

MYCELIAL MATTERS: FUNGAL EPISTEMICS AND THE BIRTH OF THE
NEW MATERIALISMS

by

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This article traces how mycelial-thinking grabbed the attention of the contemporary new materialists. Tracing moments of contact, lines of change and adaptation, and the birth of ‘mushroom fever’ in new materialisms, the article does not afford its readers a linear approach or chronological ‘history of the mushroom in new materialism’. Rather, entanglements of mycelial matters, the limitations of modernist epistemologies, and the rise of new technologies in the present are *fictioned* as key parts of a new ontological approach to what matter *is* in a complex age, how new materialists aim to understand it, and what that means for epistemological discourses in the twenty-first century. The article combines the multiple histories, associated practices, artworks and stories of fungi to show how new materialisms have been spored by mushroom-thinking—a phenomenon that is forever unfolding, growing, changing, and and and At stake are issues of justice and justice-mattering and how fungal epistemics and writing practices aim to address these, cutting together-apart critiques of anthropocenic metaphor, flattened ontologies and mycelial–digital divides, and decolonizing the field of futures-thinking with non-Northern Western encounters with mycelium.

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PRELUDE: MYCELIAL ANECDOTES TO WHET A READER’S APPETITE

*It matters what matters we use to think other matters with; it matters what stories we tell
to tell other stories with.*¹

I have just eaten some mushrooms. They are known as ‘oyster mushrooms’.² They are large and a little floppy. Some call them ‘shell-like’ but to me they resemble giant ears—the likes

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1 Donna J. Haraway, *Staying with the trouble: making kin in the Chthulucene* (Duke University Press, Durham, NC, 2016), p. 36.

2 In the UK.

of which you might find in fantasy depictions of elves or goblins or other creatures that live in the woods in British and European fairytales. As a child, when I used to wander through forests with friends or family, I regularly imagined with each mushroom encounter that the forest had grown its own often hidden and unknowable ears listening to each occupant of the forest as a part of its endlessly growing body. The metaphor stuck with me well into my scholarly engagements with art and philosophy, not in some kind of metaphysical sense where I might encounter a forest and learn to speak to it, but in a way that is perhaps even deeper than that kind of dialectal, turn-taking assemblage allows. That, ontologically, fungi are a powerful part of our entire planet's lifecycle, affecting everything, present everywhere, collaboratively making worlds endlessly with the species they encounter. Indeed, as Anna Tsing might have it, 'Making worlds is not limited to humans Humans, pines, and fungi make living arrangements simultaneously for themselves and for others: multispecies worlds.'³

Poetically speaking, perhaps one might liken an everyday ear–forest–body entanglement with the kinds of entanglements artists and scholars engaging with new materialisms have fallen in love with. And it is this kind of *entangled* thinking, this *cutting-together-apart*⁴ that mycelia have spored into new materialist thinking. In critical theoretical terms, mycelia have allowed us to move a little from Deleuzian *assemblages* to Haraway- and Barad-inspired notions of nature-cultures, where phenomena are not only put into assemblages *with* each other but are more profoundly cut-together-apart as each other. This shift in thinking continues to be huge. It differs significantly from the kinds of criticisms scientists opposed to 'wood-wide-web' propositions offer—namely that there simply is not enough empirical, Western peer-reviewed science to support the idea that common mycorrhizal networks beneficially 'listen to' and 'aid' trees as part of an assemblage. What many new materialist scholars offer instead is a shift in *ways of knowing*, which move from Deleuzian assemblages to new materialist entanglements— an epistemic revolution, if you will, that discourses on mycelia specifically have brought to critical theoretical approaches to ontology, epistemology and even methodologies, sporing new materialisms into the twenty-first century.

In the hands of new materialists, mycelia are not just an urgent and underrepresented part of our planetary ecosystem. They also allow us to think differently about how we can 'live and die well together in a thick present.'⁵ They become a very different kind of

3 A. Tsing, *The mushroom at the end of the world: on the possibility of life in capitalist ruins* (Princeton University Press, 2015), p. 22.

4 K. Barad, 'Quantum entanglements and hauntological relations of inheritance: dis/continuities, spacetime enfoldings, and justice-to-come', *Derrida Today* 3(2), 240–268 (2010). Karen Barad often makes use of '/' to demonstrate what they mean by 'cutting together-apart', in brief that distinctive phenomena are always-already entangled with the apparatuses that make them distinctive, 'specific material practices ... causally produce specific material phenomena, as part of the ongoing differential performance of the world.': K. Barad, *Meeting the universe halfway: quantum physics and the entanglement of matter and meaning* (Duke University Press, Durham, NC, 2007), p. 335. Thus enacting '/' between a phenomenon and its supposed opposite allows a different and differencing kind of reading: 'I aim to provide the reader with an opportunity to engage in an imaginative journey that is akin to how electrons experience the world: that is, a dis/orienting experience of the dis/jointedness of time and space, entanglements of here and there, now and then, a ghostly sense of dis/continuity, a quantum dis/continuity, which is neither fully discontinuous with continuity or even fully continuous with discontinuity, and in any case, surely not one with itself.': *ibid.*, p. 224. The 'opportunity' Barad is providing is a playful invitation to engage with their words differently, not a literal exhortation to reduce the electron and the human experience to the same thing. As Barad indicates across their work, and as I will also do here in these pages, anthropomorphism is not the goal here! It is a question of stretching the imagination to allow new differences in the way we might encounter topics.

5 Haraway, *op. cit.* (note 1), p. 1.

critical agent, transforming the thoughts and practices of scholars and artists. The inquiry into mycelial mysteriousness, the ‘*what exactly is going on here with mushrooms?*’ is an entrance point that is already providing the development of modes and methods of critiquing ways of knowing and ways of being that allow for a decentring of agential separability. James Bridle communicates key aspects well in his book *Ways of being*: ‘[p]lants and fungi don’t merely interact underground, they penetrate one another. Parts of fungi actually live within the cells of plants Plants, fungus and the entire ecosystem on which we and all life depends, is inseparable, right down to the cellular level.’⁶

The (in)separability of ontology is what is at stake here, and it has a huge impact on ways of knowing and thus ways of doing critical research. It encourages us to unlearn, unstick and unthink so that we might ‘stay with the trouble’ of a twenty-first century riddled with catastrophe and crisis. It provides new potentials for urgent modes of response, for thinking and doing things differently when solutions, fraught with insurmountable complexity, do not appear to be enough (or even working at all).

Un/knowing (where the ‘/’ denotes the way that not knowing and knowing are as deeply entangled as photons and the apparatuses used to measure and map the ontology of photons) is fuel for all kinds of research that seeks to question not just the object of research, but what ways of researching are (re)producing in the world. It is also uncomfortable, or at least can be, where the desire to chart and map matter into a countable, separable ‘thing’ called ‘knowledge’ shapes the practices we engage with to create that quality of clear knowability itself. This quality of the self-referentiality of measurement leads some new materialists to ask: is it ever possible to *know* a thing in itself, separable and ontologically distinct at its most foundational level? Or are we just endlessly engaging in practices of making proxies, potentials and endless configurations when we claim, ‘I know it’. Rather than hang up their hats, new materialists lean into this. It becomes a powerful mode of critical inquiry.

Thus, preserving some of that unknowability is key to this kind of research. Importantly, it can lead to critiques of epistemology, ontology and methodology that do not require either a *via negativa*⁷ or its opposite. I venture that such entangled approaches to inquiry take us right to the problematic heart of dialectics altogether, moving us away from a cannibalistic approach to knowledge-making. There is a poetry in un/knowability and un/certainty that opens doorways to different worlds. This does not negate or set itself up in opposition to positivist modes of scientific research practice. It paves the way for an ‘and’ that is crucial for research into complex problems. As Karen Barad might have it: *poetry leads to rigour*. And now as our planet shakes, burns, and drowns in waves of new ecological catastrophes, we need all the help we can get to create different and differencing ways of knowing and being as a *matter* of urgency.

HERES AND NOWS: HOW MYCELIUM HELPS US SHIFT AN ARCHIMEDEAN POINT

As I write this article, the oyster mushrooms I have eaten fuse with my insides, meeting their mycelial friends halfway inside the gut, the intestine, and all other parts of the small ecosystem I call ‘myself’. I sit at my desk and open another kind of everyday entangled network, one that Suzanne Simard⁸, professor of forest ecology, has helpfully (or

6 J. Bridle, *Ways of being: beyond human intelligence* (Allen Lane, London, 2022), p. 78.

7 For example, ‘I know it is *x* because it is *not y*’.

unhelpfully, depending on your point of view) likened to forests: a digital one. Simard uses an analogy ‘wood-wide-web’ to describe in everyday terms a view of a deeply networked state of ‘nature’ as a phenomenon. Is nature separate from culture? And in the spirit of Barad’s ‘/’, where do *we draw the line*?

The network I open *here and now* at my desk is of course ‘the world-wide-web’ and I search for ‘rock-star mycologist’ (as I have often heard him referred to) Merlin Sheldrake’s latest narrative offerings on the digital platform YouTube in order to continue the article you are reading now. Here and now entanglements abound. Bounded concepts of wood-wide-web, world-wide-web, research paper, oyster mushroom in digestion, past (recording accessed), present (scholar working on the article you are reading), future (you, in your own ‘here’ and ‘now’ wherever and whenever that is). But in a new materialist configuration, these are not simply conceptual assemblages inter-relating across or within a field of experience, they are material–discursive configurations *emerging here and now*. To illustrate this, I shall turn to storytelling.

As Salome Voegelin states in her remarkable book *Uncurating sound: knowledge with voice and hands*,

How do I write beside the line? In order not to strengthen again and again a singular and linear history but to open an expansive field of plural providence and inexhaustible futures. How do I unform a book, its writing, its structure, the frame of reference and the voice of legitimacy, and still write a book?⁹

There are many modes new materialists take to achieve this kind of critical questioning, this shifting of an Archimedean point, in order to test and occasionally unsettle the inherent linear structures of knowledge-making. In this article here, I have opted for storytelling—a storytelling that does not just switch ‘voice’, providing added multiple ways of listening and knowing, but one that appears suddenly, popping up across the article to challenge established patterns of linearity in ways inspired by mushrooms, speaking along deep currents of meaning that might at first glance appear out of sight, but which nourish and produce the ecosystem of this article.

The first thing that pops up on my screen is a short video where Sheldrake reveals he has grown oyster mushrooms quite literally out of his latest book.¹⁰ Incidentally, my tummy rumbles and digests the oyster mushrooms I just ate, which now lie in my belly as my brain synapses fire and fire again, digesting their own kind of ‘mushrooms’, the ones I hold in conceptual entanglement with the very real material currently in my belly. At the same time on the screen, Sheldrake proceeds to eat the oyster mushrooms growing out of the pages of his book, describing the moment here and now both in the cycle of digestion and in this viral performance, as being ‘his turn’ to eat them. He jokes that, in effect, this means he will now ‘eat his own words’.¹¹

What I want to draw attention to is not any of the separate, anecdotal events that appear in Sheldrake’s performance and my subsequent experience of it, but that each of the different phenomena named herein are in relationships that are rather descriptively

8 S. Simard, *Finding the mother tree: discovering the wisdom of the forest* (Knopf, New York, 2021).

9 S. Voegelin, *Uncurating sounds: knowledge with voice and hands* (Bloomsbury Academic, London, 2023), p. x.

10 M. Sheldrake, *Entangled life* (Bodley Head, London, 2020).

11 The whole performance is available at: <https://www.youtube.com/watch?v=JfJDaIV1-tE>

‘mycelial’ in their narrative character. These include the oyster mushrooms I have eaten, the oyster mushrooms I observe Merlin Sheldrake eating (via the digital recording), the writing of ‘new’ words about mushrooms in this article, the eating of previous words about mushrooms in the spored copy of *Entangled life* on the screen, the digital web that has become the site for all of this speculation, and Simard’s use of the analogy ‘wood-wide-web’ to discuss how mycelia are involved in the communication of trees. All these descriptions circulate and transform each other through the medium of a conceptual article on new materialism and ‘mushroom madness’. Life is definitely entangled here.

If we slow down enough to appreciate the theoretical and material coming-together of these experiences, we might get a felt sense of what Barad means by the entanglement of materiality and discursivity, which she calls *material-discursivity*, one endlessly unfolding composting of matter and meaning. And this slowing down and paying attention to material–discursive entanglements is exactly what is at stake in new materialist approaches to mycelia and how they can help us to reframe our ontological and epistemological relationships to the world around us. To slow down, to ‘stay with the trouble’,¹² to experience phenomena through inter- and transdisciplinary commons of arts and sciences and philosophies, are vital parts of new materialist ontologies, epistemologies, and methodological practices.

In these kinds of theoretical and oftentimes artistic approaches to mycelium, what is being foregrounded is not the inherent separability of units of cause and effect—that would be too human, too anthropocentric, and not at all mycelial, as the new materialists would have it. By contrast, the concept of ‘materiality’ in itself is a phenomenon that can be considered in flows or even *as* flows. Here, a flow of phenomena is not caught in a web of proving causality over correlation over and above its attention to processes of transformation taking place. Rather, it is about how phenomena difference each other (myself eating the mushrooms, which become part of my body; Sheldrake eating the mushrooms spored in his book). Indeed, this process ontology shifts an atomist metaphysics of pre-existing entities and suggests a world that Haraway, alluding to the work of process philosopher Alfred North Whitehead, has characterized as one in which beings do not pre-exist their relations.¹³

‘Discursivity’—or critical and theoretical engagement—fuses with and through these phenomena to produce new approaches to meaning, to ontology, and to epistemology that help us rethink our relationship to, with, and as the planet. Matter and meaning exist in intimate entanglements and flows which include (and perhaps even ‘scramble’) discreet temporalities in mycelial ways. As Erin Robinsong has written of mushrooms: *Hello below. Are you the past? Are you the future? Are you fungal galaxies?*¹⁴

These are the kinds of games you can play with mycelium. These are the kinds of ways—tiny ways that might seem insignificant or frivolous—that can rupture classical human taxonomic ways of understanding the world and get us to start thinking wildly, weirdly and differently. A shifting of the Archimedean point that was never stable but always *on the move*. In urgent times, where ‘complexity thinking’ has become a key feature of our interdisciplinary endeavours to engage with new ways of being human as a matter of urgency, in terms of both critical political thinking and bodily ecological survival (were

12 Haraway, *op. cit.* (note 1).

13 R. Dolphijn and I. van der Tuin. *New materialism: interviews & cartographies* (Open Humanities Press, Ann Arbor, 2012), p. 160.

14 E. Robinsong and M. Sheldrake (skybound press, 2024), p. 18.

they ever separate?), perhaps it is the hour for seemingly unnoticed ways of thinking, doing and being, to claim some of the epistemological territory that dominates the forms of research we can engage with in the academy. To return to Voegelin and listen to her call to think-through what linear and inherited structure of knowledge-making tells us about the world,

we could find meaning and intelligibility in plural voices, that materialise, that sing and hum and listen simultaneously. To hear an order that remained unordered and undisciplined; that is contingent and provisional, a negotiation of resources, asymmetries, (mis)understandings, coincidences, bodies, materials, and things that find legitimacy in performance.¹⁵

Enter the new materialists.

TERMS AND TAXONOMIES THAT TANTALIZE THE NEW MATERIALISTS: SENSING BEYOND ANTI/ THESIS

The new materialists did not just *encounter* mushrooms, they fell in love with them! They praised them for their aromas, their tastes, their networks, their relationships and connections, their ability to spore within and without of the most impossible places—even from the dead, and thus their propensity to exist in a queered kind of relationship between life and death.¹⁶ These aspects made them irresistible to new materialist scholars engaged in the critique of terms such as: *category*, *linearity*, *binarity*, *othering*, *community*, *complexity* from more humanistic perspectives, which can be found in the works of Rosi Braidotti, Karen Barad, Iris van der Tuin, Brigit Kaiser, Johnny Golding, Thomas Nail, Cary Wolfe and Anna Tsing, to mention a few. Furthermore, they provided critical terms to think with. The terms ‘mycelial’ and ‘fungal’ have been applied loosely to a new form of critical ‘turn’ that arguably took new materialists beyond the Deleuzian world of ‘the rhizome’—a term that previously generated much networked and intersectional thinking (for example via the work of Bruno Latour) but had not yet moved into truly entangled, mycelial territories.

Counterpointing more traditional dialectical thinking driven by eternal, often antagonistic relations of anti/thesis that tend to dominate the disciplines of both science and philosophy, the *metaphor* of mycelium allowed a material-discursive *and and and ...* to be grafted *into* the building blocks of every subject, arguably becoming amongst the greatest allies in new materialism’s turn towards new and diverse forms of generation and generativeness¹⁷ that complicates the anti/thesis binary.

But let us return to love for a moment, which is perhaps far more interesting than all that. Perhaps on some level and in a seemingly strange undoing of the idea of love’s *object*—love of *something*, *someone*, *somewhere*—new materialism itself is an odd and beautiful enactment of a phenomenon that mushrooms have ‘known’ for a long time: that relationalities such that they appear, appear in ways that are bursting with complexity,¹⁸

15 Voegelin, *op. cit.* (note 8), p. xvi.

16 Tsing, *op. cit.* (note 3); A. L. Tsing, H. A. Swanson, E. Gan and N. Bubandt, *Arts of living on a damaged planet: ghosts of the Anthropocene; monsters of the Anthropocene* (University of Minnesota Press, Minneapolis, 2017).

17 Haraway, *op. cit.* (note 1).

and that to observe phenomena *as* an entangled part of the phenomena or at least as an unextractable part of the phenomena, is ultimately a mycelial affair. So perhaps there is nothing particularly ‘new’ in new materialisms at all.

As Barad states: ‘What is needed is a method attuned to the entanglement of the apparatuses of production, one that enables genealogical analysis of how boundaries are produced rather than presuming a set of well-worn binaries in advance.’¹⁹ Staying with the trouble of Barad’s articulation of entanglement in this unfolding story that might sound occasionally ‘academic’ but is ultimately more like a deep ‘love affair’ (and why did Western academia feel the need to become so loveless in the first place?), an encounter emerges *not* as a product of individuals meeting, but as an entangled life-line thrown out of which we orient our separations (and separate subject positions) to, from, and with each other. You need to turn the workings of your brain around for this. And this is why the new materialists love mycelium. ‘We’—all in this entanglement—*intra-act* together in a generative intimacy.

[T]here is no moving beyond, no leaving the ‘old’ behind. There is no absolute boundary between here-now and there-then. There is nothing that is new; there is nothing that is not new. Matter itself is diffracted, dispersed, threaded through with materializing and sedimented effects of iterative reconfigurings of spacetime-mattering, traces of what might yet (have) happen(ed). Matter is a sedimented *intra-acting*, an open field. Sedimenting does not entail closure. (Mountain ranges in their liveliness attest to this fact.)²⁰

Hello below. Are you the past? Are you the future? Are you fungal galaxies?²¹

This is an ontology of complex relations and relationality. I stress it does not need to be the only ontology in town, cancelling out all previous notions of ontology in the imaginal sense of ‘this town ain’t big enough for the two of us (ontologies)’. Indeed, the idea of a multiplicity²² of ontologies, of being-in-the-making, is another idea beloved by some new materialists, who call on many-worlds theories from Mestiza and Zapatista movements that

18 Contemporary complexity studies (by Byrne and many others) challenge the ontological idea of individual subjects encountering one another *across* a spatial plane, a room, or a Petri dish from simple discrete units. This would be true of a ‘complicated’ system rather than a ‘complexity’ system ‘A complicated thing can be taken apart to bits and reassembled from those bits. Another way of saying that is to say it can be analysed and integrated, which means crucially that it can be described by a mathematical system founded on linearity. A complex one can’t ...’: D. Byrne and G. Callaghan, *Complexity theory and the social sciences* (Routledge, London, 2013), p. 4. Complexity champions a generative emergence from within complex phenomena that reverses the flows of how ‘we humans’ commonly understand the dynamics of encounter. As Byrne and Callaghan go on to assert, ‘We deny neither the reality of restricted complexity nor the at least potential value of agent-based modelling. Rather we assert with Morin that there is another form of complexity, both in nature of reality and in the way we can approach reality, in other words both ontologically and epistemically. The world of general complexity is composed of complex systems which are not just the product of simple interactions but have properties which are not to be understood in those terms and have to be addressed as real in and of themselves’: *ibid.*, p. 5. Here we can find in Byrne and Callaghan our *and and and* ... the generative potential of complexity approaches.

19 Barad, *Meeting the Universe Halfway*, *op. cit.* (note 4), pp. 29–30.

20 K. Barad, ‘Diffracting diffraction: cutting together-apart.’ *Parallax* 20(3), 168–187 (2014), at p. 168.

21 Robinsong and Sheldrake, *op. cit.* (note 13).

22 See M. de la Cadena and M. Blaser (eds), *A world of many worlds* (Duke University Press, Durham, NC, 2018), arguing that multiple worlds and ontologies can exist simultaneously, or indeed M. Savransky, *Around the day in eighty-worlds: politics of the pluriverse* (Duke University Press, Durham, NC, 2021), where, as he might have it, there exists a *pluriverse* of ontologies.

challenge the dominance of Northern Hemisphere thinking,²³ particularly when it comes to matters of complex ecology. Such ideas that have also captivated new materialists emerge in debates (some will be mentioned further on) on futures. Are their multiple ecological futures, human futures, species futures? Who made the future into a singularity in the first place?²⁴

For this reason Donna Haraway's suggestion that 'it matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with'²⁵ caused quite a ripple across the contemporary Northern Western scholarly world—or at least the parts of it concerned with matters of complexity, community and cooperation—the science and technology studies scholars, environmental scientists, digital humanities scholars, the posthuman and environmental artists, storytellers and digital worlders; the whole vibrant Science Fiction culture of scholarship spawned/spored by Afro/Meso/Indigenous/Sino/Middle Eastern and multiple other futurisms. These scholarly communities position ways of knowing associated with *emergence*, *interiority*, *entanglement* and *motion* at the heart of new epistemic endeavours to address the problems of the world, not by attempting to erase thesis–antithesis relations, but by stretching these, testing these, exploring how knowledge can exist and develop in other ways. Furthermore, they allowed a reconceptualization of othering, of worlding, of difference and difference-making that expanded the largely European postmodern linguistic theories of differencing into something much more—becoming new materialist, becoming *posthuman*.

Springing here the *and and and* ... mentioned earlier of mycelial entanglements into the critical tradition of postmodernism, Iris van der Tuin²⁶ asserts that positivism and postmodern linguisticism can be read as two sides of the same ontologically coded coin in that *both* posit an origin point (either matter leading to meaning in the case of positivism, or meaning shaping matter in the case of postmodernism). Neither of these is particularly 'mycelial' in its imaginations. They are too concerned with which came first and which came after and what they prove or disprove about origin points. This goes right to the heart of new materialism's response to our troubled times. The flow of meaning from language into matter (postmodernisms) or its reverse, matter into language (positivisms), is no longer enough to account for the multiple and complexity-driven crises the planet is facing.

Thus, new materialist scholarship grows, shivers and spores itself across multiple critical disciplinary terrains attempting to do 'new' things that do not privilege language over matter or matter over language in an eternal tussle for primacy, but one that sees both as mutually constitutive and, as Barad might have it, *material–discursive*.

Material conditions matter not because they 'support' particular discourses that are the actual generative factors in the formation of bodies, but because *matter comes to matter* through the iterative intra-activity of the world in its becoming. The point is not merely that there are important material factors in addition to discursive ones; rather, the issue

23 I have often been told that it is prudent to 'honour one's ancestors'. Donna Haraway might be my—and many new materialists'—mother or grandmother, but she was made with, in and through the ancestral indigenous movements absorbed in the land around her. More on this follows.

24 In terms of scholarly approaches located in the Northern Western region there is an interesting group in Oslo who have built a fairly extensive project on imagining multiple, decolonial futures: see <https://cofutures.org/>

25 Haraway, *op. cit.* (note 1), p. 12.

26 Iris van der Tuin, 'The new materialist "always already": on an A-human humanities', *Nord. J. Fem. Gender Res.* 19(4), 285–290 (2011) (<https://doi.org/10.1080/08038740.2011.620575>).

is the conjoined material–discursive nature of constraints, conditions and practices. The fact that material and discursive constraints and exclusions are intertwined, points to the limited validity of analyses that attempt to determine effects of material or discursive factors.²⁷

Or, more succinctly, ‘language has been given too much power ... the only thing that doesn’t seem to matter anymore is matter’.²⁸

As Vicki Kirby states, ‘If difference implicates all exteriority within interiority, then Culture is not a dissembling version of an entirely separate and primordial system.’²⁹ Here we can see a train of thought that starts from an interiority that envelopes exteriority, whereas with Jacques Lacan—a ‘fan favourite’ perhaps of some of the feminist postmodernists—there is a foundational gap, or ontological separation between what is interior and what is exterior. So again, contra to this, we can see why the new materialists got ‘mushroom fever’: mushrooms *are and do* this kind of otherwise-thinking as part of their everyday. At least that is what the entanglement of mushroom–scholar–Lacan–positivism–ontology–concept might do to a mushroom-mad new materialist scholar aiming to find new entanglements of matter and meaning that make sense in and for ‘our’³⁰ complexity-driven times. Matter and meaning do not exist in an inherent and singular directional flow. They are entangled.

MYCELIAL LOVE-LANGUAGES. I: THE IMPORTANCE OF DIFFERENCING, NOT FLATTENING ONTOLOGIES

Travelling (*at last!*) finally now to the object of love in itself, to the ‘cap’ or ‘fruiting body’ of a mushroom, which is so much more than the sum of its mycelial parts: mushrooms on their own—are they trying to critique humanisms? I am reminded of the beautiful, anthropomorphized pictures and sketches I loved when I was a child in the fairytale storybooks and early morning television runs of Disney fantasticals. Do we want here and now to imagine a mushroom-sentience that endeavours to speak back to the damage humans are causing to the fungal and by extension overall planetary worlds that they/we live in by capturing the imagination of a bunch of scholars? As mushroom caps emerge in little circular séance configurations in woodland areas, are they plotting in an animation or gothic fiction kind of way to connect with, influence, or even overthrow humans from within? I am not sure they really care, and I am not sure how to ask ‘them’ if indeed they really do. But such singular, inherently ontologically separable, anthropomorphized approaches to thinking are perhaps not productive. And that is the point of new materialisms. New materialists *do not anthropomorphize*.

There is a distinction at this point to be made between new materialisms and OOO (object-oriented ontology). Whilst both schools of thought do in different ways include a

27 Barad, *Meeting the universe halfway*, *op. cit.* (note 4), p. 152.

28 *Ibid.*, p. 132.

29 V. Kirby, *Quantum anthropologies* (Duke University Press, Durham, NC, 2013), p. 84.

30 I put this in quotation marks as *our* requires a deep undoing of its colonial inheritances. Who is included in ‘our’? How can we start to make community, or kin as Haraway might have it, in ways that undo the damaging binary of inclusion/exclusion, where inclusion requires a step towards the includer, and exclusion requires a step away, thus playing centre and periphery games that have been going on since the first colonial ships sailed off to go find an other.

decentring of the ontological primacy of ‘the human’, they do so in very different ways. OOO forecloses knowability in an attempt to flatten ontology.

There is a vast plenum of unique entities, one of whose essential properties is *withdrawal*—no other entity can fully account for them. These entities must exist in a relatively *flat ontology* in which there is hardly any difference between a person and a pincushion. And relationships between them, including causal ones, must be *vicarious* and hence *aesthetic* in nature.³¹

Here Morton, who extrapolates on Graham Harman’s OOO, indicates the unknowability of phenomena, but in a way that is very different from the un/knowability of Barad and their notion of ‘cutting together-apart’ described in the preceding section of this article. Morton and Harman do not proffer views of entanglement. There is an ontological separation that is fundamental if not necessary to their theories that differs from new materialism’s attention to the co-constitutive making of phenomena. I would argue that OOO offers a compelling call-to-arms to decentre Western Enlightenment humanisms, and therefore there are some compatibilities with the new materialisms that foreground notions of entanglement as described here.

The important question at stake with either (or indeed any) school of thought is always, as I see it, axiological: *what does this concept allow me to do in the world?* This returns us to world-making and the world-making potentials of all this mycelial ‘theorizing’. If questions are entrance points that shape phenomena, then how we construct them is a world-making affair: *It matters what matters we use to think other matters with.* New materialisms come down far more closely on the side of ontic entanglements and thus the focus of research is on difference-making (the processes of difference differing) rather than on occlusion via the flattening (implied in flat ontology).²⁵

Flattening ontologies arguably can create a culture of sameness that I do not think mushrooms would ‘approve of’ (I say this playfully in the context of moving away from anthropomorphism), and this problem is also a feature of new materialist thought that diverges from OOO quite significantly. New materialists are more interested in the aforementioned *processes* of difference differing than in the folding of difference into a singular, countable but ultimately unknowable cap. To flatten all ontologies might be appealing and furthermore help to decentre the aspects of Enlightenment humanisms that have produced the crises we find ourselves dealing with in the twenty-first century. However, it might also run the risk of creating a reductive sameness or flatness that inadvertently strips the Earth of its inherent topological difference-making.

Moreover, the hard-and-fast split between ‘human’ and ‘other than human’ ignores the embodied entanglements of species and materials, especially when these kinds of complexity-driven relations are causing ecological and ontological devastation on mass scales. Both these paths somehow foreclose on the subtle patterns of differences differing. And so, this mycelial metaphor of *and and and ...* that spores and complicates binaries, discrete units, and linear or exclusive forms of differencing, offers an appealing way to circumvent the inherent reductiveness of both.

31 T. Morton, *Hyperobjects: philosophy and ecology after the end of the world* (University of Minnesota Press, Minneapolis, 2013), p. 14.

The first and foremost goal of new materialists is of course the break-through of the schism between sign/culture/language and referent/nature/matter. Starting from the humanities, this would entail revitalizing ontology as the element that has seemingly become lost under the paradigm of representationalism.³²

What is shared between OOO and new materialisms is a commitment to undoing the Vitruvian Man at the centre of all things which has dominated Enlightenment thinking,³³ but whose roots go right back to Aristotle and Plato.

MYCELIAL LOVE LANGUAGES. II: BEYOND ANTHROPOCENTRIC AND MYCELIAL MORPHISMS

If it ‘matters what matters we use to think other matters with’²⁵¹, then once more the vital question or entrance point becomes: what does all this allow us to do in the world? To undercut the centrality of ‘the human’—in itself a very uncomfortable category on account that the boundary of who gets to count as human has shifted profoundly over time—is not to undercut that human beings have agency. Rather decentralizing ‘the human’ and bringing it into multiplicity allows new materialist researchers to ask more pressing political questions: how did we get to be human in the first place? Who gets to claim purchase on such a huge legal and political ontology? Rosi Braidotti³⁴ has levied profound criticism at the image of the Vitruvian Man for just such a call to exceptionalism—an image that places white, able-bodied masculinity at the centre of the pursuit of perfection.

If it ‘matters what matters we use to think other matters with’, then new materialists spend considerable energy aiming at a radical rethinking of the kinds of anthropomorphisms that have lain like an irrepressible wound at the centre of Western thinking as a first or at least vital port of call. Engaging with different and differenced encounters with mycelium as a way to understand, critique and postulate ways of knowing and ways of being at the heart of research practices allows new materialists to examine inherent complexities that cannot be satisfied by subject–object divisions or that rely on a foundational ontological boundary as a starting point for tackling critical issues. Deflating the central importance of the proud Vitruvian Man does not erase him, but neither does it suggest that we simply place a new image in his position—an animal, mineral, vegetable or fungal one.

Anthropomorphism draws the so-called ‘natural’ mushroom into human or ‘cultural’ territory, stripping it of a vast store of its differences. It allows the ‘inclusivity’ of all sorts of phenomena according to its human correspondences and without respecting the inherent ontological differences of those phenomena, a return to flattening ontologies. In other words, it does not aim to difference and show the processes of difference differing whilst doing so. It is perhaps telling that the only way some law systems can envision the basic protection of nature rights is to find ways to designate them as human. I am not against this *per se*; I just note here that this still upholds a foundational nature–culture split. Nature becomes human and thus can be rendered and made reducible and knowable according to *our* standards as a matter of its life or death. Differencing is limited rather than unbounded. The *difference* here might appear subtle, but it is in fact tremendous. It does not mean we

32 S. Alaimo, *Bodily natures: science, environment, and the material self* (Indiana University Press, Bloomington, 2010), p. 6.

33 R. Braidotti, *Posthuman knowledge* (Polity Press, New York, 2019).

34 R. Braidotti, *The Posthuman* (Polity Press, Cambridge, 2013).

might never use a metaphor again or draw comparisons and parallels between human and non-human entities in order to difference both. Or even that we should stop the attempts at nature rights whilst still in a system that was built by and for human-centric interests. It means that our metaphors and analogies aim to play multidirectionally, from a position of material–discursive, complexity-driven difference-making. This multidirectionality, once again, speaks to complexity, allowing us to do the work of unlearning unhelpful structures that might not be entirely fit for purpose in a world that is characterized by its complexity and violence. We begin, with mushrooms, to explore modes that would allow us to imagine otherwise.

In a move that is haunted by the preceding section of this article, new materialists are also not simply reversing the flow from anthropomorphism to mycelial-morphism, or in other words, trying to turn humans into mushrooms. We are playing in a narrative slippage that aims to foreground entanglement, rather than a unidirectional flow of ontological and epistemological world-making. In transdisciplinary moves that do not just allow but celebrate affect and difference, we often turn to poetry to find our rigour. This difference the kinds of critiques new materialists make of mycelial works by scholars such as Suzanne Simard and Peter Wohlleben from those made by scholars working in the ‘hard sciences’. New materialists look for different things. And so, we find different things, worlds, configurations.

Robinsong and Shelldrake take to task the inherent ‘anthropomorphism’, as they term it, at the heart of both Wohlleben and Simard’s work on the communicative relationships between fungi, trees and plants.³⁵ As the authors state of Wohlleben³⁶, ‘the author of this book, ascribes to plants ... a number of human characteristics: feeling pain, being happy and caring for other trees, being able to communicate with other trees, and being capable of creating strategies for the benefit of the group. These are the hallmarks of conscious organisms, for which there is zero credible evidence.’³⁷ Of Simard’s *Finding the mother tree*⁸, the authors go on to say that ‘[d]espite its broad appeal, and although Simard provides a fascinating window on her life in science, her book lacks a sound scientific basis and fails to accurately represent the published forestry and plant science literature.’³⁸

The critique of Simard’s ‘wood-wide-web’ and other analogies that use fungi as a key metaphor for digitality appears very differently in arguments on mycoaesthetics from the way it does in the positivist approaches of Robinsong and Shelldrake:

The success of the wood-wide-web could almost be explained by how the twenty-first century media environment selects life forms that most resemble its own structure: through our seemingly autonomous posts and retweets, platforms seek their mirror image in nature. For Jedediah Purdy, nature answers well to ‘the imaginative imperatives and limitations of its observers’. It follows that we should not be surprised that ‘after centuries of viewing forests as kingdoms, then as factories (and, along the way, as cathedrals for Romantic sentiment), the 21st century would discover a networked information system under the leaves and humus’. Purdy is right to be sceptical of this latest conceptual metaphor for nature. The question of whether the better analogy is DNA or the nervous system for the internet is less important than the fact that both converge

35 Robinsong and Shelldrake, *op. cit.* (note 13).

36 P. Wohlleben, *The Secret Network of Nature* (Vintage, London, 2017)

37 *op.cit.*, p. 21.

38 *op.cit.*, p. 26.

on a predictably cybernetic logic of information and transmission. Well before digital modernity, mutual influence between cybernetics and ecology during the second half of the twentieth century made this convergence possible.³⁹

In other words, ‘It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with’.⁴⁰ The way inquiry frames questions, its entrance points and methodologies allow multiple points of differencing. Research is not just kaleidoscopic—it is diffractive. Working in this mode does not provide us or our research with clear-cut answers or simple and identifiable solutions to linear problems—it helps us rather to stay with complexity in all its challenges, staying with the trouble to find alternative ways of knowing and being in urgent times.

Perhaps a key challenge new materialists levy on debates on research practice is just how entangled the methods by which we investigate a subject are with the research those methods produce. Thus, whilst we might in principle agree that the reductionist dangers of anthropomorphism are stymying the complexity of differencing, the inherent reductionism of multiple ways of knowing to a singular mode is also equally challenged. This is perhaps one reason why new materialist work can be brought to bear on decolonial and anti-racist scholarship, as both challenge the singular way-of-knowing espoused by sciences, social sciences, and even humanities subjects that place a knowable singularity at the heart of ‘credible’ research practice. A way of knowing that postulates a stability of subject and object in the first place grates against the ideas of entanglement, processes, differences *and and and* Again, this is not to denounce such approaches to research but calls into question the enshrinement of certain ways of knowing (tied so deeply with a long colonial project) that exclude affective, multiple and ‘slippery’ ontologies and epistemologies in favour of reinforcing a singular way to do things and know things. As Joshua Finzi suggests in his article ‘Fungal rhizomes: mycorrhizae and posthumanism’:

an effective means of undermining this ontological stratification between domains of life is realised through rhizoanalytic approaches to fecund contexts in fungal worlds, as they allow for the employment of methodologies which endeavour to articulate the multi-agential, embodied processes of worldmaking which occur ceaselessly within and around human bodies.⁴¹

In light of new materialist scholars, including those mentioned so far, making *a* difference (in the singular) in the world is perhaps no longer as satisfying as it used to be. Because such scholars are more preoccupied these days with making *differences*, or indeed, mapping the patterns of differences differing, than focusing on singular, modal attempts. Why? Because, not unlike the rich, deep entanglements of mycelium, such a move allows something other than presence: the concept of *emergence* itself. It allows us to do different things with our research and scholarship, and to envision and engage with complexity in different ways. A pertinent purpose of both posthuman⁴² and new materialist myco-aesthetics is to ‘explore the position of fungi in current discussions of “other” forms of intelligence,

39 *op.cit.*, p. 107.

40 Haraway, *op. cit.* (note 1), p. 12.

41 J. Finzi, ‘Fungal rhizomes: mycorrhizae and posthumanism’, *Green Lett.* 28(1–2) 1–16 (2024), at p. 1.

42 ‘Posthumanisms’, in their aims to decentre humanisms from twenty-first century thinking and rethink how matter comes to matter in the world and in research specifically, are often deeply interwoven with new materialisms.

a “fungal intelligence” that unsettles our androcentric understandings of the term intelligence.’⁴³

Such research modalities resist, map and unmap, extend and erase parts of the ideas they bring. They unsettle their own approaches, assertions, developments. Is not this the way scholarship works? *Stretch, extend, fruit, wilt, traverse, feast and promise . . .*

MYCELIAL DECOLONIALITY OR BREAKING UP WITH DONNA HARAWAY

Kao handed me the mushroom. That’s when I first experienced the smell. It’s not an easy smell. It’s not like a flower or mouth-watering food. It’s disturbing . . . some people liken it to rotting things and some to clear beauty—the autumn aroma. At my first whiff, I was just astonished.

(Tsing⁴⁴)

Is it possible that there is something so eerily intelligent and so utterly non-human about mushrooms in themselves that they seem almost *ungodly* to humanists of a ‘Vitruvian’ persuasion? Not only can mushrooms kill us, extend our consciousness, or bring forth olfactory and salival ecstasy or disgust, but when they invite us to watch them, we inevitably end up watching ourselves—they are in us, everywhere, as much as they are outside us. The watch us *as* us. They spore the entire planet and yet are occasionally separable, pickable and consumable at the same time. They teach us in practical terms what it is to live *as* an ecosystem without having to renounce our individuality in order to do so. There is something so magical and so mundane about them. They are the kid-next-door we might have fallen in love with when no more than children ourselves, inviting us into huge and mysterious worlds that we had never known possible, our own lively beating human hearts full and pulsing with the promise of possibility.

Cautionary note: It might, however, be possible to become blinded by excitement for what mycelium can do to, and with, our thinking in our complex ecological, political and economic moment. Like that first love, which when we discover it erases the past and future for a moment, where we might feel *at the time* like the only one in the world who has experienced it, we can become madly aroused by the mushroom and what it can do to us and for us. But whilst I love first love, it has its problems. As Mary Zournazi states in her exposition of the philosophical trajectory of Michel Serres,

we are only interested in our own stories; we never hear the plentitude of the soft. The sea is dying, is polluted. We are unable to see the languages or codes that are not our own. We only ever acknowledge language and convention; and when language boils down to convention and contracts without soul or connection, we create stories about places and things, rather than with them. We do not see what we encounter in this world; nor are we able to comprehend it. In this violence, we lose the path of relation. We lose the ability to connect to the networks and threads that exist and surround us. We lose the potential for rebirth, and ultimately the link between the past, present and the future.⁴⁵

43 S. Gruss, ‘Fungal intelligence and the posthuman: mycohuman art, entangled theory, and fungi in (eco-) Gothic narratives’, *J. Posthum.* 4(2), 141–149 (2024), at p. 141.

44 Tsing, *op. cit.* (note 3), p. 14.

The critique of potential solipsism alluded to above finds new forms across scholarship that have subsequently been questioned in recent explorations of new materialism. For example, in her book, *This will not be generative*, Dixa Ramirez-D'Oleo 'breaks up with' Donna Haraway as her scholarly muse on the premise that lurking deep within Haraway's work, particularly on the concept of 'the generative', which suffuses particularly her latter works, is an unseen layer of White epistemic domination. D'Oleo suggests that,

writers moved by similar signs of 'care' or 'repair' elevate specific kinds of pathos—benevolent, optimistic, or sympathetic—at the expense of methods that either avoid pathos or affects such as 'reticent', 'uncooperative', or 'withholding'. The demand that intellectual engagement conform to specific affective scripts through a gluttonous desire for generativity ironically silences a wide array of intellectual inquiry.⁴⁶

Pathos, in D'Oleo's rendering, is brought specifically into entanglement here with a historical/hauntological harkening back to nineteenth-century North American abolitionist rhetorics that ultimately see 'the end' coming and a necessary fight on the horizon for White survival in the face of its destruction, rather than an ethical proposition in its own right. This 'urgent' fight for survival takes shape through hurrying to find new forms of symbiosis with the forces that come to undo it. The result: *The emergent; the generative*; notions of 'care' that aim to quell the fires that Audre Lorde wrote about in the 1980s in her essay 'The uses of anger',⁴⁷ so that when the apocalypse hits the White world, Black and Indigenous ecological and ontological knowledge is harnessed (yet again) to 'save' White cultures, populations and existence.

In other words, attention must be paid to the oncoming colonization of Black and Indigenous knowledge about mushrooms and 'mycelial thinking' via a faddish struggle to hitch on to any ride that will take us out of here, disregarding the deep ontological and epistemic status of mushrooms in cultures that have been hitherto demonized, reduced and violently erased previously (and currently). As Alexis Pauline Gumbs writes in her academic novel *M-Archive: after the end of the world*, '[T]hey started stealing the meaning out of everything. Out of everything you ever said. You let them co-opt the conversation you were having. With freedom.'⁴⁸

The 'first love' obsessiveness of some new materialists with mycelium and what they can do for us cannot justify the erasure of multiple pasts and futures. To put it quite bluntly, having faced multiple apocalypses, ecological, cultural, economic, spiritual, cultural *and and and* ... already, Black and Indigenous scholars and environmentalists might be a little weary (to put it mildly) of endless epistemic plunder that becomes more pressing as White futures are suddenly now also thrown into danger. As Barad notes throughout their work, 'marks have been made on bodies'. And furthermore, we *are* the marks that made us, emergent from all the violences that pre-exist and continue to exist after.

Entangling mycelium with multispecies apocalypses requires that generativeness is not just seen and made to be generative for one group. In her article 'Fungal intelligence

45 M. Zoumazi, 'Cosmocracy: a hymn for the world?: Reflections on Michel Serres and the natural world', *J. Multidiscip. Int. Stud.* 9(2), 1–9 (2012).

46 D. Ramirez-D'Oleo, *This will not be generative* (Cambridge University Press, 2023), p. 6.

47 A. Lorde, 'The uses of anger', in *The master's tools will never dismantle the master's house* (Penguin, London, 2017) 22–35.

48 A. P. Gumbs, *M-Archive: after the end of the world* (Duke University Press, Durham, NC, 2018), p. 155.

and the posthuman', and fungi in (eco-)Gothic narratives, Suzanne Gruss entreats her readers: 'rather than talking and thinking *about* fungi, we should perhaps listen to them *do* the talking/thinking.'⁴⁹ In light of the preceding section on anthropomorphisms and new materialisms, this of course is not a statement that is as simple or as uncritical as it seems. It requires an undoing of the way we think about thinking, not to reduce all things to intelligibility by 'our' very specific standards (when we cannot even listen to each other, understand each other, pay attention to difference-making within our own species). This is in part the beginning of her aim to undo the utopic, and somewhat self-obsessional drive underlying a lot of the turn to mushrooms in the spirit of providing a way out for (mostly White) humans.

In the face of the often-bleak cultural imaginings and scientific debates of humanity's (non)future in the Anthropocene, fungi have become almost metonymic for the miraculous resilience of the non-human, promising hope by way of their seemingly limitless adaptability to different climates and living conditions.⁵⁰

In light of Sylvia Wynter, Achille Mbembe, Zakiyya Jackson, Christina Sharpe and many other Black writers on materiality and the becoming human within species-being, the 'non-human' is a very loaded term, past and present. Aiysha Siddiqa writes:

[b]een born from so many apocalypses, what's one more? Love is still the only revenge. It grows each time the earth is set on fire. But for what it's worth, I'd do this again. Gamble on humanity one hundred times over. Commit to life unto life, as the trees fall and take us with them. I'd follow love into extinction.⁵¹

Like Siddiqa, I too perhaps qualify for the category of 'love junkie' when it comes to mushrooms, mycoaesthetics, posthumanisms and new materialisms in and for twenty-first century responses to ecological disaster. It is a powerful place to situate oneself. Audre Lorde wrote on the use of affective or pathos-driven languages to create real shifts in the visibility of Black women and the development of new forms of historicity, hitherto erased, in her renowned piece *Poetry is not a luxury*. But the cautionary tale here might be better described through her other text *The uses of anger*: 'My anger has meant pain to me but it has also meant survival, and before I give it up I'm going to be sure that there is something at least as powerful to replace it on the road to clarity.'⁵² Or in alternative words, colonial extinction and futures extinction are deeply entangled and so, in a sense, '[t]oxicity is relational'.⁵³

So how might an investigation into species-making, boundaries and difference-making processes be the very thing we need in order to understand ourselves and how we do research as an entangled part of world-making? The flow of repetitions, spirals and circles across much of the writing here is intentional. Engaging with a mycelial-style structure (as observed by humans at any rate) to write this article, my intention is to decentre the

49 Gruss, *op. cit.* (note 38), p. 141.

50 *Idem.*

51 Aiysha Siddiqa, 'Foreword', in A. Escobar, M. Osterweil, and K. Sharma, *Relationality*, p. xiii (Bloomsbury Publishing, London, 2024).

52 Lorde, *op. cit.* (note 44), p. 34.

53 K. Crane, 'Thinking fungi, or random considerations', *Comp. Crit. Stud.* **18**(2–3), 239–258 (2021), at p. 243.

‘shoulders of giants’ or linear approach to scholarly persuasion. Thinking with mushrooms allows the mycelial not just to be a topic of pure observation (there never was such a thing), but a flow of entangled relations, differencing and un/doing relations already made and in the making. Differences discussed are made gradually, through slow scholarly writing, through cul-de-sacs and caveats and side-quests. Through metaphor and slippage and interruption and echo. Through re/turning again and again, but never in exactly the same way. As Voegelin asks,

Are we willing to step into the disorder of another voice and feel our way through the text, not to reach the message we are looking for, but lingering in impressions, ideas and the jouissance of participation to find another way to sense? Or do we instinctively take on the baton of organisation, taking a righteous voice that knows the field and keeps it clean?⁵⁴

MYCOAESTHETIC ENTROPIES: FROM DECOLONIALITY TO FICTIONING DEATH

In 2011 Jae Rhim Lee, an artist and designer, delivered a TED talk where she introduced the concept behind the prototype of her Mushroom Burial Suit. Concerned about the green impact of death and dying since our twenty-first century human bodies are now so full of toxins, including heavy metals, preservatives, pesticides and all manner of ‘junk’, and that both contemporary burial and cremation leave huge footprints, she decided to design something a little bit different. Death and dying is a squeamish business. Lee says of the suit in the talk, ‘It’s a step toward accepting the fact that someday I will die and decay. It’s also a step toward taking responsibility for my own burden on the planet.’⁵⁵

The suit is black and rather like a cross between a pair of cosy pyjamas and a ninja outfit. Lee experimented with growing fungi until she finally came upon the right composition that metabolizes the toxins and breaks down the twenty-first century human body, delivering nutrients to plants along the way. These fungi are spored into a netting that lines the suit. It is a strangely beautiful garment, if, as Lee hopes, you can get over the squeamishness.

As a side note—a ‘popping up’ in unexpected places as it were—it is interesting perhaps that Jae Rhim Lee was born in Gwangju, Korea, which in 2024 hosted a biennale. The remit was that the exhibition had to be structured in three sections following a narrative that the organizers said moves ‘from the human density of urban space to the non-human worlds, either microscopic or cosmic. From a saturated planet to the search for the “big outdoors”’.⁵⁶ Mushroom-thinking emerges across the globe, in a host of locations that echo the feverish current fascination with imagining otherwise, across scales, across times, disciplines and species, to play further with metaphor and analogy. A spooky-action-at-a-(mycelial)-distance. A kind of *hey-presto!* that speaks to us in material-discursive ways we cannot understand but can appeal to *feeling* to explore. Much like Feynman’s famously strange turn to affective language to describe the weird behaviours of electrons: ‘*oh horror!*’⁵⁷

54 Voegelin, *op. cit.* (note 8), p. xv.

55 Jae Rhim Lee, *My mushroom burial suit*, TED Talk (2011), https://www.ted.com/talks/jae_rhim_lee_my_mushroom_burial_suit

56 For more, see: <https://ocula.com/magazine/art-news/gwangju-biennale-2024-pansori-shamans-chants/>

57 For an interesting exploration of this, see K. Barad, ‘Transmaterialities: trans*/matter/realities and queer political imaginings’, *GLQ* 21(2–3), 387–422 (2015).

Scholars using this kind of accidental and anecdotal approach to writing in order to effect changes in thinking have captured the imagination. From mycologist Paul Stamets, to Merlin Sheldrake, to natural historian Richard Fortey, to Ostendorf-Rodriguez's fascinating book on indigenous mycelial thinking, *Let's become fungal*,⁵⁸ the art of storytelling recurs, embedding the mycelial in the everyday, creating a fungal conceptual commons that comes to entangle with traditional scholarship and devour it from the inside out.

Thus, mycoaesthetics and new materialisms pair together in a move that brings fictioned approaches to offer new modes of aesthetic storytelling with critical purpose. In her article 'New materialism and the nonhuman story', Serpil Opperman says:

Nonhuman stories are ontologically performed and 'differentially enacted' by material agencies in unceasing flows of expressions and carry a signature of time. This is the reason why we read matter as 'a living text with rich narrative efficacy ... exerting its influence in conceptual and material habitats ... This vision can inspire us to align our creativity with the expressive Earth communities, compelling us to rethink our storied coexistence and coevolution in the story of the animate earth and to think beyond anthropocentricity. It is a way of making connections between and across species, lively materialities, environments, and inhuman durations. 'All we have to do,' as Serenella Iovino suggests, 'is to heed the tacit voices of the world.'⁵⁹

Another beautiful, uncanny piece of 'weird' fiction that managed to both popularize and deeply investigate the potential of mycelial thinking in imaginative prose form is the novel *Annihilation*. Acclaimed author Jeff VanderMeer extends the squeamishness associated with a mycelial power over 'the human'—especially as it relates to death and madness. In somewhat posthuman gothic terms, the assailant in the book's eerie Area X is not a separable human or alien 'character' but a lively and intelligent kind of fungus, slowly diffracting and composting all life in the area.

Think of it as a thorn, perhaps a long, thick thorn so large it buried itself deep in the side of the world. Injecting itself into the world. Emanating from this giant thorn is an endless, perhaps automatic, need to assimilate and to mimic. Assimilator and assimilated interact through the catalyst of a script of words, which powers the engine of transformation. Perhaps it is a creature living in perfect symbiosis with a host of creatures. Perhaps it is 'merely' a machine. But in either instance if it has intelligence, that intelligence is far different from our own. It creates out of our ecosystem a new world, whose processes and aims are utterly alien—one that works through supreme acts of *otherness* as it becomes what it encounters.⁶⁰

This visioning goes to the heart of the violence of othered encounters, diffractions and blurred edges between human and non-human layers of life as they appear in fictioned approaches to critical mycelial 'thinking'. At the blur between *bios* and *zoë*⁶¹ exists a generative disruption to species-being and discreet taxonomies (as mentioned above). This

58 Y. Ostendorf-Rodriguez, *Let's become fungal: mycelium teachings and the arts* (Valiz, Amsterdam, 2023).

59 S. Oppermann, 'New materialism and the nonhuman story', in *The Cambridge companion to environmental humanities* (ed. J. Cohen and S. Foote), pp. 258–272 (Cambridge University Press, 2021), at p. 267.

60 J. VanderMeer, *Annihilation* (FSG Originals, New York, 2014), p. 191.

61 See Braidotti, *op. cit.* (note 31).

blur does not exist as two entities meet and merge. Rather, in a mycelial rendering, these exist within each other *as* each other. It depends how you set the lens as to where you might find points of separation and label them ‘origins’. There is radical potential here, and whilst VanderMeer’s human heroine comes to first interrogate and then surrender to this most ancient of realities, much to the fear and mortal dread of her peers in the novel, I might argue that the new materialists have paused their squeamishness just enough to find exactly this kind of exploration a vivid point of critical inquiry.

In the spirit of a fungal conceptual commons, entering into my own accidental initiation into mycoaesthetics, I was meandering around in New York City a couple of years ago having just taken part in a conference on arts and education. My research group and I had prepared four discrete papers, but upon arrival had decided to present these through one another, by which I mean selecting key themes and expanding each other’s work through them, thus entangling and diffracting knowledge production, inviting audience interruptions and additions—a kind of scholarly sporing that we joked about later and that we hoped would embrace the tangential, the half-finished thought, the impetuous utterance. The session was bright, joyful, lively. It was the reverse of the deathly, fearful, or sombre versions of ‘mycelial’.

After the conference, I wove around the streets with no destination in mind, cutting down one sidewalk, then turning randomly into another, pulled by colours, lights, smells and nothing-much-in-particular. When I came across a gallery entrance, I felt drawn inside. And I found myself face to face with a full retrospective of acclaimed artist Wangechi Mutu—a fruitful encounter that cut-together-apart with the mycelial modality of our conference papers, the conference audience (incidentally, the hall was unexpectedly full and several of our audience were sat on the floor, literally ‘popping up’ in random places with interruptions), and the subject matter of our works. In short, I saw the exhibition in a completely different way having encountered it at this point in the day. Paying attention to differencing and configurations of difference-making, rather than making separable, testable notes on causation, speaks to the spirit of new materialist work, linking it with aesthetics. In this mode, I have no need to prove direct causation or random correlation of this or that configuration of phenomena. Rather, by paying attention to aesthetics and the affects therein, I might chart how configurations of difference flow through, within and from out of each other.

Wolgemuth *et al.* state of differencing:

Theorised this way, difference and differences might inspire talk instead of debate—caring engagement rather than competition—which we believe holds greater promise for producing creative, generative qualitative methodologies that speak to the realities and uncertainties of multiple often overlapping injustices.⁶²

Wangechi Mutu’s work inspires this kind of mycoaesthetic thinking. Mutu is a celebrated Kenyan artist who now pops up sometimes in Brooklyn and sometimes in Nairobi, having made both her home. Looking at her works—the paintings in particular—I felt pulled into a world of mushroom–human hybridity. Chelsea Mikael Frazier, a scholar working at

62 J. R. Wolgemuth, T. M. Marn, T. Barko and M. B. Weaver-Hightower. ‘Radical uncertainty is not enough: (in)justicematters of post-qualitative research’, *Int. Rev. Qual. Res.* **14**, 575–593 (2022), at p. 577.

the intersection of Black feminism and environmental humanities (and not strictly a new materialist, if such an adverb can ever truly be applied in this context) writes of her,

When asked how her [Mutu's] figures come into being and how they retain the mottled flesh that calls fungal imagery to mind, Mutu has explained: *That happens within the lines that I want the drawing to be in. But if it pools beyond a certain point, it creates a river and sometimes you don't know where it will go. It goes from the belly down to the knee and if you leave the work for five hours, when you come back, you realise the knee has turned into two legs or something ... I call it 'determining'. I allow the chemical and natural qualities of the material to decide how it wants to lay on the paper. For example, in 'A dragon kiss always ends in ashes', the figure was almost perfectly placed on the paper and when I came back, her face had opened up. So this dragon or serpent that she's kissing actually created itself overnight ...*⁶³

Here, Mutu makes clear that spontaneity and mycelial-ness (if you will forgive the crude turn of phrase) are part and parcel of each other, but not reducible to one another. The process she describes allows the materials she uses a certain measure of agency to co-create the work, and thus it might be described as leaning in to the qualities of the materials and to how these might react to other situational forces (for example gravity, placement of canvas, *and and and ...*). But she describes these in terms of an entangled *narrative* becoming as well. You cannot separate the one from the other—they generate from within, 'determining' each other in ways that are arguably cut-together-apart in an infinite *in/determinacy*.

The political power of this kind of myco-arts practice is examined by Zakiyya Iman Jackson at depth, who states of Mutu,

Departing from an exclusive focus on structure, whether it be that of the double-helix or scaled up to the symbolic order, I argue that black female sex(uality) and reproduction are better understood via a framework of emergence and within the context of iterative, intra-active multiscalar systems—biological, psychological, environmental, and cultural. Mutu's *Histology of the Different Classes of Uterine Tumors* crucially reveals the stakes of this intra-activity as it pertains to the semio-material history of 'the black female body,' reproductive function, and sex(uality) as linchpin and opposable limit of 'the human' in scientific taxonomies and medical science, particularly that of Linnaeus's *Systema Naturae* and Ernst Haeckel's highly aesthetic approach to evolutionary theory

Mutu's art is notable for its constructive reorientation of the theorization of race via a reflexive methodological practice of collage, one that reframes the spectatorial encounter from that of a determinate Kantian linear teleological drama of subjects and objects to that of intra-active processes and indeterminate feedback loops. Thus, this is not a study of a reified object but of an intra-actional field that includes material objects but is not limited to them.⁶⁴

Returning to questioning linearity, multi-scalar approaches, and limits of the notion of 'the human'—these all appear in Jackson's work on Mutu to bring us into research

63 C. M. Frazier, 'Thinking red, wounds, and fungi in Wangechi Mutu's eco-art', In *Ecologies, agents, terrains* (ed. C. Heuer and R. Zorach), pp. 167–194 (Yale University Press, New Haven, 2018), at pp. 183–184.

64 Z. I. Jackson, *Becoming human* (NYU Press, New York, 2020), pp. 32, 42–43.

practices that support mycelial thinking. It is important also to underline that Jackson talks of symbiosis—a very mycelial affair, a term that has also, for all the reasons now unfolded throughout this article, captured the imagination of new materialist scholars.

I do not wish to see mushrooms everywhere, but there is a clear epistemic shift happening here in terms of how we make categories and how new materialist thinkers turn to more intra-active modes of materiality. These modes engage with mycelial and symbiotic-friendly modes of thinking-doing-being to address in/justice matterings in ways that diverge from scientific taxonomies and that refute alternative systems of flow at the foundational ontological level of research. This affects not just the ontological or epistemological, but also the way we craft research methods and methodologies.

Interestingly, in their critique of the ‘postqualitative’ turn—a methodology that owes its own taxonomic differencing from ‘qualitative research’ to new materialist scholar Elizabeth St Pierre—Wolgemuth *et al.*⁶⁵ are suspicious of what such a *discrete* methodological turn, often used to develop new materialist scholarship, achieves within the field.

I like the idea of justice as pragmatic. Justice needs to be pedagogical; it’s not somehow above qualitative or postqualitative inquiry but must be a thing that is produced Both poststructuralism and postcolonialism were grounded in real intractable lives and circumstances before postqual was ever conceptualized. Sometimes postqual seems more like an attempt to advance academic careers than to actually address injustice. Maybe it’s less important to define justice than it is to enjoin others in their conceptions of justice Justice as mercurial. Justice as messiness. Justice as always that which is only ever coming into being.⁶⁶

Wolgemuth *et al.* stage the verbatim discussion on the relevance of postqualitative inquiry to the field of social justice research in emergence, as the main part of the piece, affording the reader the opportunity to see the argument un/fold through the key themes of justice, action and scholarship as the scholars think through them. For example, the article also includes the voices of the ‘*et al.*’, parsed out on the page in the original as belonging to each author, merging and mingling as scholarly prose emerges. The result on the page speaks well with mycelial research practices that do not proffer a polished or unified voice, but that expose the emergent critical processes inherent in research *as* the research. This kind of practice once again questions the structural approaches (mostly linear) of argumentation upon which research cultures are built and in which scholars are deeply invested so as to make way for alternative forms of research to emerge.

Similarly, if we look at *Emergent strategy* by adrienne maree brown,⁶⁷ we can see the same sort of thing moving into radical Black feminist writing that is not necessarily taxonomically ‘new materialist’, but that calls upon the inherent structural properties of non-human forms of life to help us rethink ways of organizing politically and socially, and here I note that brown *does indeed use fungi directly to illustrate this*—a desire to imagine otherwise that embeds the metaphor of mycelium as a way of developing methodology across its thinking. Thus, mycelial madness marches across the sensate skin of new research

65 St. E. Pierre, ‘Post qualitative research: The critique and the coming after’, In *The SAGE Handbook of Qualitative Research*, 4th ed. (SAGE, 2011), at pp. 611–625.

66 Wolgemuth *et al.*, *op. cit.* (note 60), pp. 581–582.

67 brown resists the capitalization of names. adrienne maree brown, *Emergent strategy: shaping change, changing worlds* (AK Press, Chico, CA, 2017).

emerging across new materialisms as well as research into social justice more broadly. It is enfolded in the book, the talk, the research network, in me, in you, in them and across the ever-heating flashes of data-harvesting servers one thought at a time

SPORED!: UNDOING THE LINEAR END

So, dear reader, if you have come this far in what is a somewhat nonlinear, sometimes linear, sometimes spiralling tale bursting with histories, fictions, mushrooms, humans and non-humans, and a whole load of other entangled but never flattened ontologies, you will I hope have come to know that at its heart, this is primarily a love story. Because it is nothing less than the wild, sensate and often nonlinear experience of love of phenomena that excites us scholars, artists, activists and enthusiasts to take the risk to get to know the world. To listen to how our stories are entangled with its stories. To rupture the binary between subjects and objects that—when taken as the *only* ontic story—got us into so much mess in the first place. To think of life and living as an endless *and and and* that goes on in ways that resist linearity.

It is a story, made out of pinheads, hyphal knots, spores and symbiosis. It is a story made out of epistemic controversies. Out of science and technology studies scholars, performers and artists. Out of the violence of humanisms (and the wonders of humanisms too). Out of axiology and matters of justice. The new materialists fell in love with mushrooms, not just because they loved the fragrant caps, but because of how they *moved*, and how their intimate, intricate and far-reaching dances provided new material–discursive models for how we might think, move, and create new modalities of knowing and being for urgent times as part of this ecosystem.

In *Dear science*,⁶⁸ Katherine McKittrick takes to task the underlying epistemic assertions that take place in the ‘doing’ of research. She works with what might be described as a *posthumanist* perspective—an approach that might sit on the shelf between copies of Braidotti’s *Posthuman knowledge*⁶⁹, Barad’s *Meeting the Universe halfway*, and even, at a push, Tsing’s *Mushroom at the end of the world*. I would like to give that little ‘push’ as follows. McKittrick goes on to state that Sylvia Wynter’s⁷⁰ work boldly shifts the lens of scrutiny from the subject of so-called ‘human’ identity to the processes by which we make such subjects and therefore all the subsequent violences these delineations produce.

Wynter *methodologizes* the unfinished possibilities of collective struggle ... describing her work as invested in ‘the human’ (as an object of analysis) is perhaps misguided ... the human is not singular but rather, is a *manifestation of new ways of living with each other* that emerges from an inter-species-interecological schema. A preoccupation with only-the-human also privileges and centres the very human she (and we) seeks to challenge by disregarding or marginalising the perspectives of Man’s human others and Wynter’s ongoing insistence on a species perspective that is tied to our ecological worlds (plot-and-plantation, drought, desertification, global warming and climate change and so on). If our analyses of Wynter’s work are preoccupied with the figure of the human, we

68 K. McKittrick, *Dear science and other stories* (Duke University Press, Durham, 2021), pp. 41–42.

69 *op. cit.* (note 66).

70 K. McKittrick, Katherine, *On being human as praxis* (ed. S. Wynter), p. 42 (Duke University Press, 2015).

risk only talking about and writing about and describing the human we already know
....⁷⁰

Mushrooms are not just pretty or poisonous. As material–discursive phenomena that can be drawn on to explore nothing less than onto-epistemologies, they are starting to teach us how to think through aspects of relationality that require our examination. They teach ‘us’ to radically redefine what makes us ‘us’—both as a species, and as a collective, and as outsiders simultaneously. ‘Us’ becomes a term that is spored, distributed, relational, new material and *posthuman*. Because these terms *matter*. These epistemic practices *matter*. Because mycelial approaches to living and dying open a doorway that may have always already been there, but that has become overgrown in all the bluster and noise of Vitruvian stories alone.

I am mushroom. I am all of these things and the taste on your tongue. I am the subject of so many books and articles by the ‘new materialists’ whatever they are. I am in you, buried inside every part of you, whispering my knowledge to you in every move you make. You are the ear I speak to. You are the ear I speak as, repeating my own story in you as you, all the way down! Write me well

DATA ACCESSIBILITY

This article has no additional data.

DECLARATION OF AI USE

I have not used AI-assisted technologies in creating this article.