TECHNOPHANY
A Journal for Philosophy and Technology

Technophany Vol.3 No.1

Polycephalous Slime: Chemistry & Intelligence in *Parallel Minds*

Scott Schwartz

Laura Tripaldi, *Parallel Minds: Discovering the Intelligence of Materials*. Falmouth, UK: Urbanomic, 2022. 192 pp. $18.95 (Paperback ISBN: 9781913029937)

Shortly after the introduction of the Physarum polycephalum (aka mucilaginous mould, aka polycephalous slime), I began to wonder if Laura Tripaldi's *Parallel Minds* might be a Borgesian crypto-fictional zoology. Given that the book was published by Urbanomic, an imprint known to flirt with "theory fiction," my suspicions were heightened. But the science checks out. Polycephalous slime happily resides within the planet's consensus reality. Rather than a surrealist foray, *Parallel Minds* offers a survey of cutting-edge nano-chemistry and the perceptual universes of a range of materials—living, un-living, and indiscernibly in-between.

Parallel Minds is more than just a worthy addendum to the growing literature in the broad posthumanism ←→ new materialism matrix. It can certainly be read alongside the works of Karen Barad, Rosi Braidotti, Jane Bennett, Manuel De Landa, Graham Harman, and Donna Haraway, among many others. However, Tripaldi's contribution is unique in her (re)considerations of the relationship between intelligence and materials. The most intriguing and provoking explorations suggest that intelligence is chemical, not computational. That is, while popular conversations about artificial intelligence usually center on machine learning and computechnical developments, Tripaldi suggests intelligence may more likely be synthesized chemically. This suggestion, of course, demands a slight reconsideration of what many have come to normalize as intelligence.

Rather than the anthropocentric veneration of the brain, Tripaldi articulates an intelligence reminiscent of Jacob von Uexkull's or Charles Peirce's semiotics: "Every intelligent material defines and constructs its own world, made up of signals and experiences that may be different from ours."[1] That is, slime and spider webs perceive environmental signals. The spider web is a technology that extends the spider's perceptive universe. Perhaps more fundamentally, it "radically challenges our idea of what a mind is."[2] Rather than traditional notions of the mind as a mirror that builds representations of the world, Tripaldi illustrates the workings of non-human minds "that function in a

1 Laura Tripaldi, *Parallel Minds* (Falmouth, UK: Urbanomic, 2022), 59.

2 Tripaldi, *Parallel*, 4.

ISSN 2773-0875

non-representative way, without any need to build a reflective image of themselves and the world, and yet still manage to exhibit intelligent behavior."[3]

Some of this intelligent behavior includes the capacity of polycephalous slimes to solve nodal network optimization problems that "require a prohibitive amount of calculation time for ordinary computation."[4] This capacity has led to investigations in Physarum computing—harnessing the ability of fungal systems to optimally configure themselves within their environment for our computational hardware. This "morphological computation" relies on thinking with form, bodily modification as intelligent response. The polycephalous slime colonizes "its environment with an efficiency comparable to that of human beings, even without a brain."[5]

While not explicitly attempting to detonate Cartesian mind-body dualism, Tripaldi's book does contribute to a growing wave of discontent with Descartes's intractable inheritance. Mind and matter, spirit and body—these may not be as clear cut as the architects of Eurocolonial thought assumed. From the feminism of Elizabeth Grosz to the Black science studies of Denise Ferreira da Silva or the computational philosophy of Luciana Parisi, duality has sustained damaging blows to its ontological primacy. "[I]t is difficult to deny that our body as a whole is an integral and indispensable part of our mind."[6]

In re-assessing the borders of mind and intelligence, the line between life and non-life also gets fuzzy. While anthropologist Edwin Hutchins (1995) compellingly theorized human tools as a form of distributed cognition,[7] the spider's web does seem to further blur the line between life and technology.[8] The web senses and responds to vibrations. Can the same be said of hammers and phones? Tripaldi points to research in astrobiology that proposes "lyfe" as a more expansive category than life as we know it on Earth—"Rather than a specific phenomenon that occurred only once…life is being interpreted as a broader class of self-organizing processes."[9]

At times, the book feels like a defense of chemistry against the dominance of physics as the fundamental arbiter of reality. Tripaldi laments that the average person is probably more familiar with Schrödinger's cat than the chemical polyesters of their socks. Reshuffling the eminence of physics, chemistry, and biology reflects a recent interest in

3 Tripaldi, *Parallel*, 143.
4 Tripaldi, *Parallel*, 39.
5 Tripaldi, *Parallel*, 40.
6 Tripaldi, *Parallel*, 56.
7 Edwin Hutchins, *Cognition in the Wild* (Cambridge, MA: MIT Press, 1995).
8 Tripaldi, *Parallel*, 110.
9 Tripaldi, *Parallel*, 123.

"top-down causation," most prominently from cosmologist George Ellis.[10] The argument here is simply that the needs of higher-order systems (e.g., an organ like the heart) *cause* alterations to lower-order systems like genes, and ultimately that protein and gene activity controls electron flows.

In challenging key assumptions of the European Enlightenment, Tripaldi's work raises sociopolitical concerns regarding the relationship between epistemology and politics. As Kathryn Yusoff argues in *A Billion Black Anthropocenes*, the geologizing and mineralization of colonial science was crucial to normalizing exploitation of human and non-human alike.[11] Tripaldi demonstrates that a world made of discrete materials in rigid interaction with each other "is a world in which relations of domination can easily be established, because this allows us to deny the subjective experience of the other…locking us in the dead-end closed room of our anthropocentric perspective."[12]

The book troublingly reifies notions of reality at times. While there's certainly a growing attachment to realism these days as philosophy and the humanities recover from their postmodern hangover, the recurring phrase, "In reality, …" implies an authoritative access to reality that speculative realists don't usually approach. This could just be a translational artifact—the substitution of a phrase like "In fact, …" could amend this minor qualm.

More significant might be the figurations of nature. There are references to the "relational nature" of innovative materials[13] and rediscovering our "lost continuity with nature."[14]. Tripaldi suggests, "any appeal to the concept of nature, whether to protect it or to exercise dominion over it, ends up reaffirming the distance that separates us from it."[15] The sentiment is well-taken, but the idea that there is a separatable nature standing at a distance could be slightly more nuanced. Perhaps the 2015 xenofeminist coda might be a more appropriate finale: "If nature is unjust, change nature!"[16]

10 George Ellis, "Top-Down Causation and Emergence: Some Comments on Mechanisms," *Interface Focus* 2, no. 1 (2011): 126-140.

11 Kathryn Yusoff, *A Billion Black Anthropocenes Or None* (Minneapolis: University of Minnesota Press, 2018).

12 Tripaldi, *Parallel*, 61-2.

13 Tripaldi, *Parallel*, 12.

14 Tripaldi, *Parallel*, 138.

15 Tripaldi, *Parallel*, 152.

16 Laboria Cuboniks, *Xenofeminism: A Politics for Alienation*, 2015, http://laboriacuboniks.net.

Bibliography

Cuboniks, Laboria. *Xenofeminism: A Politics for Alienation*. http://laboriacuboniks.net, 2015.

Ellis, George F. R. Top-Down Causation and Emergence: Some Comments on Mechanisms. *Interface Focus* 2, no. 1 (2011): 126-140.

Hutchins, Edwin. *Cognition in the Wild*. Cambridge, MA: MIT Press, 1995.

Tripaldi, Laura. *Parallel Minds: Discovering the Intelligence of Materials*. Falmouth, UK: Urbanomic, 2022.

Yusoff, Kathryn. *A Billion Black Anthropocenes Or None*. Minneapolis, MN: University of Minnesota Press, 2018.