Poetics of Mycelium

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"*Heaven and earth were born with me, and all things are one with me*" *Chuang Tzu*

Mycelium is a root-like structure of a fungi, consisting of a mass of branching, thread-like hyphae. Its normal form is that of branched, slender, entangled, anastomosing, hyaline threads. Fungal colonies composed of mycelium are commonly found in and on soil and many other substrates.

Mycelium plays a vital role in both terrestrial and aquatic ecosystems, where its vast and intricate networks weave through soil, decaying matter, and living organisms. It breaks down plant and animal debris, enriching the environment by creating fertile new soils. Additionally, mycelium recycles carbon, nitrogen, and other essential elements, while connecting the diverse components of the ecosystem.

The largest known fungus may be a honey fungus of the species *Armillaria ostoyae*. In the Malheur National Forest, nestled in the Blue Mountains of eastern Oregon, U.S., a colony of this species has been identified as the largest fungal organism on Earth. Estimated to be around 2,200 years old, it spans an astonishing 8.9 square kilometers. If considered a single organism, it holds the title of the largest living organism in the world by area. But how can so many mushrooms belong to the same organism? You guessed it: the mycelial network.

Nicholas P. Money, professor of biology at Miami University has confirmed that fungal hyphae show exquisite sensitivity to their environment. This reactiveness is demonstrated at many levels, from changes in the form of the hypha resulting from alterations in patterns of exocytosis, to membrane excitation, and mechanisms of wound repair. These behaviors are expressions of cellular consciousness. Fungal mycelia display decision-making abilities and adjust their developmental patterns in response to interactions with other organisms. Remarkably, mycelia may even possess spatial recognition and learning capabilities, along with a form of short-term memory.

What we truly seek to explore is whether there exists a form of consciousness and ecological intelligence within the mycelium. How does it work on a technical level? How does mycelium establish cross-species communication and build symbiotic relationships with other ecosystems in the forest? What happens when we include more-than-human species in our systems of collective decision-making? Could there be a poetic, interdependent, animistic network of coexistence? And can the techniques and intelligence of mycelium be harnessed to reorient, bio-integrate, and initiate a planetary ecopolitics?

Mycelium constitutes a planetary, stratigraphically distributed, neural-network-like system of negative organismic governance, one that can inspire a regenerated epistemology of planetary ecopolitics in relation to Deleuze's concept of the "Rhizome." In other words, it moves beyond frameworks that define the connections between humans and nature, biodiversity, and trans-species relationships through necropolitical paradigms such as the nation-state, colonialism, neoliberalism, and human supremacy. Instead, it advances an

eco-political poetics of holobiont connectivity, non-hierarchical coexistence, and sumbiocentrism.

The ecological governance embodied by mycelium resembles the interconnected, interwoven dynamics of particles in quantum entanglement. It continuously articulates, reorganizes, and nourishes the intrinsic interdependence and cross-species synergies of the ecosphere as a whole, enabling humanity to reawaken to the fragility and unsustainability of its own political structures. Meanwhile, it reconfigures its political paradigm so that sovereignty is exercised through an intimate life-togetherness — a symbiotic relationship among organisms of different species, interconnected with one another and with the shared environment they inhabit.

As it is currently understood, life on Earth has evolved through two primary processes: first, Darwinian evolution by natural selection, which favors fitness within a given environment; and second, Margulisian evolution through symbiogenesis, fostering mutualism between species in the pursuit of shared interests. The practice of mycelial symbiosis has, over the past 50 years, profoundly transformed our planetary understanding of ourselves and our relationships with other species. Meanwhile, the symbiotic collective consciousness of the mycelium continues to heal humanity's species loneliness.

When rationality takes precedence over nature, humanity drifts ever further from the first nature, retreating instead into an "artificial nature" of its own construction. How can the Social Ecology, as envisioned by Murray Bookchin, be reconstructed through processes of decolonization, anti-extractivism, de-scarcity, and de-hierarchization? Is it possible to cultivate a third nature — one of endosymbiosis between human and mycelial communities? Not the new "Tianxia System" of socialism and grand unification, nor the post-capitalist necropolitics rooted in colonialism and ecocide, but rather the symbiotic praxis of the multitudes, grounded in mutualism, communalism, and direct action.

Mycelium constructs a post relational aesthetics; it exists between species, embodying an interrogative, speculative, and deeply connected presence. Mycelial networks can be understood as inseparable parts of an interwoven web — one that echoes the "Net of Indra," an infinite expanse of pearls, each reflecting the light of all the others. When we isolate a single pearl, or the ego, from this cosmic tapestry, we distort the interconnectedness and interdependence of the entire, infinitely faceted intergalactic net.

I am the tremor beyond the clock's hands, seated on time's pedestal,Weary as a fungus,
Seeping into the hunger for damp, conjuring the swamp's own hymns.
Burdened plants sprawl outward, dark emotions irrigate them, black soil entombs them.

I am the miner amid the cries, the halo in the ring of algae reefs,
The union of star-born dust, the comet dragged beyond its vanishing border.
A thousand plateaus pulse, entwining Gaia's nerves, misting the air with spore-born haze.

Within the totem, quantum fungi bloom, spreading ancient *Nine Songs*, loosing braids to the wind.
I am the sleepless tremble, the mutual aid in spasm, the one beyond the wild rays,
Carving words deep into soil, into the gleaming veins of wood.

Earthworm tears, moss whispers, pulse-fed etymologies —
I am the child in song, the breath of the distiller, crafting the rhetoric that binds the plants,
And the twenty-four histories of wings, distilling the void into pure oxygen.

Mycelium undeniably demonstrates spatial recognition, memory, and intelligence. It is a conscious organism. Fungal hyphae adapt to the texture of soil and the anatomy of plant and animal tissues as they advance, foraging for sustenance. They have effectively created a forest internet — the "Wood Wide Web" — interconnecting entire forest ecosystems into a web of distributed collective intelligence and symbiosis. Mycelial techniques offer the potential for ecosystem regeneration and repair on a planetary scale. They stimulate the regeneration of ecological and geological neurons within complex, multi-network structures.

Mycologist Merlin Sheldrake, in his book *Entangled Lives*, writes, "Mycelial coordination is difficult to understand because there is no center of control. Fungi as decentralized organisms, there are no operational centers, no capital cities, no seats of government. Control is dispersed: Mycelial coordination takes place both everywhere at once and nowhere in particular. A fragment of mycelium can regenerate an entire network, meaning that a single mycelial individual—if you're brave enough to use that word—is potentially immortal."

What's more, mycelial networks form "streams of embodiment" that act as an ecological connective tissue, stitching the rest of the living world into relation. Do these networks constitute a single organism, or a plurality? A plurisingularity? Might they even inspire a new politics of Sumbiocracy?

Mycelial technique bears a certain resemblance to the activities of non-human, or even cross-species, actors described in the "Actor-Network Theory" developed by French philosopher Bruno Latour and others — an approach that also informs perspectives on mycelial action and restorationism. Within the action network of mycelium, there is no central authority, no subject-object dichotomy. Each node is a subject, an actor capable of agency, positioned in a dynamic of affirmative action. Every mycelial subject exists within an intersubjective relationship of mutual recognition, interdependence, and reciprocal influence, collectively constructing a network of mycelial commons, with ecological restoration and sustainability at its core.

Meanwhile, they can also enable networked, distributed, and anarchic planetary political structures: there is no central command, only local subsidiarity and problem-solving at the edges. If you disrupt or disturb a mycelial network, it will grow more densely elsewhere. Mycelium forms a mutually beneficial, symbiotic, cooperative, interoperable, and stochastically composable network that intelligently interfaces with many different species to achieve positive-sum outcomes. It is therefore fractally egalitarian, with no upper or lower hierarchies.

Andrew Adamatzky, a British scientist who studies unconventional computing, has raised the possibility of a fungal computer. He has proposed that basidiomycetes can be used as computing devices, where information is represented by spikes of electrical activity, computation is carried out within the mycelial network, and the interface is realized through fruiting bodies. Adamatzky views it as a type of sensor, acknowledging the relative slowness of such computations, but envisions its application in distributed, large-scale environmental sensing systems.

Mycelium operates at a level of complexity that surpasses the computational power of even the most advanced supercomputers, which we might imagine as biologized quantum computers. Through the cross-species interface provided by mycelial intelligence, humans could potentially receive and transmit vast amounts of data concerning the movement of all organisms across the landscape within the ecosphere. By biotechnologically programming myconeurological networks to monitor and respond to environmental threats, and by fully integrating themselves in a de-anthropocentric, cross-species-aware manner, humans could contribute to the creation of a fully ecologically reset "Mycopunk" future.

The notion that fungi may participate in some form of planetary interspecies communication or consciousness through their mycelium might seem a bit far out, but consider that psychedelic mushrooms have been used to expand human consciousness for countless millennia. Beyond the well-known psychedelic properties of certain species are their neuritogenic effects — that is, their ability to promote the growth of new neural cells and enhance communication between them. The resemblance between the filamentous structures of the brain and the mycelial networks within the soil may, therefore, be more than mere coincidence.

American ethnobotanist and mystic Terence McKenna believed that if humans consume psilocybin at a sufficient level, it can dissolve the ego and eliminate boundaries, thereby fostering community cohesion and collective activity. Can we then consider whether the symbiosis of mycelium in the soil might generate and catalyze a symbiotic, collaborative, direct-democratic post-communalism within human consciousness through its pharmacological effects?

As we learn about fungi, the boundaries of the self begin to blur. The sense of individuality and separateness from our environment and nature dissolves. This realization can lead to a profound shift in how we view ourselves and our place in the world. There is no clear boundary between where the body begins and the environment ends. Instead, we are in a constant, what Merleau-Ponty calls, *embodied inter-becoming*. Just as mycelium feeds the fungi, our environment feeds our cognition.

Spores drift down, mycelium spreads wide, dust blankets tangled whispers.
Within plants, cultivation and freedom surrender to disguise, to rootless tribes.
The singer of ancient odes rises, grasping the pillar,Taking the edges for order,

Symbiosis for ceremony, the river's drift for wisdom, passion’s tremors
weaving the fibered layers, stirring the promise of string theory.
Pollinators wield the grammar of plants, mycelium scripts organic magnetic fields.

Fungi, formless and void of definition, sprout fruiting bodies at random,
Mending meaningless lives, resetting time unbound by time.
The empathic forest lines up its interdependent scripts,Hoarding the fervor and decay of dark, rich humus.

Rippled poems, songs of the boughs, sing the photosynthesis of inverted tales.
Children dive into the chemical chronicles of fungal realms,Guided by the bee's dance, dosed with visions,
Defying the endless branching trials, circling death-traps of recursion.

Mycelial mutualism begins with mycelial connections that penetrate tree roots, forming tight physical bonds through which water and dissolved minerals are transferred to the trees in exchange for food produced by photosynthesis. The mycelium of the mycorrhizal fungus functions as an auxiliary root system for the tree, spreading its filamentous hyphae over a larger area than the plant's own rootlets can reach.

Mycologist Paul Stamets, in *Mycelium Running: How Mushrooms Can Help Save the World*, stated, "I believe that mycelium is the neurological network of nature. Interlacing mosaics of mycelium infuse habitats with information-sharing membranes. These membranes are aware, react to change, and collectively have the long-term health of the host environment in mind. The mycelium stays in constant molecular communication with its environment, devising diverse enzymatic and chemical responses to complex challenges." Meanwhile, plants also appear to use mycelium as a language to communicate within ecosystems, with mycelium functioning as a biologically encoded network—an ecolinguistic model that connects organisms.

Mycelial techniques embody a form of edge-centered wisdom, where perception and response arise from the margins, dissolving the need for centralized hierarchical structures. In the dystopian context of relentless human intervention in the biosphere, it becomes essential to reimagine planetary eco-politics through the living architecture of mycelial networks. This alternative political vision seeks to cultivate cross-species kinships and to de-anthropocentrize ecological thought, moving beyond frameworks that place humans at the center of the biosphere. It aspires to re-commonize interdependent relationships grounded in symbiosis, synergy, resilience, and multi-local responsiveness, offering an alternative to the prevailing systems of unilateral, monopolistic, and hierarchical eco-political dominance.

Traditional democracy is, by definition, anthropocentric and capable only of offering partial answers to human-biased questions concerning the body politic. Yet, the multiple crises engulfing the Earth demand that Sumbiocrats possess a deep understanding of entire ecosystems and the symbiotic relationships that sustain them, as well as universal solutions for planetary eco-politics that fully incorporate non-human life in all its forms.

Perhaps both Modernism and the so-called "Great Geographical Discoveries" are fundamentally rooted in colonial plunder and extraction. How, then, can we establish a planetary governance model inspired by mycelial politics for the Symbiocene? A system that draws on the most inclusive ideas and organizational forms of the past to build a planetary ecological politics grounded in collective intelligence, symbiosis, deep ecology, and holobiont connectivity.

Fungi engage in a wide spectrum of symbiotic relationships, ranging from parasitism to mutualism, all of which play a crucial role in sustaining biodiversity across ecosystems worldwide. For instance, cellulose-digesting fungi have evolved to live within the guts of termites, allowing these insects to consume and digest wood. Another remarkable form of fungal symbiosis is found in mycorrhizae, or mycorrhizal networks, where fungi form intricate connections with plant roots to support nutrient exchange and ecological balance.

The role of mycorrhizal fungi in the biosphere, through mutualistic symbiosis, is profoundly significant and serves as a powerful example of mutual aid as a driving force

in evolution. This concept was originally championed by Peter Kropotkin and later expanded upon by Murray Bookchin, becoming a cornerstone of Social Ecology. It embodies the principle of "unity in diversity," where mutualistic relationships between different organisms in the biosphere open new evolutionary pathways and possibilities.

Ecopolitical action, in the form of mycelial parasitism, offers a potent and necessary disruption within a post-capitalist society dominated by technocratic elites. Could we, like Cordyceps, draw upon the strategies of infiltration—puncturing, infecting, and manipulating the decaying body of post-capitalism in a mycelium-running fashion? Gradually zombifying its various components, steering it persistently off course from its intended trajectory and presumed utility. And, in a burst of ecstatic, trembling ritual, guiding it toward the sun, until at last, we penetrate its skull and bring forth a new emergence.

What can we learn from the way of life of the omnipresent, symbiotically existing mycelium? How can we activate the nodes of empathy and connection within our relational web of togetherness? And how might new forms of solidarity help us reimagine networks of mutual aid, care, and political practice—networks that are cross-species, permanently interconnected, and mutually empowering? Is it possible to build a deterritorialized, endosymbiotic, non-homogeneous, and mycopoetic planetary ecopolitics? How, and what, might we learn from fungal superorganisms to compost, cannibalize, and digest the toxins of the Anthropocene, in order to revitalize our ecological agency?

Time's miller stores within the earth, a thousand strands of crystalline rites.
Song and cry intertwine, as water bodies unfurl waterfalls of roots.
Hunger crouches in the gut of the mycelium, brewing shamanic trances and spectral limbs of spirit.

Even if music is buried, passion and sorrow will still root themselves deep.
Piercing stone, curling through branch and blade, like the silence before clouds learn to bloom.
Sunlight scalds the mycelium with blazing verses; mushrooms awaken as vessels of random insight.

Tasting every herb, boiling the dew, the gatherer wavers between sacrifice and spiritual quest.
Scarcity cannot mend the self, nor can austerity unmake its nature.
Like spectra and tides, rising and falling, beyond even the usurper's reach.

The entire forest, a labyrinth of poetics, treats infection itself as a path to cultivation.
Reciting riddles knotted like bamboo joints, weaving mycelial songs that cross all species.
Leafless and self-born, branchless in spread, flowerless, fruitless — a meditation beyond organs.

Awareness is not an exclusive privilege of the human mind; rather, it exists in many forms throughout nature. Fungal consciousness, like human consciousness, is just one expression within this diverse and intricate biological continuum. In other words, consciousness is a fundamental characteristic of life itself, not a special attribute reserved for Homo sapiens. The mycelial network is composed of countless "minimal selfhoods"—

conscious patterns of behavior that do not require a brain or neural tissue. An infinite network of mycelium thus elevates consciousness and intelligence to the level of multicellular organisms: brainless beings whose intricate sensory and response mechanisms are far greater than the sum of their parts.

Is there a possibility of linkage and interpenetration between non-human and human consciousness, where communication within the mycelium unfolds through electrical impulses and electrolytes? Could human consciousness be re-embedded within the entangled, holobiont processes of reciprocal, collective decision-making? Given that certain mycelia can control and manipulate insects, might there exist a form of ecological sensing—a symbiotic, collective consciousness operating through digestion, infection, and bioprogramming of the human nervous system and the human-bacteria interface, mediated by mycelium? Let us reflect and act upon how we might contribute to shaping and nurturing ecological inter-relations and inter-actions in a regenerative, cross-species, and consciously co-evolving way.

Mycelial intelligence is one of communal support, not domination—it embodies redistribution and community. When considered in the context of re-indigenization, mycelial intelligence weaves together nature, spirituality, and indigenous wisdom to form an omnipresent socio-political narrative and an epistemologically emancipatory practice. It offers an organic response to chaos and entanglement, serving as an example of self-organization and the potential for de-authorizing hierarchical control within complex communities.

Re-indigenization is an act of resistance against the cannibalism of insatiable colonialism and consumerism, and a restoration of the indigenous terrestrial order. It seeks to liberate all species, including mycelium, from the shackles of denaturalization and species hierarchy in the Anthropocene. By opposing the “monocultures of the mind” through indigenous languages, treaties and covenants, ethical systems, and land-care practices, it strives to restore the Earth's immune system.

In an article co-authored by mycologist Patricia Keshian and writer Hasmik Jurakian, they write: “Fungi have been largely neglected by science and European-American culture, and collectively, they have a reputation for being harmful, poisonous, and pathogenic despite all of their critical ecological functions described above. The explanation for this is not straightforward but is related to the ways in which fungi disrupt the Western cultural values of individualism, predictability, and control. By embodying collective, unpredictable, and uncontrollable biologies, fungi have been perceived as antagonistic”.

Mycelium-constituted ecopolitics envisions a collective practice of leaderless, heterogeneous communication that operates outside the established order. A mycelial approach to politics should mirror the proliferating nature of the mycelium itself, creating open-ended, dynamic, indeterminate, flexible, and communicative structures. It must reject all temptations of ego-formation and centralization. Such stagnant structures should be consumed and cannibalized. Eat your ego, surrender it and transform it. Redistribute the excess energy generously to sustain the collective, affirmative body that underlies the active exploration and expansion of the mycelial network.

The term Symbiocene was coined by Australian philosopher Glenn Albrecht in 2011. The Symbiocene will be characterised by sumbiocentric human intelligence that replicates, in all aspects of social life, the symbiotic and mutually reinforcing, life-reproducing forms

and processes found in all living systems. The Symbiocene will be that period in Earth's history where humans symbiotically reintegrate themselves, emotionally, psychologically and technologically, into nature and natural systems.

The ideas derived from this understanding of symbiosis have yet to be fully integrated into the diverse domains of human activity. Such insights should already have inspired a new mode of thinking—*sumbiocentric* thinking—that mirrors the associative, interconnected dimensions of life itself. In contrast to anthropocentrism, or human-centred thinking, sumbiocentrism calls for an awareness of the harmony of life-interests across the entirety of the *symbioment*. As a philosophical position, sumbiocentrism asserts that the preservation of diversity and the cultivation of harmony within symbiotically unified, complex systems represents the highest ethical good.

The symbiotic revolution calls for a profound re-evaluation of ourselves and the relinquishment of the notion of human exceptionalism. The belief that humans are autonomous entities, engaging only in 'external' relationships with other beings, has proven to be a misconception. In truth, we are *holobionts*—composite organisms, living in intricate symbiosis with countless others, sharing a common life within what can be called the *biocomunen*. As the inevitable transition from the anthropocentric *Anthropocene* to the sumbiocentric *Symbiocene* unfolds, it becomes clear: while affirming human rights, we must equally recognize the rights of nature, and the fundamental symbiotic right of all beings to coexist and flourish together.

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Inspired by

Chuang Tzu
Gilles Deleuze
Bruno Latour
Merleau-Ponty
Peter Kropotkin
Murray Bookchin
Glenn Albrecht
Merlin Sheldrake
Paul Stamets
Nicholas P. Money
Lynn Margulis
Andrew Adamatzky
Kristina Šekrst
Jessica Böhme
Michelle Montgomery
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Anna Lowenhaupt Tsing
Patricia Kaishian
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Thom Blane
Sophie Strand