Light lamp

Water culture:

225ml distilled water

0.35g Ms

Observation journal.

Light regime:

29.11.21

Start 15:30 End 19:30

30.11.21

Start 8:00 End 19:30

1.12.21

Start 9:00 End 20:35

2.12.21

Start 15:30 End 23:08 (signs of mold)

3.12.21

Start 15:00 End 23:00

- Mold started to grow on the small kalanchoe plant in gellan. On others, it grows faster, and the roots are fully covered in mold

This means that I didn't fully disinfect the roots with the antibacterial soapy solution.

4.12.21

Mold is growing even faster. I switched off the lamp completely

5.12.21

Mold got bigger

I sacrificed my friends for the sake of the experiment. For my curiosity. I relied on the scientific approach. I made a sterile environment for the plants to die. I separated us while in day-to-day life we live in one "petri dish." I bread in the air it cleans and probably some spores from the soil, we drink the same water and probably many other things connect us but I simply don't notice them. In a way, we indeed have a symbiotic relationship. It relies on me I must fertilize its soil, clean it, and report it when the time comes. In exchange it gives me the satisfaction of seeing lavash foliage and occasionally flowers, it provides me with clean air. Why then I am tormenting my plant for my project? I should rely on my knowledge the knowledge that we all have. I'm going to use the well-known and successful water culture method.

6.12.21

Signs of a new type of mold on gellan. This means the gellan got contaminated in the preparation step

7.12.21

No data

8.12.21

Discarding the samples in the bleach solution

"Humans may have forgotten the spirits, but the spirits remember us"
(Sarangerel 2003, 5)

Ami - the soul of the middle world

I am from the Republic of Buryatia, located in Eastern Siberia, on the border with Mongolia. Buryat people are of Mongolian descent, and our spiritual beliefs are influenced by both Tibetan Buddhism and Shamanism. Growing up, the concept of animism was natural to me, and my grandparents taught me from a young age how to treat all living beings with respect, make rituals and praise the spirits. They explained that animals and trees have spirits, souls just like humans. The mountains, forests, rivers, lakes, rocks, and trees all have their spirits, and they deserve our respect for the many gifts they offer us, such as food, shelter, and materials.

My favorite sacred place is located near the village where my grandfather was born. It is a foresty area with a hill on top of where we perform a ritual. We visit that place to welcome and honor the spirits of our ancestors, conveying to them our deep respect and remembrance. We ask them for prosperity and bring offerings of Sagaan Edeen (white food) (milk, cheese, butter, sour cream) and some sweets. The ritual is led by the eldest member of the family, who chants mantras and revolves slowly while scattering the offerings. They repeat this by pouring milk on the ground in a circular motion.

White food, starting from the cradle with mother's milk, has accompanied humans throughout their lives. For the Buryats, milk and all milk products are the most revered and sacred. Since ancient times, white milk has been offered daily to spirits both inside and outside the dwelling. The most honored guests were welcomed with white food, and it was served to local spirits. After childbirth or during the burial. Milk is present during the building of a house or a new yurt, at all wedding ceremonies, and during all stages of Sagaan (Lunar New Year) celebrations, as the most sacred product.

Buryat-Mongolian Shamanism also known as Tengerism is an animistic religion that centers around the worship of the Tengri (Blue Sky). Everything in the world is considered to have a spirit, including animals, plants, mountains, rivers, and rocks. The spirits have the power to influence human life, both positively and negatively, and it is important to show respect and gratitude to them. The shaman is a central figure in Buryat-Mongolian Shamanism, acting as a mediator between the human and spirit worlds, and performing rituals and ceremonies to maintain balance and harmony between them.

The universe is considered to consist of three worlds – the upper, middle, and lower. They are all inhabited by spirits, but the middle world is special because it

also includes our material world. The upper world is believed to be located in the heavens, not in outer space, but in another dimension. The lower world is populated by human souls awaiting their next rebirth. But it is not a bleak place at all, for it has not lost its naturalness. (Sarangerel 2003, 170-172)

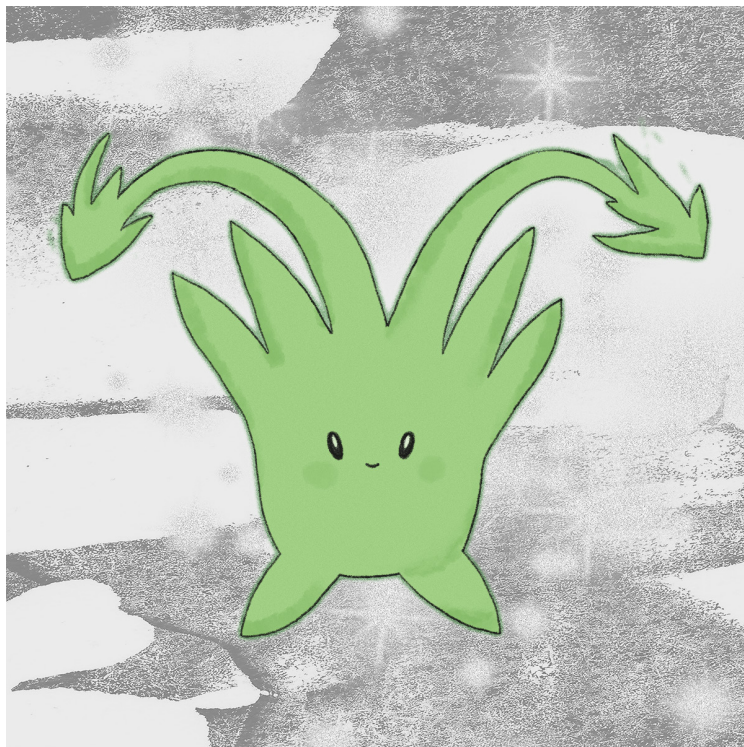
The Buryats and Mongols understood the importance of honoring and respecting the sky, water, and earth in order to maintain balance in the world. All things and places contain spirits and souls, creating a universe that can be symbolized by a circle. This circle represents not only the three dimensions but also time itself, as everything moves in a circular motion. This includes the sun's path, the yearly cycle, and the cycle of all living spirits as they are reborn on Earth. The circle also encompasses the axes with the four directions and the center of the world, connecting the upper world of the Eternal Heavens and the lower world of Mother Earth.

These notions and traditions are ingrained in my life to such an extent that it would be difficult to alter them. However, after conducting my first plant experiment, I came to the realization of how unnatural it was to forcibly bend nature to my will, particularly because my aim was to establish communication with the plant.

I cannot claim that I fully understood my house plant. Instead, I recognize that I do not need it as I do not need to prove that it responds to me in any other way. It is enough for me to see that when its leaves look droopy, I need to water it.

The phrase "Science tries to make magic real" has stuck with me since I first heard it. Indeed, the basis of science can be traced back to the magical framework of early discoveries of natural processes and alchemy. Despite this, the two fields are often seen as polar opposites. The world of magic depends on natural energies and recognizes the power of non-human entities, striving to collaborate with them. Science aims to elucidate and demystify the phenomena of the world around us.

Perhaps it is possible that by combining the perspectives of science and magic, we could attain a more thorough comprehension of the world and our position within it. By tapping into our inner resources and the power of the natural world, we may be better equipped for the future.



References

Borroff, Marie. 1967. *Sir Gawain and the Green Knight a new verse translation*. New York: W · W · Norton & Company · Inc ·.

Cummings, B.E, and M.S Waring. 2020. *Potted plants do not improve indoor air quality: a review and analysis of reported VOC removal efficiencies*. N.p.: J Expo Sci Environ Epidemiol.

"How do plant roots find the quickest way down? - Cornell Video." 2015. Cornell University. <https://www.cornell.edu/video/how-plant-roots-find-quickest-way-down>.

Jacobs, Joela. 2019. *Phytopoetics: Upending the Passive Paradigm with Vegetal Violence and Eroticism*. Vol. Vol. 5. No. 2 vols. N.p.: Catalyst: Feminism, Theory, Technoscience. <https://doi.org/10.28968/cftt.v5i2.30027>.

Kimmerer, Robin W. 2013. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. N.p.: Milkweed Editions.

Machinic Specters. 2022. "*The will to vegetate*." Machinic Specters. <https://machinicspecters.substack.com/p/the-will-to-vegetate>.

Mancuso, Stefano, and Alessandra Viola. 2015. *Brilliant Green: The Surprising History and Science of Plant Intelligence*. N.p.: Island Press.

Ovid. 2004. *Metamorphoses*. Translated by David Raeburn. N.p.: Penguin Books Limited.

Park, SH, and RH Mattson. 2009. *Ornamental indoor plants in hospital rooms enhanced health outcomes of patients recovering from surgery*. N.p.: J Altern Complement Med. 10.1089/acm.2009.0075.

Ross, Professor of Modern History C. 2017. *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World*. N.p.: Oxford University Press, USA.

Santos-Granero, Fernando. 2012. "*Beinghood and people-making in native Amazonia A constructional approach with a perspectival coda*." HAU: Journal of Ethnographic Theory 2, no. 1 (Spring). <https://doi.org/10.14318/hau2.1.010>.

Sarangerel. 2003. *Chosen by the Spirits: Following Your Shamanic Calling*. N.p.: Fair-Press.

Sheldrake, Merlin. 2021. *Entangled Life: How Fungi Make Our Worlds, Change Our Minds & Shape Our Futures*. N.p.: Random House Publishing Group.

Shepard Jr, Glenn H., and Lewis Daly. 2021. "*Sensory ecologies, plant-persons, and multinatural landscapes in Amazonia*." Botany 100, no. 2 (November). <https://doi.org/10.1139/cjb-2021-0107>.

Smirnov, D.Y, A.G Kabanets, B.J Milakovsky, E.A Lepeshkin, and D.V Sychikov.

2013. *"Illegal logging in the Russian Far East: global demand and taiga destruction."* WWF Russia.

Sueki, Fumihiko. 2018. *"The Buddhahood of Plants and the Japanese View of Nature."* Dharma World 45 (JULY–DEC).

Tan, Tzer Han, Jesse Silverberg, Daniela Floss, Maria Harrison, Christopher Henley, and Itai Cohen. 2015. *"How grow-and-switch gravitropism generates root coiling and root waving growth responses in Medicago truncatula."* Proceedings of the National Academy of Sciences of the United States of America. 112 (October). 10.1073/pnas.1509942112.

Tracy, Larissa. 2007. "A Knight of God or the Goddess?: Rethinking Religious Syncretism in 'Sir Gawain and the Green Knight.'" *Arthuriana* 17, no. 3 (FALL). <https://www.jstor.org/stable/27870844>.

