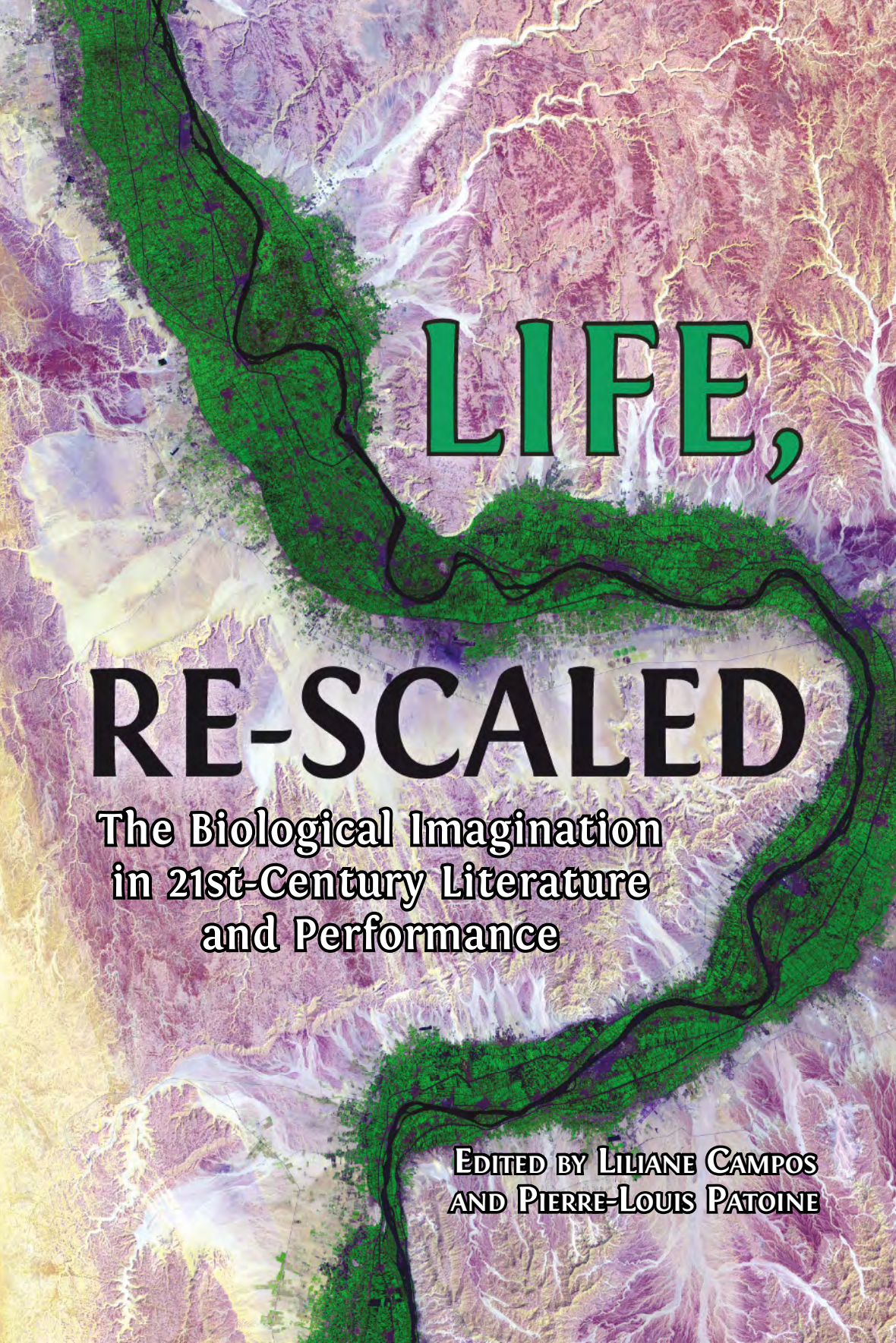
LIFE,
RE-SCALED
The Biological Imagination
in 21st-Century Literature
and Performance
Edited by Liliane Campos
and Pierre-Louis Patoine

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4. Mycoaesthetics

Weird Fungi and Jeff VanderMeer's *Annihilation*

Derek Woods

'Words? Made of fungi?'

—Jeff VanderMeer, *Annihilation*

The twenty-first century has seen a new wave of interest in the Kingdom Fungi across biology, literature, and visual art. One reason for this has been a shift in both fungi's ecological scale and cultural image driven by the arrival of the 'wood wide web'. This phrase is a punning technomorph coined in the context of Suzanne Simard's research in forest ecology; prior to the phrase, the concept has analogues in indigenous traditions.[1] When Simard published her first paper on the topic, 'Net Transfer of Carbon between Ectomycorrhizal Tree Species in the Field' (1997), Sir David Read, who had shown in 1984 that 'carbon could pass between normal plants through fungal connections', published a commentary at the request of *Nature*'s editors. On the cover of the issue, they placed a

1 As Allison Weir argues in reference to the wood wide webs of Peter Wohlleben and Suzanne Simard, 'it appears that Western science is just discovering what Indigenous scientists have known for many thousands of years'. 'Decolonizing Feminist Freedom: Indigenous Relationalities', in *Decolonizing Feminism: Transnational Feminism and Globalization*, ed. by Margaret A. McLaren (New York: Rowman and Littlefield, 2017), pp. 257–89 (p. 265). Suzanne Simard also suggests that the wood wide web is in accord with indigenous knowledge in *Finding the Mother Tree*: *Discovering the Wisdom of the Forest* (New York: Alfred A. Knopf, 2021), p. 293.

 https://doi.org/10.11647/OBP.0303.04

phrase coined by Read, 'the wood wide web'.[2] Simard has since become the public face of the idea that trees communicate with one another, nutritionally and semiotically, through networks of fungi in the soil.

The wood-wide web is a new biological scale: it shifts attention from single, familiar mushrooms to the subterranean bodies of fungi known as mycelium—bodies of which mushrooms are only the ephemeral fruit or reproductive structure. Here individuals are hard to define, but bodies might stretch across many square kilometers. As a moving target in twenty-first-century cultures of science, the wood-wide web is also a new biological image: it invites us to see fungi not as individual organisms but as 'technological' networks that grow in the dark, dense, and invisible space of the soil.

One major influence on the new wave of enthusiasm about 'mycology', the study of fungi, was Paul Stamets' book *Mycelium Running: How Mushrooms Can Help Save the World* (2005), which opens with a chapter on 'Mycelium as Nature's Internet'. Ten years later, Anna Lowenhaupt Tsing published a much-cited ethnography of mushroom pickers that cites Stamets, *The Mushroom at the End of the World* (2015). Published in the same year was Peter Wohlleben's *The Hidden Life of Trees: What They Feel, How They Communicate* (2015) which became a bestselling popularization of Simard's work. Dozens of imitative articles followed in digital media. For example, nature writer Robert McFarlane discussed 'The Secrets of the Wood-Wide Web' (2016) in *The New Yorker*. Ed Yong told us that 'Trees Have Their Own Internet' (2016) in *The Atlantic*. Wohlleben and Simard starred in Julia Dordel's documentary *Intelligent Trees* (2016), 'a scientific journey into the "wood wide web."'[3] In 2017, Simard gave a talk for TEDx Seattle entitled 'Nature's Internet: How Trees Talk to Each Other in a Healthy Forest' (2017). Soon after, Richard Grant asked whether or not 'Trees Talk to Each Other?' (2018) in *The Smithsonian Magazine*. Claire Marshall reported on how 'Trees Social Networks are Mapped' (2019) for the *BBC*. In the documentary

2 Suzanne Simard, 'Net Transfer of Carbon between Ectomycorrhizal Tree Species in the Field', *Nature*, 388 (1997), 579–82, https://doi.org/10.1038/41557. David Read, 'The Ties that bind', *Nature*, 388 (1997), 517–18, https://doi.org/10.1038/41426. Merlin Sheldrake recounts this story of the phrase in *Entangled Life: How Fungi Make Our Worlds, Change Our Minds, and Shape Our Futures* (New York: Random House, 2020), p. 214.

3 *Intelligent Trees*, dir. by Julia Dordel (Dorcon, 2016).

Fantastic Fungi (2019), Louie Schwartzberg's interviewed Simard for a segment on mycelial networks. In an article entitled 'The Wood-Wide Web Can Really Help Trees Talk to One Another' (2020), Josh Gabbatis rehashed these ideas for *Science Focus*. In the same year, Richard Fortey reviewed Merlin Sheldrake's striking book *Entangled Life: How Fungi Make Our Worlds, Change Our Minds & Shape Our Futures* (2020) with the clickbait title 'Wood Wide Web: The Magic of Mycelial Communication' (2021). And the cinematic popularization continues with the German documentary *The Hidden Life of Trees* (2021). The list could go on, embracing a wave of popular science writing and visual culture. This enthusiasm calls for an explanation.

Digital hype about fungi imagined as digital media seems a drastic shift from this taxonomic kingdom's centuries of invisibility. Almost every author who writes about mycology complains that fungi have been ignored by humans, who prefer to notice flowers and charismatic megafauna. Scholars have only begun to study the reasons for this, which include the many ways that fungi have been understood as negative, pathological, vegetable—anything but themselves.[4] And yet, only one of the titles listed above mention fungi despite the fact that fungal mycelia form the very web in question. Even in the context of enthusiasm for fungi, their specificity as a form of life is quickly absorbed by attention to plants and to more familiar concepts of ecological connectedness. As we will see, the wood wide web is often treated as a kind of prosthetic for plant communication rather than a wonderful biological phenomenon in its own right. The goal of this chapter is to explain why this happens through the study of a central structure of twenty-first-century *mycoaesthetics*, or the cultural representation of fungi.

My case study is Jeff VanderMeer's 'weird fiction' novel *Annihilation* (2014)—especially his image of fungal writing in the novel's setting, Area X, an alien ecosystem inexplicably 'terraforming' Earth's biosphere.[5]

4 I discuss this history in 'The Fungal Kingdom', *Alienocene: Journal of the First Outernational*, Stratum 8 (2020).

5 Jeff VanderMeer's *Southern Reach Trilogy* includes *Annihilation* (New York: Farrar, Strauss, and Giroux, 2014), *Authority* (New York: Farrar, Strauss, and Giroux, 2014), and *Acceptance* (New York: Farrar, Strauss, and Giroux, 2014). For more on terraforming in relation to literature, philosophy, and ecotheory, see the special issue of *diacritics* edited by myself and Karen Pinkus entitled 'Terraforming', *diacritics*, 47.3 (2019), https://doi.org/10.1353/dia.2019.0023.

This weird ecology is Earth-like yet unearthly/uncanny, possessed by a force defined less by malevolence than mimicry and mutagenesis. When an expedition discovers writing in words made of fungi beneath the ground of Area X, they bring VanderMeer's readers to the core of the novel's critical significance. These subterranean fungal words follow a spiral staircase into the earth; they compose a single endless sentence reminiscent of the final chapter of James Joyce's *Ulysses* (1920), becoming a kind of alien poem nested within the novel.[6] But this is not the only role played by fungal writing in *Annihilation*. The novel's metafiction nests this subterranean fungal script inside a journal written by its first-person narrator, a biologist who enters Area X as part of a doomed expedition.[7] As the novel draws to a close, the biologist leaves her journal on a pile of decomposing journals from previous expeditions, so that the novel ultimately imagines fungi to be infecting, decomposing, and perhaps reading its own narrative. Several layers of form within the novel, the fungal sentence, and the decomposing journal, leave us with a formal complexity that invites careful interpretation.

VanderMeer's image of subterranean fungal writing evokes the wood wide web, but its spiral form also suggests the double helix of DNA. One could read this fungal writing as an ecological genome: Area X is a superorganism and the fungal writing is its DNA: a kind of memory, source code, or nervous system that controls the becoming of the setting. Like the wood wide web, such a reading would take the subterranean writing as a cybernetic information system, where fungi play the roles of media for plants and figures of ecological connectedness.

An alternative way to read the novel's fungal writing is to see it as an expression of the relation between fungi's aesthetic effects and their ontological status as neither plant nor animal. The comparatively recent emergence of fungi as a historically contingent ontology is a major factor

6 This similarity between Joyce's Molly Bloom chapter and the fungal sentence raises questions, beyond my scope, about the relationship between science fiction/fantasy and modernist literary form. On modernism and science fiction, see, for example, Ursula Heise, *Sense of Place and Sense of Planet: The Environmental Imagination of the Global* (New York: Oxford University Press, 2008), p. 77 and p. 174; Alison Nikki Sperling, 'Weird Modernisms' (2017), *Theses and Dissertations*, 1542, https://dc.uwm.edu/etd/1542; P. March Russell, *Modernism and Science Fiction* (London: Palgrave Macmillan, 2015).

7 For spelunking investigation of the subterranean in literature and climate change, see Karen Pinkus, *Subsurface* (forthcoming).

in creating the aesthetic 'weirdness' of fungi and making this image of the kingdom prominent in the twenty-first century. Both readings are important, but the second is a needed criticism of the wood wide web in a moment of zeal for anthropomorphism and networks. Fungi are a kingdom no longer conflated with plants or negated as merely parasitic, 'improper life'.[8] They are fungi, not a species of something else; they attract cultural attention for what they alone are and can do.

From the perspective of mycoaesthetics, what *Annihilation* shows so well is that fungi, as a new biological image/scale in the twenty-first century, have both ontological autonomy and a tendency to be captured by more familiar ecological concepts of connectedness. I argue that twenty-first-century mycoaesthetics is constituted by a 'hinge' central to its new prominence. This hinge is an ambivalent movement between the wood wide web and the fungal kingdom as weird life, neither plant nor animal. If the latter answers the question of why fungi are weird, the former tends to dilute this ontological and aesthetic characteristic by shifting plants to center stage or affirming a holism that has a long, troubled history in ecological thought.[9]

My essay begins making this argument by tying VanderMeer's work to a wider cultural field and concludes by asking how literary and aesthetic theory should write with the life forms we find in texts. This is also a question about how ecocriticism and posthumanism should address current debates about formalism, but with an eye to the specific problem of *Annihilation*, where fungi are thematized but also (de)compose the narrative itself. That is, a distinction emerges whereby weak mycoaesthetics indicates the very real ways that human agency can depict fungi one way or another, and strong mycoaesthetics envisions the fungal kingdom's own contribution to its aesthetic imprint: the idea that there is something about life forms, particularly at certain levels of taxonomic abstraction, such as the Kingdom Fungi, the Phylum Mollusca, or the Class Arachnid, that correlates with patterns of

8 I borrow this term from Timothy Campbell's *Improper Life: Technology and Biopolitics from Heidegger to Agamben* (Minneapolis: University of Minnesota Press, 2011, https://doi.org/10.5749/minnesota/9780816674640.001.0001), where it refers to life that falls outside the sphere of biopolitical management and nurturing.

9 See Thomas Patrick Pringle, 'The Tech Ecosystem and the Colony', *Heliotrope*, 12 May 2021.

literary and artistic form in ways that should not be reduced to arbitrary construction.

Weird Ecology, Weird Fiction

One way to think ecology is through what I call the transvaluation of weird life. Organisms that once seemed evil, disgusting, useless, small, inferior, or merely strange are said to have some functional role to play.[10] This is already true for one of the earliest ecological concepts, the economy of nature, so named by the parson and naturalist Gilbert White in *The Natural History of Selbourne* (1789). In a passage about worms, White writes that 'earth-worms, though in appearance a small and despicable link in the chain of nature, yet, if lost, would make a lamentable chasm'.[11] A logic of function replaces weirdness and minority. Gross things that live in the dirt are necessary for the whole chain. As Janelle A. Schwartz argues in a book about worms and British Romanticism, in the eighteenth century the meaning of the word worm referred to more than the squiggly annelid of today. For early moderns, the word had a broader sense of lowly life, death, and decay: 'the vermiform as everything from an earthworm to a larva to a maggot, a flying insect, and the unknown'. Indeed, Schwartz's work suggests the worm was a stand-in for weird life, 'a figure through which to consider the origin and progress of life during a period when each new discovery dislodged previously set categories and frustrated attempts to comprehend a totalized life through its unbounded parts'.[12] By valuing the worm, White asks readers to shift their thinking about life from the great chain of being to a proto-ecological view.

Like White's worms, fungi are now evoked as a biological image for ecological functions. Yet this functionalization does not dispel the weird aesthetics of fungi, and not only because of their unstable ontological status as neither plant nor animal. In recent years, weirdness has become

10 More on this argument in Derek Woods, 'Scale in Ecological Science Writing', in *The Routledge Handbook of Ecocriticism and Environmental Communication* (New York: Routledge, 2019), pp. 118–29.

11 Gilbert White, *The Natural History of Selborne* (New York: Penguin, 1977), p. 196.

12 Janelle A. Schwartz, *Worm Work: Recasting Romanticism* (Minneapolis: University of Minnesota Press, 2012), p. 11, https://doi.org/10.5749/minnesota/9780816673209.001.0001.

a descriptor of global warming and attendant ecological mutation. Environmentalist Hunter Lovins calls it 'global weirding'.[13] For Jonathan Turnbull, 'recent scientific discoveries [...] are often accompanied by a simultaneous sense of estrangement and fascination, which are often associated with the *weird*. On our terraformed planet, the weird is unearthly, gesturing towards and veering away from Earth. [...] The weird involves (un)earthly belonging'.[14]

In the twenty-first century, weird life has become a new bio-aesthetic category, with fungi as one of its central representatives.[15] In his essay about ecological and climatic estrangement, Turnbull cites the 'radiotrophic' fungus *Cladosporium sphaerospermum*. This radiation-eating fungus has been found throughout the ruins of the Chernobyl nuclear reactor, 'the most radioactive place on Earth'.[16] Evidently this fungus is able to use gamma radiation to grow while protecting itself from mutagenic effects with the pigment melanin.[17] Stranger still, there are more than 200 species of fungi huddling around the reactor.[18] In the same brief piece, Turnbull also cites VanderMeer's exemplary trilogy. Area X clearly resembles both the rewilded, ominous, and mutant ecology of Chernobyl and Russian director Andrei Tarkovsky's film *Stalker* (1979), where an expedition enters 'the zone', a mysterious place of idyllic fields, forests, and ruins haunted by a psychoactive force.[19] Tarkovsky's famous film was, in turn, and adaptation of Arkady and Boris Strugatsky's novel *Roadside Picnic* (1972). As this citation path from novel to film to ethnographic essay on the climatic weird clearly suggests, the weird morphs readily between genres and contexts, so that it is difficult to establish distinctions between the contexts of fiction

13 Thomas L. Friedman popularized 'global weirding' in 'The People We Have Been Waiting For', *The New York Times*, 2 December 2007.

14 Jonathon Turnbull, 'Weird', *Environmental Humanities*, 13.1 (2021), 275–80 (p. 275), https://doi.org/10.1215/22011919-8867329.

15 See, for example, David Toomey, *Weird Life: The Search for Life that Is Very, Very Different from Our Own* (New York: W.W. Norton & Co., 2013).

16 Johnathon Turnbull, 'Weird', p. 277.

17 Ekaterina Dadachova and Arturo Casadevall, 'Ionizing Radiation: how fungi cope, adapt, and exploit with the help of melanin', *Current Opinion in Microbiology*, 11.6 (2008), 525–31, https://doi.org/10.1016/j.mib.2008.09.013.

18 N.N. Zhdanova et. al., 'Ionizing radiation attracts soil fungi', *Mycological Research*, 108.9 (2004), 1089–96, https://doi.org/10.1017/S0953756204000966.

19 *Stalker*, dir. by Andrei Tarkovsky (Mosfilm, 1979).

and non-fiction. When it comes to weird ecology, both grapple with the speculative defamiliarization of life.

Nevertheless, critics have done valuable work on the weird as a specifically literary and aesthetic category. From Jeff and Ann VanderMeer to Mark Fisher, Graham Harman, S.T. Joshi, Kate Marshall, Timothy Morton, Benjamin Noys, Alison Sperling, and Eugene Thacker, among others, the history of weird fiction is defined by relations between the weird and the uncanny, the weird and the queer, the old weird and the new, the weird and horror, the weird and the body, the weird and ecological thought.[20] These critics share the conclusion that the weird is an aesthetic at play among science fiction, fantasy and horror, one with close ties to both literary and philosophical realism. They share with Turnbull and others the idea that weird aesthetics deserves attention in new ways because of global warming and ecological violence. As Sperling writes in an article on the *Southern Reach Trilogy*, 'a particularly 'weird' ecology is one explicitly linked to modes of embodiment specific to the environmental conditions of the twenty-first century'.[21] With this line of argument, Sperling deepens the relation between this literary mode and the mutation of ecosystems.

This recent and environmental weird also determines what Noys and Murphy distinguish as the last of three stages in the history of weird fiction. For them, the third stage is characterized by 'a new sensibility of welcoming the alien and the monstrous as sites of affirmation and becoming', a transvaluation that invites comparison with White's important worm. Noys and Murphy find a contrast, in this affirmative repurposing, to 'Lovecraft's horror at the alien, influenced by his racism'. Disgust at human otherness, biopolitical hierarchies, and what Calvin L.

20 See Ann VanderMeer and Jeff VanderMeer, *The New Weird* (Ashland, OH: Tachyon Publications, 2008); Graham Harman, *Weird Realism: Lovecraft and Philosophy* (Washington: Zero Books, 2012); S.T. Joshi, 'Establishing the Canon of Weird Fiction', *The Journal of the Fantastic in the Arts*, 14.3 (2003), 333–41; Timothy Morton, *Dark Ecology: For a Logic of Future Coexistence* (New York: Columbia University Press, 2016, https://doi.org/10.7312/mort17752); Kate Marshall, 'The Old Weird', *Modernism/modernity*, 23.3 (2016), 117–34, https://doi.org/10.1353/mod.2016.0055; Timothy S. Murphy and Benjamin Noys, 'Introduction: Old and New Weird', *Genre*, 49.2 (2016), 117–34, https://doi.org/10.1215/00166928-3512285; Alison Sperling, 'Second Skins: A Body-Ecology of Jeff VanderMeer's *The Southern Reach Trilogy*', *Paradoxa*, 28 (2016), 230–55; Eugene Thacker, *In the Dust of this Planet: Horror of Philosophy, Vol. 1* (Washington: Zero Books, 2011).

21 Alison Sperling, 'Second Skins', p. 230.

Warren would call anti-black metaphysics, saturated the early stages of the weird.[22] By contrast, 'the new weird adopts a more radical politics, with 'the alien, the hybrid, and the chaotic as subversions of the various normalizations of power and subjectivity'.[23] If horror and the weird were initially indistinguishable, new weird fiction lowers the volume of horror enough for it to become positive while retaining an experience of otherness. If 'monstrous' bodies are essential to the generic conventions of horror, which also evoke conventional biological objects of disgust such as insects and decomposition (and thus fungi), then the new weird posits that monstrosity is better than the proper life of furry pets, charismatic megafauna, and privileged human bodies.

Mark Fisher may be right to say that 'any discussion of weird fiction must begin with Lovecraft'.[24] But fungi were already established at the core of weird fiction by the work of Edgar Allan Poe and other American writers in the nineteenth century. Kate Marshall indicates these writers in her argument about the earlier, Gothic origins of weird fiction. For her, 'an expanded sense of what might constitute weird writing beyond the *Weird Tales* writers or the boundaries of the New Weird offers in turn an expanded set of literary resources through which to think the nonhuman'.[25] If the structure of mycoaesthetics that I introduced in the first section is new to the twenty-first century, the relation between fungi and weird fiction is not.

One example that supports this argument on the terrain of the fungal weird is the use of fungal imagery in Poe's *The Fall of the House of Usher* (1839). It appears in a key moment for establishing the ominous setting, when the narrator's host first welcomes him to the gloomy house, where 'minute fungi overspread the whole exterior, hanging in a fine tangled web-work from the eaves'.[26] Further examples exist both in and out of the category of weird fiction, forming a minor tradition in Anglophone literature: the magic mushroom in Lewis Carroll's *Alice in Wonderland* (1865) that gives Alice the power to shrink or grow; the

22 Calvin L. Warren, *Ontological Terror: Blackness, Nihilism, and Emancipation* (Durham: Duke University Press, 2018).
23 Benjamin Noys and Timothy S. Murphy, 'Introduction', p. 125.
24 Mark Fisher, *The Weird and the Eerie*, p. 16.
25 Kate Marshall, 'The Old Weird', p. 634.
26 Edgar Allan Poe, *The Fall of the House of Usher, and Other Tales*, 1839 (New York: Signet Classics, 2006), p. 120.

fungal underworld of John Urri Lloyd's old weird novel *Etidorpha; or, the End of the Earth* (1895); the 'fungoid'[27] skin of H.G. Wells' aliens in *The War of the Worlds* (1898); Philip K. Dick's telepathic slime mold in *Clans of the Alphane Moon* (1964); the gentle fungal plague in Ling Ma's *Severance* (2018); the serial killer, named after mycologist Paul Stamets, who uses fungi to digest people in Bryan Fuller's TV series *Hannibal* (2013–2015).[28] Fungi have a long standing association with the weird as a literary mode, not accidentally but as important elements of its aesthetic effect.

During the first two decades of the twenty-first century, the appearance of the ecological weird due to heightened awareness of the Anthropocene has dovetailed with the reinvigoration of weird fiction, as VanderMeer's work shows, and the role of fungi has only amplified.[29] This new context for weird fiction has, in turn, led critics to look back and read the roots of the genre in a new light. For example, Fisher reads Lovecraft as a case of the naturalistic rather than the supernatural weird. In this frame, briefly put, 'a natural phenomenon such as a black hole is more weird than a vampire'.[30] One naturalistic story that seems to have influenced VanderMeer's trilogy is Lovecraft's story 'The Colour Out of Space' (1927), where an alien substance arrives with a meteorite in a placid New England town. This substance soon takes the form of an unknown color—a new band in the electromagnetic spectrum. As Lovecraft's narrator puts it, 'the colour, which resembled some of the bands in the meteor's strange spectrum, was almost impossible to describe; and it was only by analogy that they called it colour at all'.[31] As

27 H.G. Wells, *The War of the Worlds*, 1998 (New York: Penguin, 2005), p. 22.

28 John Urri Lloyd, *Etidorpha; or, the End of Earth, the Strange History of a Mysterious Being and the Account of a Remarkable Journey* (Cincinnati: John Urri Lloyd, 1895); H.G. Wells, *The War of the Worlds* (Peterborough, ON: Broadview, 2003), p. 55; Philip K. Dick, *Clans of the Alphane Moon* (New York: Mariner Books, 2013), Ling Ma, *Severance* (New York: Farrar, Strauss, and Giroux, 2018); 'Amuse-Bouche', *Hannibal*, NBC, 11 April 2013.

29 The weird would have been an apt fourth chapter in Sianne Ngai's elaboration of Kantian aesthetics in *Our Aesthetic Categories: Zany, Cute, Interesting* (Cambridge, MA: Harvard University Press, 2012), where she adds to his familiar notions of the beautiful and the sublime.

30 Mark Fisher, *The Weird and the Eerie*, p. 15. See also Eugene Thacker, '*Naturhorror* and the Weird', in *Spaces and Fictions of the Weird and the Fantastic*, ed. by Julius Greve and Florian Zappe (London: Palgrave Macmillan, 2019), 13–24, https://doi.org/10.1007/978-3-030-28116-8_2.

31 H.P. Lovecraft, *The Call of Cthulhu and Other Weird Stories* (New York: Penguin, 1999), pp. 175–76.

the 'baffling bands' of this 'queer colour' with an 'unknown spectrum' permeates the environment of the town, flowers and leaves take on its hue.[32] In a beautiful biological image, the colors of autumn include it too. Over time, however, this color becomes a malevolent force that devours bodies like a cosmic parasite, turning farms and their inhabitants into grey dust. But Lovecraft's story is weirdest in its initial premise, where the new color estranges the pastoral landscape without destroying it. When the color out of space becomes a devastating and 'shapeless horror',[33] this glimmer of the weird as opposed to the horrible gets reabsorbed, as it were, by horror, with its reliance on graphic violence, death, and the supernatural. Here, the weird is an aesthetic phase that approaches horror without reaching its intensity, much like weird life is a category that revalues organisms considered repulsive and disgusting by viewing them as exotic, and, if still disturbing, as more desirable than repulsive.

Wood Wide Web as Ecological Genome

In an allusion to 'The Colour Out of Space', Area X begins with a fragment of light. In the third novel of *Southern Reach*, *Acceptance* (2014), the 'sliver' of light falls in the lawn of a lighthouse before an invisible barrier separates it from the rest of the Earth. There is no explanation of the mysterious terraforming that creates Area X, with all its beauty, psychotropy, and mutagenic power. Like rural New England in Lovecraft's story or the Earth as terraformed by the Oankali in Octavia Butler's *Xenogenesis Trilogy*, Area X is ambiguously (extra)terrestrial, both Earth and another planet. But if the light that falls outside the lighthouse in the third volume looks like 'glass', 'a key', 'a gleam', and a 'shifting spiral of light',[34] the first volume's narrator also characterizes Area X as thorn and parasite:

> Think of it as a thorn, perhaps, a long, thick thorn so large it is buried deep in the side of the world. Emanating from the side of this thorn is an endless, perhaps automatic, need to assimilate and mimic. Assimilator and assimilated interact *through the catalyst of a script of words, which*

32 Ibid., p. 176.
33 Ibid., p. 197.
34 Jeff VanderMeer, *Acceptance* (New York: Farrar, Strauss, and Giroux, 2014), pp. 24–25.

> *powers the engine of transformation*. Perhaps it is a creature living in a perfect symbiosis with a host of other creatures. Perhaps it is 'merely' a machine. But in either case, 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 mirroring, and by remaining hidden in so many other ways, all without surrendering the foundations of its otherness as it becomes what it encounters.[35]

For my claim that twenty-first-century mycoaesthetics works as a 'hinge' between fungal weirdness and the wood wide web, the importance of this passage lies in the fact that the biologist comes to see the fungal writing, 'the catalyst of a script of words', as the agency that 'powers the engine of transformation'. Such a causal script evokes philosophical work on performativity in the sense of linguistic action, notions of virality between biology and digital culture, and the visions of language as an alien parasite that we find in earlier experimental science fiction writers such as William S. Burroughs.[36] From the chemical sound of this 'catalyzing' script of words, it is easy to make the connection to the genome, which leads me to read both the helical fungal script of *Annihilation* and the wood wide web as a kind of ecological genome.

The biologist begins to think that the tower may be a 'living creature of some sort', and thus that the expedition is 'descending into the living organism'. If the tower is an organism, the fungal writing becomes its DNA.[37] The narrator of *Annihilation* is a female biologist whose partner died on a previous expedition into Area X. Focalization corresponds with specialization; the unnamed characters are referred to by their occupations. This focalization is also metafiction in that the narrative of annihilation takes the form of a journal or scientific report about the expedition. Before offering any other background about this character, however, the plot takes us quickly to Area X's subterranean 'tower', a spiral staircase made of stone that leads down into the Earth. The zone's second major architecture is a lighthouse. But the lighthouse is a human artefact left from the time before the boundary separated Earth from Eaarth[38] and the tower is a product of Area X itself.

35 Jeff VanderMeer, *Annihilation*, pp. 190–91.

36 See for example William S. Burroughs, *The Soft Machine* (New York: Olympia Press, 1961).

37 Jeff VanderMeer, *Annihilation*, p. 41.

38 Bill McKibben's term for Earth under climate change is *Eaarth: Making a Life on a Tough New Planet* (Toronto: Vintage, 2011).

As the characters enter the tower, the expedition begins to break down. The biologist discovers words made of fungi on the wall—the first sign that the place they have entered will not be easy to explain or comprehend. On the first descent, she inhales spores released by the words, which begin her transformation into what becomes a 'leviathan', 'a monumental storm', 'a mountain' in the third novel.[39] She will ultimately become Area X at some more distributed level than that of a single bounded organism.

Inhabiting the stairway is a being called the 'Crawler'. Readers eventually learn that this being is the source of the subterranean tower's fungal words. For the biologist, seeing the Crawler for the first time is 'a similar experience at a thousand times the magnitude' of seeing for the first time a rare starfish named the destroyer of worlds. At the core of Area X, she encounters the crawler as a life form completely beyond analogy, 'a figure within a series of refracted panes of glass', 'a series of layers in the shape of an archway', 'a great sluglike monster ringed by satellites of even odder creatures, 'a wall of flesh that resembled light […] things lazily floating in the air around it like soft tadpoles'.[40] This nearly unimaginable image of the crawler moves the narrative toward a limit case of weirdness. Despite the comically extreme description, however, both Lovecraft's color and the Crawler are depicted by radicalizing natural phenomena—they answer to Fisher's argument about the naturalist weird and Marshall's interest in the relation between weird fiction and speculative realism. Both VanderMeer and Lovecraft use analogies with other bands of electromagnetic spectrum and with terrestrial organisms like slugs and tadpoles. Considered spatially, then, the center of Area X is a limit case because it is the weirdest life that can still be understood in a naturalist frame. The fungal writing is contiguous with the crawler, but less radically alien or external. Like ripples in disturbed water, the setting's weirdness diminishes as the narration moves away from this central unimaginable entity.

If the fungal words are the first indication of Area X's fundamental weirdness, they are also something more, considering the biologist's closing theory of the place. As a genome, the spiral staircase inscribed with writing evokes the spiral helix of DNA, the information molecule

39 Jeff VanderMeer, *Acceptance*, pp. 194–95.
40 Ibid., pp. 176–77.

of life. From this biological perspective, the Crawler is at least as much a reader as a writer, moving along an unbroken spiral like the ribosomes often described as 'crawling' along strands of mRNA as they decode genes for protein synthesis.[41] The passage from the surrounding natural landscape into the paranatural zone thus recalls twenty-first-century digital animations discussed by Adam Nocek in *Molecular Capture: The Animation of Biology* (2021), such as *The Inner Life of the Cell* (2006), which visualize biochemical reactions invisible to both microscopes and the naked eye.[42]

The weird ecology of Area X is an alienation that brings out what seems unnatural about nature itself—as for 'speculative realist' readers such as Harman and Thacker, for whom weird fiction narrates realities that are unreal because so different from what human senses can perceive and from our scales of time and space. For her part, Marshall seeks 'an expanded set of literary resources through which to think the nonhuman and to think beyond some of the paradoxes that thought presents'.[43] The biologist's descent into the tower then becomes an allegory of scaling 'down' into the world of molecules, while Area X becomes a stand-in for the otherness of the microscopic scale and its putative ability to control what happens at the scales of human senses and social systems.

That the Crawler's words are fungal words offers a tempting connection between this ecological genome and the wood wide web. This analogy across scale raises the possibility that the mycelial internet is not only about trophic relation among plants and fungi, but also a means of control, memory, and reproduction like DNA is for organisms. But the analogy only goes so far. If the wood wide web is a kind of memory system, then it would also be radically different from the function of a genome. Just as the superorganism analogy broke down in the history of ecology, so the wood wide web can only be loosely

41 Dieter Beyer et. al., 'How the Ribosome Moves Along the mRNA during Protein Synthesis', *The Journal of Biological Chemistry*, 269.48 (1993), 30713–17 (p. 30714), https://doi.org/10.1016/S0021-9258(18)43872-0.

42 Adam Nocek, *Molecular Capture: The Animation of Biology* (Minneapolis: University of Minnesota Press, 2021, https://doi.org/10.5749/j.ctv1cdxg6p); XVIVO, *The Inner Life of the Cell* (Harvard University Department of Molecular and Cellular Biology, 2006).

43 Kate Marshall, 'The Old Weird', p. 634.

compared to a genome in the biological sense. Like the connected tree roots of Ursula K. Le Guin's story *Vaster than Empires and More Slow*,[44] the wood wide web is something else, a kind of horizontal vehicle of communication among species, the nervous system or communication system of a biome. In this reading, fungi are not only fungi but the informative fiber of ecological connectedness. They express a shift, in twenty-first-century cultures of science, from 'bio' to 'eco', from concern with genomes and DNA to Anthropocene ecosystems, climate change, and weird ecologies. And this raises the question of whether the holist connectedness of the wood wide web has more to do with the reductionist DNA than most scholars seem to expect.

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'.[45] 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 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.[46]

Notions of web, mesh, network, entanglement, symbiosis, and assemblage have been essential for countering overly individualist, liberal, and Neo-Darwinian ideas of competition among bounded organisms in a

44 Ursula K. Le Guin, 'Vaster than Empires and More Slow', in *The Wind's Twelve Quarters* (New York: Harper Perennial, 2004 [1970]), pp. 181–217.

45 Jedediah Purdy, 'Thinking Like a Mountain', *N+1*, 29 (2017). Sheldrake also worries about the repurposing of 'starry-eyed fantasies of the internet' and 'digital utopia' in the form of the wood wide web's horizontality (*Entangled Life*, p. 162).

46 For example, see Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, The Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006), pp. 43–44 and p. 203, https://doi.org/10.7208/chicago/9780226817439.001.0001.

struggle for life with the non-negotiable interdependence of life on Earth. Given the success of network concepts and their mainstreaming in images like the wood wide web, however, critics can now learn more by seeing where they break down than by celebrating them. If we have already seen that fungi are quickly taken up as figures of ecological relation through both cybernetic rhetoric and the transvaluation of weird life (in both ecology and fiction), in the concluding section of this chapter, I argue that twenty-first-century mycoaesthetics is also about the ontology of fungi alone as an autonomous kingdom that is neither plant, animal, nor exemplar of the ecological thought. In *Annihilation*, the image of fungal writing lends itself to both interpretations. The hinge between ecological relation and fungal autonomy that VanderMeer foregrounds in his trilogy is the central structure of twenty-first-century mycoaesthetics.

The Fungal Kingdom

One downside of the wood wide web is that it risks reducing mycelia to a tool used by plants. For Sheldrake, there is thus an insidious 'plant-centrism' at work in many discussions of the wood wide web, as shown by the titles of the books and articles I mentioned above (*The Hidden Life of Trees*; 'Trees Have Their Own Internet'; 'Do Trees Talk to Each Other?').[47] Sheldrake argues in a chapter on the wood wide web that 'plants have been the protagonists' in stories about shared fungal networks. Within prevailing instrumentalist logics of technology, technomorphism can have the effect of reducing organisms to tools: 'fungi have featured inasmuch as they connect plants and serve as a conduit between them', so that they become 'little more than a system of

47 As in the interconnected plant-planet of Le Guin's *Vaster than Empires and More Slow* and Jeffrey Nealon's tendency to collapse the Deleuzo-Guattarean rhizome into plant life in *Plant Theory: Biopower and Vegetal Life* (Stanford: Stanford University Press, 2015, https://doi.org/10.1515/9780804796781). I am not the first to point out that mycelium seems better suited than the roots of plants to the kind of 'distributed territory of rhizomatic plant life' that Nealon sees as an alternative biopolitical model to organic wholeness and plant/animal binaries (p. 118), but fungi are never mobilized to help in this deconstruction. Instead, Nealon follows the Aristotelian and Linnean tradition of collapsing fungi into the plant kingdom or into an expansive category of the 'vegetal' of which plants are the only exemplary life form.

plumbing that plants can use to pump material between one another'.[48] Without a detour through post-instrumental theories of technology, the wood wide web, as an image and figure of speech, comes with the risk of falling back on metaphysical hierarchies of life. For Sheldrake, 'plant-centric perspectives can distort. Paying more attention to animals than plants contributes to humans' plant-blindness. Paying more attention to plants than to fungi makes us fungus-blind'. The wood wide web implies 'that plants are equivalent to the web pages, or nodes, in the network, and fungi are the hyperlinks joining the nodes to one another'.[49]

While these comments come in the context of a discussion of Simard's work and its robust public reception, they can be generalized as a lesson about the invisibility of fungi—an irony of mycoaesthetics given that the motive behind the wood wide web is to make the invisible subterranean scale of fungi visible. The wood wide web becomes an example of how fungi can be ignored or reduced to plant prosthetics despite that fact that 'every link in the wood wide web is a fungus with a life of its own', so that fungi are 'active participants'[50] rather than instruments or altruists. In this way, Sheldrake's critique of the wood wide web from the perspective of someone fundamentally invested in mycelium is an interpretation of mycoaesthetics that shows how writing about fungi can easily blur away into the most general concept of ecological thought: for Timothy Morton, the idea that 'everything is interconnected'.[51]

Sheldrake does not seem to doubt that plants might communicate with one another through fungi or negotiate symbioses through subsurface mycelial media. He is interested in the metaphors we use and the baggage they bring along with them. Despite the title of his book about fungi, *Entangled Life*, he emphasizes the question of what makes fungi different from other life. He raises a question useful for understanding the hinge between ecological genome and fungal kingdom: faced with the soil's internet, 'are we able to stand back, look at the system, and let the polyphonic swarm of plants and fungi and

48 Merlin Sheldrake, *Entangled Life*, p. 160.
49 Ibid., p. 160.
50 Merlin Sheldrake, *Entangled Life*, p. 161.
51 Timothy Morton, *The Ecological Thought* (Cambridge, MA: Harvard University Press, 2010), p. 1.

bacteria that make up our homes and our worlds be themselves, and quite *unlike* anything else? What would that do to our minds?'[52]

At least since the turn of the century, VanderMeer seems to have been interested in such questions in relation to literary form. Before writing the *Southern Reach* trilogy, he published two books more closely aligned with the hollow earth novels of writers like Jules Verne and, more obscurely, John Urri Lloyd. Like Lloyd's *Etidorpha*, VanderMeer's *The City of Saints and Madmen* (2001), *Shriek* (2006), and *Finch* (2009) are about a world that contains its own negative image, an underworld kingdom of sentient fungi.[53] As the twentieth century gave way to the twenty-first, VanderMeer centered his weird fiction on the image and underworld scale of the fungal kingdom. His interest in these weird life forms helps me sustain my argument about mycoaesthetics as a hinge between the wood wide web and fungal autonomy. While the fungal writing in *Annihilation* can be read as an ecological genome, VanderMeer's prior interest in fungal underworlds suggests his fungal words are more than just accidental figures of connectedness.

The alternative to reading the 'tower' as the genome of Area X becomes clear in what the biologist sees on her second descent, when she examines the words more closely under the influence of their spores:

> Things only I could see: That the walls minutely rose and fell with the tower's breathing. That the colors of the words shifted with a rippling effect, like the strobing of a squid. That, with a variation of about three inches above the current words and three inches below, there existed a ghosting of *prior words*, written in the same cursive script. Effectively, these layers of words formed a watermark, for they were just an impression against the wall, a pale hint of green or sometimes purple the only sign that once they might have been raised letters.[54]

So much could be said about how VanderMeer uses a kind of life-form rhetoric in passages like this one, where the light media of squid amplify the aesthetic effect of the fungal script, as though the subsurface tower were not only underground but underwater. The squid simile evokes the chiasmic history of naming terrestrial life after aquatic (oyster

52 Merlin Sheldrake, *Entangled Life*, p. 174.

53 Jeff VanderMeer, *The City of Saints and Madmen: The Book of Ambergris* (Rockville, MD: Cosmos, 2001); *Shriek: An Afterword* (New York: Tor, 2006); *Finch* (Portland, OR: Underland, 2009).

54 Jeff VanderMeer, *Annihilation*, p. 48.

mushrooms) and vice versa (catfish). The rippling colors allude to the rich tradition of imagery, in science fiction, that draws on sea life to visualize extra-terrestrials.

While the fungal words compose an endless modernist sentence about death, decay, darkness, and worms (thus recalling White and Schwartz on weird life and associating worms with the fungal weird), the fact that these words are themselves composed of words leads the narrator to wonder whether the meaning matters or whether these words are building material or a process of fertilization rather than any kind of purposeful communication.[55] The biologist's theories give the fungal writing causal roles in the production of Area X, but the formal qualities of the Crawler's poem suggest a different interpretation.

From the perspective of strong mycoaesthetics, the essence of this passage is the 'ghosting' of words that makes the tower's fungal writing a palimpsest. Like a medieval manuscript that has been erased and overwritten, the words on the wall of the tower are inscribed in a medium made of similar words that are now fading or decaying into unreadability. The relationship between medium and form is relative; what was once the form, words with meaning, is now the medium for another form.[56] This entails recursivity because the pattern is self-similar. When we shift from one level to another, from language to the inscription surface, we find language again. The pattern repeats, self-similar at the level of form and its material substrate. But the fungal writing is also recursive in the sense of fractal repetition through scaling. It recalls Leibniz's pond filled with fish, where 'each portion of matter can be conceived as like a garden full of plants, or like a pond full of fish', but a pond or a garden in which 'each branch of a plant, each organ of an animal, each drop of its bodily fluids is also a similar garden or a similar pond'.[57]

The turn to modernist form with the endless sentence amplifies the recursivity of the fungal words through allusion to the aesthetics of art

55 Ibid., pp. 91–93.

56 Niklas Luhmann explores this relationship between medium and form in *Theory of Society, Vol. 1*, 1997 (Stanford: Stanford University Press, 2012), pp. 113–20.

57 Gottfried Wilhelm von Leibniz, *Monadology and Other Philosophical Essays*, trans. Paul Schrecker and Anne Martin Schrecker (Indianapolis: Bobbs-Merrill Educational Publishing, 1965), p. 159. See also Gilles Deleuze, *The Fold: Leibniz and the Baroque*, 1998 (Minneapolis: University of Minnesota Press, 1992).

for art's sake. Like Marcel DuChamp's famous urinal, *Fountain* (1917), modernist art constantly refers to itself by eschewing representation and questioning what counts as art. While this idea of modernism is as familiar as it is foundational, its role here is to add another layer of recursion to the scenes of fungal writing in *Annihilation*. If the reading of the fungal writing as a kind of ecological genome imagines the tower's connectedness with the rest of Area X, then the recursivity of the fungal writing makes it seem separate and self-generating.

The image of words within words or inscribed in a medium of words also has an intensifying effect commensurate with the narrator's own heightened perception, which is itself produced by the psychedelic effect of the words. The narrative doubles down on the weirdness of fungi, which leads us to think less about what kind of place Area X might be or what it might have to say about the estranging nature of ecological relation and more about the meaning of fungi in the narrative. What are fungi and why does the fungal kingdom appear in the historically contingent ways it does? Answering questions such as this might be better served by what Frédéric Neyrat calls an 'ecology of separation' than by an ecology of connectedness. Where he fears that the latter tends to make everything available for dynamic transformation according to the logics of neoliberal resilience, 'the net of a flat world, rendering all beings equivalent and annulling all exteriority', I share the position that ecological thought needs to reincorporate the 'ontological separation necessary for any relation'.[58] When we turn from one side to the other of the ambivalent mycoaesthetics at work in VanderMeer's prose and, more broadly, in the fungal image as a twenty-first-century culture of biology, the question becomes how to think fungi as a distinct kingdom.

For many, no life form should be considered in isolation. The relations between fungi and other organisms, including humans, are what should really interest us. Yet the story of what fungi are and how they took on their current ontological status as a taxonomic kingdom is a surprising one. For example, fungi are more closely related to animals than to plants: DNA sequencing has shown that the distance between plants and fungi

58 Frédéric Neyrat, *The Unconstructable Earth: An Ecology of Separation* (New York: Fordham University Press, 2019), https://doi.org/10.5422/fordham/9780823282586.001.0001.

is greater than that between fungi and animals.[59] As Lynn Margulis notes in *Five Kingdoms*, fungi did not become a kingdom in their own right until 1969, when R. H. Whittaker argued to make them one.[60] Five is no longer the 'right' number of kingdoms, and if you search for biology's latest accepted number you will not find clear and easy answers. Carolus Linnaeus wrote in keeping with ancient tradition when he proposed his new system of classification in *Systema Naturae* (1735), dividing nature into animal, vegetable, and mineral. In Linnaeus's still-current schema of Kingdom, Phylum, Class, Order, Family, Genus, and Species, fungi figured as members of the plant kingdom. As G. C. Ainsworth argues in his *Introduction to the History of Mycology*, 'from the time of the herbalists, fungi, even if confused with corals and other organisms, have been associated with plants'. It was in this form that modern natural history carried forward the premodern idea that fungi are lesser versions of something else. Ainsworth enumerates the many ways in which natural history characterized fungi as negative or epiphenomenal.[61] Parasite, secretion, accumulation of moisture, negative ontology, incomplete plant, or the primitive ancestor of plants—as plants, fungi could never compete with the world of flourishing leaves and colorful flowers. For those who observed through the lens of plant/animal metaphysics, they seemed pale and sickly by comparison. The systematic classification of life existed for almost two and a half centuries before fungi were given clear and separate status.

The newness of the fungal kingdom's separate status compared to the continuity of plant and animal life from ancient categories to modern kingdoms goes some way toward explaining why fungi are weird—why they so often emanate an aesthetics of the horrible, queer, psychedelic, or eerie, as in VanderMeer's new weird fiction. The emergence of fungi between the plant and animal kingdoms is a different explanation of fungal weirdness from the classical one offered by Gordon Wasson's 1957

59 Cavalier-Smith, Thomas, and E.E. Chao, 'The Opalozoan Apusomonas Is Related to the Common Ancestor of Animals, Fungi, and Choanoflagellates', *Proceedings of the Royal Society B*, 261.1360 (1995), 1–6, p. 1, https://doi.org/10.1098/rspb.1995.0108.

60 R.H. Whittaker, 'New Concepts of Kingdoms of Organisms', *Science*, 163.3863 (1969), 150–60, https://doi.org/10.1126/science.163.3863.150.

61 See G. C. Ainsworth, *Introduction to the History of Mycology* (Cambridge: Cambridge University Press, 1976), p. 13. Histories of zoology and botany abound, but this appears to be the only scholarly history of mycology available in English.

concept of *mycophobia* that divides cultures into the mycophilic and the mycophobic.[62] In his famous field guide to mushrooms, *All That the Rain Promises and More*... (1991), David Arora finds that in a 'fungophobic (mushroom-loathing) society such as ours', 'it takes a certain boldness and curiosity to seek mushrooms'.[63] He goes on to say that eccentric, bold, and curious fungophiles have shaped the form of his book. The book's photographs document the weird antics of foragers, starting with the cover image of a trombonist in a tuxedo, leering at the camera from beneath an oak tree as he cradles his instrument in one hand and a pile of chanterelles in the other.

The weirdness or eccentricity at large in amateur mycology might well be a symptom of widespread fear of fungi in the Anglo-imperial world. Wasson and Arora are right that other cultures are more inclined to love the fungi, and there may be a way to explain fungal weirdness in terms of cultural relativism and colonial history. It would then be a mistake to think my ontological and scientific account of kingdoms applies universally.

In future work, much more should be said about the relation between kingdom and ontology—about the historical contingencies through which certain humans came to know about fungi, but also about the ontological status of taxonomic kingdoms. To do fungal ontology is to think through the significance, for literature and science, of this process of abstraction whereby a third category emerges between plants and animals. If viruses famously deconstruct the opposition between life and nonlife, then fungi do the same for the thin bright line between plants and animals. But the point of this deconstruction is not to dissolve all categories into indistinction, flux, or plasticity. The point is to show that the plant/animal binary, as a persistent ontology of life, cracks open to yield a multiplicity—which is not to say an open-ended or unlimited diversity of categories. In this reading of twenty-first-century fungal scales and images, turning from the wood wide web to fungal ontology,

62 Gordon Wasson first popularized psychotropic mushrooms of the genus *Psilocybe* in 'Seeking the Magic Mushroom', *Life*, 13 May 1957. See also Erik Davis, "Mushroom Magick: A Visionary Field Guide." 2 April 2009. https://techgnosis.com/mushroom-magic/.

63 David Arora, *All that the Rain Promises and More* (Berkeley: Ten Speed Press, 1991), p. 3.

the fungal weird is an effect of this fitful emergence in histories of literature and science.

Where does this leave us with the idea that fungi shape their own representation in non-arbitrary ways? Certainly, the desire for strong mycoaesthetics is palpable and urgent in the form of *Annihilation*. The diegetic narrator breathes in spores from the fungal words, which affect her perception and thus make her a uniquely psychotropic unreliable narrator; the spores that help her see the words more clearly come from the words themselves, and the biologist reports that the fungal words 'infected our sentences', the dialogue of the novel, 'when we spoke'.[64] When she goes to the lighthouse, she discovers a large pile of decomposing journals left by previous expeditions, 'rife with striations of mold', so that 'the history of exploring Area X could be said to be turning into Area X';[65] thus also turning into the biologist's fate. But the narrative of *Annihilation* also presents itself as the biologist's journal, which she leaves on the pile of journals to molder and decay with the others, becoming fungal words of a different kind; if the novel begins with fungi that turn into words, it ends with words that turn into fungi. No doubt this chiasmus, along with the other examples of embeddedness and recursiveness given here show a desire for literature to incorporate weird life into the infrastructure of meaning, or for weird life to express itself through literature, proliferating from the biosphere into the 'semiosphere'.[66]

Yet all of this happens in the pages of a novel, leaving us at the border between weak mycoaesthetics and strong. Even if I agree with scholars who embrace nonhuman agency, semiosis that precedes or breaches species boundaries, and, as Tobias Menely puts it, the need 'to identify textual symptoms that express not historical but socioecological and even geohistorical contradiction',[67] it remains difficult to move past the objection that we can only know nonhuman life through mediating constructions that have little to do with the object itself. It is easy to

64 Jeff VanderMeer, *Annihilation*, p. 47.

65 Ibid., p. 112.

66 Yuri M. Lotman, *Universe of the Mind: A Semiotic Theory of Culture*. 1990. Translated by Ann Shukman (Bloomington: Indiana University Press, 2000), p. 125.

67 Tobias Menely, *Climate and the Making of Worlds: Towards a Geohistorical Poetics* (Chicago: University of Chicago Press, 2021), p. 20, https://doi.org/10.7208/chicago/9780226776316.001.0001.

agree with Sheldrake that metaphors are about more than the inevitable literariness of scientific knowledge, because they show how hard it is 'to make sense of something without a little part of that something rubbing off on you'.[68] But it is more difficult to offer a watertight argument for this stain. For the process of understanding both contemporary enthusiasm about fungi (especially the wood wide web) and the role of fungi in weird fiction such as VanderMeer's novels, strong mycoaesthetics would theorize the difference between simply studying representations of *x*, *y*, or *z* life forms in literature and something more significant. For future work, it will be crucial to continue to think about how conversations regarding form, mode, genre, and reading practice can and should shape how we read texts in ecocriticism and other fields that address the nonhuman in the humanities—put differently, what might an eco-formalism look like that would have the same influence as materialisms in our fields? At stake here is a concern with how nonhuman agency plays itself out through texts, but also the more specific question of how bio-ontologies such as kingdom or phylum, levels of abstraction different from concrete organisms, have already structured the texts we read at the level of form as much as content.

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68 Merlin Sheldrake, *Entangled Life*, p. 214.

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