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Material Frictions: Troubling the Ethics of Experiment in the Ecopoetic Work of Rita Wong and Christian Bök

Ryan Fitzpatrick

> I am still amazed that astrocapitalists insist on mining yet another asteroid, when poets on Earth struggle to write about their devotion to remain tied to a single wobbly planet.
>
> — Schuster

In their 2009 anthology *Regreen: New Canadian Ecological Poetry*, Madhur Anand and Adam Dickinson collect a group of contemporary poets for whom, in Dickinson's words, "the environment is not simply a nonhuman wilderness that beckons us toward weekend escapes, but is in fact a composite, plural, interactive space of competing physical, social, and conceptual frames of signification" (12). For Anand and Dickinson, this dialogue between ecology and language drives ecopoetry, not simply through an ethics of representation, but also through the affirmation that "ecological dynamics" and "poetic procedures" (11) operate through one another.

Ecopoetry as a category encompasses work with immensely different formal and political concerns. My thinking for this essay began as I leafed through *Regreen* to find poets as different as Rita Wong and Christian Bök falling under the auspices of ecopoetry. Ecopoetry is and has been a formally diverse field — the category acting transversally within contemporary poetics — and both Wong and Bök make sense within the category. But reading them together produced a tension that I felt in how they approach poetry as a mode of engagement with the material world off the page. For me and some other poets and critics whom I talked to, there seemed to be an ethical friction between the two writers bound up with the problem of how humans engage with nonhuman actors.

This problem of material engagement cuts through ecopoetry and its desire to intervene in the material world through intertwined impulses both to critique and to experiment. Distinguishing what he calls eco-

logical poetry from nature poetry, Dickinson draws from a definition made by Juliana Spahr: "One way of marking the difference between the idealized environments of classical pastoral 'nature poetry' and contemporary 'ecological poetry,' is to consider Juliana Spahr's distinction that 'ecopoets' are concerned with 'a poetics full of systematic analysis and critique that questions the divisions between nature and culture while acknowledging that humans use up too much of the world'" (11). Spahr's distinction between idealized nature poetry and ecopoetics as a mode of critique highlights the ways that an ecologically invested poetics can interrogate exploitative relationships with nonhumans at the level of language. For Spahr and other activist poets, this involves using poetry as a tool to map the power vectors that shape the hybrid geographies shared by human and nonhuman actors. At the same time, these poets have taken to experimenting with those relations both on the page and off it. In this group, we might include the experiments by angela rawlings with sound and erasure as an analogical reflection on extinction, Stephen Collis and Jordan Scott's more material engagements with the ecology of British Columbia in *Decomp*, or Dickinson's testing of his own body for toxic elements in *Anatomic*.

I don't want to set up a binary either/or between the expressive procedures of the poem and the material dynamics of the world, but I do find it important to assert that ecopoetry is caught up in a dialectical exchange between reflecting on the imaginative problem of the anthropocene and participating in (or experimenting with) the material production of our shared conditions. The idea that poetry can engage with the material world is a seductive lure, carrying, on the one hand, a political potential while demanding, on the other, a different set of ethical considerations. As ecologically invested poets strive to move their words off the page, they click together very different understandings of materiality, negotiating between the materiality of language as artistic medium and the agency of matter for which New Materialist critics argue — poetic procedure meets ecological dynamic.[1] When poetry leaps from the page, it wrestles with the difficulty of using language to engage the material world (whatever the causal direction) because of a gap in understanding that appears when actors in space meet one another. For poetry, engaging with this gap involves wading into a woozy space between the analogical and the non-analogical. In *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Karen Barad works through what she calls a non-analogical

approach to science studies and quantum physics that accounts for the contingencies of matter across scales from the atomic to the global. She asserts that she is "not interested in drawing analogies between particles and people, the micro and the macro, the scientific and the social, nature and culture," and instead she works to understand "the epistemological and ontological issues that quantum physics forces us to confront" (24).

This tension between the analogical and the non-analogical is central to contemporary ecopoetry because of how it works at the limit of poetry's ability to address the material world through expressive means. This tangle of concerns about materiality's relation to expression and of poetry's potential to work non-analogically resides at the heart of my twinging feeling that Christian Bök and Rita Wong do not sit quite right when read together under the sign of ecopoetry. My impulse in this essay, then, is to read these two poets together to ask what they can show us about poetry's limits in addressing the nonhuman. Although Bök and Wong share space at the table of the avant-garde literary community and express deep concerns about the problems facing the planet, their work diverges at the point where they consider the material world off the page, seen most clearly in their split approaches to experimentation. Where Bök takes on the role of scientific experimenter in his "Xenotext" project,[2] striving to implant a poem into bacterial DNA, Wong worries in the eco-activist poetry of *forage* and *undercurrent* about how she and others have been experimented on by the mechanisms of late capital without consent.

In this essay, I read Wong and Bök alongside one another to struggle with questions about the role of poetry as it interfaces with the material world, how it both imagines and facilitates the ways that humans and nonhumans meet one another, and what kinds of ethical (and not so ethical) stances are possible. Reading Wong and Bök alongside one another in terms of their relationships to matter highlights a tension in the instrumentalization or extraction of the nonhuman for human benefit. This instrumentalization defines *The Xenotext* even as Bök works to paper that over with rhetorical gestures to his experimental subject's agency (imaginable only through a liberal lens of personal autonomy). In contrast, Wong critiques how the extractive instrumentalization of the nonhuman can affect humans negatively because of a shared dependency. Her work theorizes an ethics of reciprocity that does not sit well with the agency (and authorship) that Bök ascribes to his bacteria because Wong asks us to consider how we fit within (and mutate with)

nonhuman systems rather than asking how the nonhuman can be made to bow to our demands.

Experimenting on Immanent Dependency

Rita Wong extends her attention to consider the nonhuman all the way down to the mineral, to the solvency of water, and to the microbial. Her poetry uses multiple formal approaches to think through and with what Elizabeth Povinelli calls the immanent dependencies connecting humans to each other and to their relations on the land. In the thick of these relations, Wong expresses a worry — an *apprehension* — about the entangled operations of science and capitalism as they treat the Earth as both dump and experiment. In an interview with Heather Milne, Wong frames experimentation not as something that she does but as something that she is part of without consent:

> I feel like I've been put into this experiment through genetic engineering and the sale of foods and things that are not labeled. I've been put into an experiment that I didn't choose or give consent to but am still a part of. So what does it mean in terms of how I work through my language? I think it disrupts syntax, and then you repiece things together as they are broken apart. (345-46)

Her sense of experiment carries a social dimension — a sense that her language and her body (along with other bodies) are caught up in a larger set of processes that she cannot control. Wong inverts a typical stance of experimental poetics in the way that she figures the experiment of global capitalism as it blasts through syntax, a deterritorializing edge that leaves syntax broken, framing poetry as a response because of how it can piece understandings back together.

"Experiment" is a fraught term that speaks to both scientific and poetic procedures. To talk about an experiment is to talk about the way that "something," whether language, relation, or physical matter, is being experimented on. As a vague term loosely applied to avant-garde or post-avant poetic procedures and forms, "experimental" describes a body of work fuelled by a spirit of play, of just trying something out. In it, language is something to mess with. When experimentation becomes something done with material bodies, however, it becomes more apparent that it is a kind of engagement shaped by logics of valuation wherein some bodies are more valuable than others. Mel Y. Chen's elaboration of the

slipperiness of animacy hierarchies provides a sense of the ways in which human and nonhuman actors are valued and devalued. Usefully, Chen asks how rhetoric and language about the nonhuman slide into different human-human and human-nonhuman engagements, reinforcing uneven and unjust social forms and processes. Chen critiques a complex hierarchy of things, running, top to bottom, from humans to animals to inanimates (plants, rocks and minerals, objects) to incorporeals (a catch-all for things such as abstract concepts, natural forces, emotions, events, etc.). Bodies slide up and down this hierarchy — racialized human bodies are treated as less than human, whereas inanimate objects gain a kind of human agency. Countering this hierarchy are calls, such as that by Sto:lo writer Lee Maracle, for a sense of value rooted in reciprocity and respect, in learning how to live together with human and nonhuman actors. Maracle argues that recognizing value involves understanding not only the relationships that humans have with the nonhuman world but also the ways in which human lives are bound up with the nonhuman.[3]

Embedded in both of these formulations is a question about how our shared intimacies emerge and are shaped. For Wong, experimentation results in both bodies and language being disrupted in favour of something new but not necessarily better. This is because of the way that experimentation operates in the tensions built up in emergent spatial intimacies between mobile attachment and immanent dependency. Lauren Berlant uses the concept of mobile attachment to account for the production of non-institutional emergent relations that are "new," experimental, or evental. Povinelli's concept of immanent dependency tempers the utopian bent of emergence by reminding us that relations are not so easily cracked apart and played with because of the way that we depend on relations with humans and nonhuman others to live. Through the tensions between dependence and attachment, not only does the body tug at and become tugged by its relations, but also, in how it requires some of those relations (say, fresh water or rent money) for life, an individual body does not always have the level of autonomy that it might seem to under neoliberalism. Recognizing dependency also recognizes that the agency that humans would like to claim for themselves is actually distributed[4] through wider assemblages that enable and shape action.

Wong's work tries to account for the/her body as it both shapes relations and emerges from those relations, looking for the signs of an unintended experiment sprouting up through the concrete conjunc-

tions of science and capital. In her essay "Resuscitations in Rita Wong's *Forage*: Globalization, Ecologies and Value Chains," Christine Kim observes the ways in which Wong's "larger political project of decolonizing language and promoting social equality" (166) comes in *forage* to focus on diffuse and less visible forms of domination. She argues that, "By scrutinizing byproducts of the global economy such as genetically engineered food, overfilled garbage dumps and exploitative labour practices, [Wong's] speaker underscores the need to examine different kinds of violence and complicity" (167). Wong's response, according to Kim, refigures Northrop Frye's "Where is here?" into a question about immediate material pressures: "By asking the readers of *forage* to rework that familiar Can Lit question and consider 'what is here?,' the poems demand that we grapple with challenging ethical and political questions about how we inhabit this space and perpetuate ongoing problems of social power" (167). Kim recognizes in Wong's work both a concern about her embodied, complicit position within conditions that are not entirely in her control and a poetic invested in mapping the pressures that those conditions apply to everyday encounters.

In the belly of this, Wong practises what Roy Miki calls a "poetics of the apprehensive." For Miki, this apprehensiveness marks her work as doubly attentive, emerging from both an affective, embodied unease and a quickness to apprehend a situation. This double definition "offers up a binary zone in which the nervous condition arising from insecurities that exceed control and threaten the well-being of the body exists alongside the vital capacity in the human organism to manage its conditions, including those conditions that might otherwise overwhelm its will to exist" (184). Miki turns to Fred Wah's concept of the hyphen to connect the two parts of Wong's doubled apprehensiveness. For Miki, Wah's hyphen operates as "a graphic sign of division and connection that also signifies the instance of transition in which the one and other interface with each other" (184). In this context, Miki's invocation of Wah's sense of the hyphen seems to be a little out of joint, but it opens up a number of possibilities because of how Wong's poetics articulates a wide range not of voices but of bodies as they connect through the parts that they play in larger global networks of resource extraction and commodity production. Because of the way that Miki displaces it from Wah's examination of mixed-race experience, the "hyphen" might be too precise a term for what Wong works through, but I would like to affirm how Miki's move puts forward not only a reading of her doubled

apprehensiveness but also both the importance of race to her global mappings and the interconnections and encounters that she dramatizes in both *forage* and *undercurrent* between human and nonhuman bodies and worlds. The sense of articulation embedded in the hyphen spills out across scales, connecting not only different aspects of an individual body but also different bodies as they meet in relation — hyphen becomes chain. Wong's poetics propose articulation and interconnection through both content and form, reflecting on the body as an articulatory point in the world even as her language turns fragmentary and non-transparent to denaturalize our sense of disconnection between things.

This investment in articulation — in putting things together rather than taking them apart — is what pushes Wong's work toward a pedagogical directness[5] that informs her turns into more defamiliar syntax. This start and stop of directness and defamiliarization comprise the central formal moves of *forage* and *undercurrent*, but I want to pay particular attention to the former because of how that directness seeks to inform, to build solidarities, and to spark action. I see the moments of directness in her poetry as comprising a play for the world off the page as Wong addresses the conditions and logics through which humans engage with the nonhuman, asking her fellow humans to change their actions rather than trying to engage the nonhuman through her poetry in the way that, as we will see, Bök attempts to with *The Xenotext*.

Part of this directness involves producing for the reader a critical map of the ways that our individual bodies are caught up in wider systems. Matthew Zantingh points us to this in his reading of *forage*'s "sort by day, burn by night," a poem that reflects on the dumping of circuit boards in Guiyu, China. Zantingh argues that Wong's poem maps a global intimacy, in Lisa Lowe's sense of things, asking us "to consider how the material objects of everyday life emerge from networks that connect disparate places and peoples together" (624). Wong points to how bodies are treated as incidental guinea pigs by the circuits of capitalism, making explicit the interconnection of bodies on a global scale by asking about the fate of the metals that make up consumer electronics:

> where do metals come from?
> where do they return?
> bony bodies inhale carcinogenic toner dust,
> burn copper-laden wires,
> peer at old cathay, cathode ray tubes.

what if you don't live in guiyu village?
what if your Pentium got dumped in guiyu village?
your garbage, someone else's cancer?
economy of scale
shrinks us all (46-47)

Wong asks a series of questions that implicate global circuits of consumption in the poisoning of people in Guiyu — a hub for the disposal of electronic waste.[6] Matter, as Zantingh reminds us, comes to matter in a particularly worrisome way as human bodies meet mineral agency not only through the interconnections enabled by technology but also through the afterlives of those technologies.

In *undercurrent*, this worry expands to a larger examination of water as both universal solvent and substance comprising much of our bodies. In her essay "Waters as Potential Paths to Peace," Wong turns to a mix of vital materialism and ecological thinking to propose — counter to present conceptions of water as just another resource ready for exploitation — water as a kind of "hydrocommons" (216), as a conduit for our immanent dependency. "From this perspective," she argues, "water is no longer a singular, external object, but rather a material that animates us, and that we in turn animate. In tracing its transformative flows, our conceptions of internal/external, object/subject, singular/plural become complicated because water is no longer just something out there, but is very much the majority of what is in here, perpetually moving in a temporal flux" (216). For Wong, water operates not as a metaphor but as a material substance through which bodies (human and nonhuman) are connected. Water courses through bodies and erodes rocks and minerals. It shapes affective landscapes and physical landforms. In the spirit of these circulations, and in the same way that she asks of metal where it comes from and where it returns to, Wong suggests that she "find[s] it helpful to contemplate where the water I drink comes from, and where it goes" (217).

undercurrent, then, attempts to map the ways in which bodies are not only connected by a larger water system but are also part of that system. The movements dramatized in Wong's fluid style imagine the swerving flow of water as both a vessel for environmental devastation and a hopeful figure of interconnection — a doubled perspective inflected by the intersection of her activist practice and her dialogues with Indigenous communities in both literary and activist settings.[7] In *undercurrent*, Wong slides between registers, moving from polemic to anecdote, from

clear sentences to disjunctive run-ons and fragments, formally staging the way that "mess amasses" as both positive and negative and proposing through this that, if "water has a syntax" (9), then it amounts to more than the atomistic billiard balls of the cascading *clinamen* as water, alongside, within, and through the spatial organization of bodies, pools, infiltrates, seeps, erodes, and hardens. In conceptualizing these unpredictable and interlinked relations, capital and nature affecting one another unevenly, Wong makes an extended argument about the disruptive potential of extraction, distinguishing between short-term gains and long-term outcomes, as in this moment from "The Wonders of Being Several":

> thank the great decomposers
> quiet multitudes within
> as unsettlers excavate like there's no tomorrow
> so much short-term gold, long-term arsenic
> short-term bitumen, long-term cancer
> short-term packaging, long-term polyethylene
> for germs to reorganize (13)

Formally within the stanza, Wong situates the deterritorializing interference of the "unsettlers" (extractive industries nevertheless connected to processes of settler colonialism) within a microbiological system of biodegraders (as mentions of them book-end the stanza) while also positioning the microbes as "quiet multitudes within" — not only within their ecosystem and the capitalist production of it but also within bodies. These unexpected and quiet reorganizations shift ecologies as the dumped waste of capital enters circuits of water and cells, making the body, for Wong, a site of intensive toxic accumulation as that waste burdens and poisons the body — made explicit in her two-column poem "Body Burden: A Moving Target":

while body sweats	infiltrated by capital's loud shout
& sweats, porous	consumed while consuming
ongoing experiment	disorientated in proprioceptive profusion
rich in nurdles	seepage from decomposing bottle not just
poor in ecological literacy	plastic but democracy degrading
atrazine in your armpits?	inner monster muscles up
pcbs in your pelvic core?	as daily toxins come & go
furans in your feet?	a revolving door
dioxins in your diaphragm?	head & shoulders (40-41)

Printed on facing pages, Wong's lines read both down the page and across the gutter. As it sweats while capital shouts into it, the body becomes an ongoing experiment, a revolving door, and a toxic sink, collecting material through its porousness — a porousness that connects to the larger water cycle, here dramatized in the seepage of chemicals from decomposing plastic.

Experiments in Misplaced Agency

Wong's sense of material bodies as interconnected and interdependent provides, I think, a useful rubric to reflect on Bök's Xenotext Project both on and off the page. When — looking apprehensively from the page to the threatened spaces of the Peace River, Guiyu, or even her own body — Wong shifts her poetics away from literary experiment to something more direct, even pedagogical, I see this as an exploration of the limits of literary work in the face of material justice. The ethical ramifications of experimentation that Wong wrestles with and the way in which she insists on a globally intimate reading of interdependence might give us a way to approach the tricky materiality of the bacterial body as it performs its split role as artistic medium and agential subject. Certainly Bök shares with Wong a generalized concern about the fate of the planet, though I would argue that the scale of their concerns is very different. Wong focuses on bodies in relation as they are caught up in global chains of extraction and value generation. Bök's poems reveal a complicated relationship to scale, laying out the massive movements of the planetary, the microscopic, and the allegorical intimacies of the Orpheus myth.

In the pages of *The Xenotext: Book 1*, Bök obsesses over extinction and preservation, over the fate of the planet. The book's opening poem, "The Late Heavy Bombardment," dramatizes a long crisis spanning eons and operating at a planetary scale, laying out an analogy between the destructive geological events of the Hadean Eon and the various scientific, political, *human-made* catastrophes that run through the history of the twentieth century (the Holocaust, nuclear testing, revolution). Bök's analogy draws a kind of symmetry: the violent destruction of the Hadean Eon leads to the formation of the Earth, and the destructive capacities of humans lead to mass extinction and genocide.

This introduction to the book asks us as readers to reflect on the possibility of the end of the world while opening us up to analogy as

a poetic strategy. Analogy is a powerful articulatory move, tied perhaps to what Ada Smailbegović calls, in reference to *The Xenotext*, a molecular poetics. Smailbegović pushes us to think through how poets address the molecular "in order to address how a materialist approach to poetics could theorize processes of signification that occur within and among the recalcitrant materialities of biological molecules" (135). Smailbegović's conceptual framing pushes us to consider the ways that poets use analogy to grapple with the recalcitrance of matter. We can see this in how Adam Dickinson's *The Polymers* draws from plastic's molecular chains to ask how plastic also chains relationally at a wider scale, showing up in our bodies, in our local and global logistics, and in ecological systems. We also see it in Wong's *forage*, particularly in the way that letters and sounds trade places between words to dramatize DNA mutations or the movements of seeds between fields.[8] It is important to consider how Bök's investments in the molecular are partially analogical. In the sequence "The March of the Nucleotides" in *The Xenotext*, for instance, Bök *emulates* (his word) the structures of DNA and its nucleotide base units using language torn from the pastoral poetry of Virgil. These poems exploit a tension between the forward-looking language of science and the backward-looking language of the nature poem. This mixing of registers asks readers to reflect on whether science and poetry might be imbricated with, rather than opposed to, one another.

This sense of imbrication drives the central gesture of *The Xenotext*: two poems that represent, for Bök, a junction of science and poetry. The first, "Orpheus," is a short sonnet translated into a genetic sequence that can be implanted into the DNA of bacteria — early tests use the common bacteria *E. coli*, and the later goal is to implant it into the indestructible extremophile *D. radiodurans*, which has a better chance of surviving for eons in inhospitable conditions. The second poem, "Eurydice," is a similar sonnet "written in response" by the bacterium itself as the genetic code implanted by Bök is transcribed into a protein. On its surface, Bök's project proposes a poetic kind of encounter between lovers, a call-and-response in which the bacteria are on equal footing with the poet.

It is with this poem and his commitment to implanting it inside a bacterium that Bök's project takes a step from analogy to non-analogy. Bök exploits a tension between imaginary solution and scientific procedure — the central tension of pataphysics — to use the materiality of the

body as a medium to solve a largely aesthetic problem. As a procedure, it operates as a limit case for his investment in the intersection of science and poetry, standing at the site where poetry does not just play with scientific discourse but actually enters into the material assemblage of science itself. Science, according to Bök, is "a complex tissue of hybrid tensions" comparable to poetry in certain ways: "Like poetry, science is a bricolage of figures, an assemblage of devices, none of which fit together perfectly — but unlike poetry, science must nevertheless subject its tropes to a system, whose imperatives of both verity and reality normally forbid any willing suspension of disbelief" ('*Pataphysics* 15). Science's system of "verity and reality" holds for Bök a much different relationship to authorship from that of poetry. "Science moves toward anonymity," he suggests, whereas "Poetry moves toward eponymity" (15).[9] In science, authors recede into a larger truth-seeking apparatus, serving some end outside themselves, whereas in poetry authors serve no end other than the work itself. In this framing, pataphysics transversally connects scientific and poetic practices through how it "valorizes the exception to each rule in order to subvert the procrustean constraints of science" (5), operating as a kind of Deleuze-styled "nomad" science meant to subvert or mutate the rigid dictums of a state or "royal" science. For Bök, pataphysics produces a contact zone between science and artistic production that opens the possibility of a *clinamen* or swerve of exception, producing a line of flight that reconfigures the field in which it participates.

Both Christian Bök and compatriot Darren Wershler (formerly Wershler-Henry) present the *clinamen* as an important operation within pataphysics — a swerve based on a kind of appropriation or parody of the authority of science and the state. Bök and Wershler imagine a Baudrillardian fatal strategy, becoming more scientific than science in order to oppose it. But, with its drive to destabilize the truth of science and the state and produce a pataphysical smooth space, this reversal risks ignoring (or, worse, exploiting) the material relations that compose space.[10] If there is a potential for the imaginary solutions of pataphysics, then does it not need to address explicitly this ethical gap between invention and representation in a way that holds itself responsible to the material relationships that compose the world?

Bök finds himself caught between both literary and scientific assemblages, but when he considers the ethics of his project he imagines those ethics in cultural terms. He transcribes his sense of ethics in a podcast

interview with the *Missouri Review*. Asked to speak to his intimations of immortality, Bök presents human cultural preservation as an ethical imperative:

> Well, my naysayers will say to me that that's an act of hubris — to imagine writing a poem that lasts forever. Who are you to write a poem that might last forever? And I would say I'm just like you. That I think there's an ethical requirement for the only sentient civilization in the universe to actually find ways to preserve its cultural legacy over epochal time. I mean our presence on the planet is potentially limited and ephemeral. That would be a sad thing if we disappear and there's no testament to our presence here. ("From" 31:39-32:31)

Bök, like Wong, worries deeply about the planet, and *The Xenotext* is his answer to the sad ephemerality of human existence. But where Wong worries about material interdependence as it is pressured under global systems, Bök's worry about the planet is massive to the point of abstraction. It is this worry about the death of the planet that drives Bök to memorialize and archive — moves that, sincere or not, assume a fatalistic position.

Leaping off the page, Bök treats, famously at this point, the genetic material of bacteria as the vessel to preserve his creative genius against a guaranteed extinction — a biological monolith designed for a non-human readership. Reading a doubled fatality in his approach — both his fatalism about the destruction of the Earth and his strategic and potentially ironic pataphysical surrender to science — Robert Majzels poses in his essay "The Xenotext Experiment and the Gift of Death" that Bök's response to human extinction "compels [Majzels] to reflect on [his] responsibility to that biosphere":

> The Xenotext calls upon us to turn our face away from the heavens and back to the smallest living being on this our planet. What is my responsibility toward that nucleotide, and toward the bacteria which I encode with my message? I am compelled to reflect, not only on the attribution of value to different organisms, based on criteria like size and closeness to my own species, but also on my attitude towards the other in general.

This response to Bök's project pivots around a particular inversion of his logic, proposing that, instead of writing outward into the blackness of

space to an alien species, Bök disrupts the poetic speech of an alien species that exists on Earth — the bacteria as the alien species. For Majzels, Bök's project "imagines it is initiating a conversation, when the other has already been speaking." In turning the microscope around, Majzels points us to the question missing from Bök's own understanding of his project: where are the bacteria in *The Xenotext*, and how does Bök valuate them? This question about how we value and understand the other is also a question about how bodies understand and speak to one another. In order for Majzels to reposition *The Xenotext* to be useful to us, we have to understand that bacteria *speak*, but they do so *materially*, creating material effects as they enter into relations with other bodies.[11] In the same way, the water, toxic elements, or genetically modified foods that Wong writes about also speak through interrelation and agency. Bacteria need to be understood as material actors with agency, certainly, but only if that agency is part of a distribution across a larger assemblage — for Bök, the intersecting assemblages of science and literature.

In his essay "The Xenotext Experiment, So Far," Wershler frames Bök's project as a transversal boundary object working in an intermedial zone between the typically mutually exclusive practices of science and poetics by extending and refining a fairly recent practice that treats the bodies and genetic codes of different organisms as both archive and collaborator. For Wershler, Bök's experiment is "biomedia" (a concept that he draws from Eugene Thacker), meaning that it is "a project designed to assess the aesthetic potential of genetics in contemporary culture" (47). Bök's project proposes to unlock the aesthetic potential of the genetic process, leading to a future in which, for Bök, "genetics might lend a possible, literary dimension to biology, granting every geneticist the power to become a poet in the medium of life" ("Xenotext Experiment" 229). Engaging with life as *medium*, I would argue, requires attention to life's complex material agencies and how humans value and exploit the productive capacities of the nonhuman. Bök recognizes this, framing his engagements with the bacteria's genetic code through a kettle logic that presents the bacterium both as an inscriptive surface or medium and as a co-author of its own genetic recombination. In the interviews, essays, and talks in which he narrates the project, he returns to three figures to conceptualize his relationship to the bacteria — archive, machine, and co-author — which propose slightly different positions with regard to agency and instrumentality.

By working in biomedia, Bök first frames the bacteria as a kind of archive. To do so, he draws inspiration from three thinkers (cybernetic expert Pak Wong, multimedia artist Eduardo Kac, and astronomic expert Paul Davies) who, as Bök describes in his essay "The Xenotext Experiment" (an early attempt to describe the project), "have all suggested the degree to which the biochemistry of living things has become a potential substrate for inscription" (228). Biochemical inscription presents a compelling spatial fix for human culture as it stares down extinction — a space-bound golden record scribed onto a living body.

At the same time, bending this sense of the archival surface to account for the biological processes of bacteria, Bök also frames the bacterium through metaphors that imagine it not just as an archive for his poem but also as a bit of productive machinery. In an explanation that he gave in a 2014 interview with Kaveh Akbar, he said that

> I have written this text in such a way that when it is inserted, as a gene, into the cell, the organism can actually read the poem, interpreting the gene, as a set of instructions for building a protein — one whose string of amino acids are themselves a totally different encipherment of a totally different poem. I am trying, in effect, to engineer a bacterium so that it becomes not only an archive for storing my poem, but also a machine for generating a poem in response. ("Teaching")

In the move from passive archive to active machine, Bök means to shift the bacteria from merely an inscriptive surface and to propose how the processes of DNA and RNA transcription can be captured to generate a second poem. Designing this machine, Bök invents a pataphysical game of mutual "encipherment" in which each letter in the alphabet is connected to another letter to form a cipher that mimics genetic transcription processes. In this, Bök inputs one poem into the machinic bacterium and stands outside, tapping his foot, waiting for the output that he determined when he designed the cipher that scripts the new poem.

But his language does not limit the bacterium to an instrumentalized position, instead moving to give the bacterium a kind of authorship. The move, then, is from passive archive to active but instrumentalized machine to agential author. In a talk given at Simon Fraser University in 2013, Bök described the call-and-response nature of the poem implanted in the bacterium and its enciphered response:

> Now the text on the left is written by me as a masculinist assertion about the aesthetic creation of life, while the text on the right is written by the microbe, I think, as a kind of feminine refutation about the woebegone absence of life. And the two poems resemble Petrarchan sonnets — abbreviated sonnets in dialogue with each other much like poems in the elegiac pastoral tradition of the herd boy and the nymphette. ("Department" 28:32-29:02)

Bök's reading of his own poems is interesting for how it forwards the bacterium's authorial agency, but only in the literary frame of the pastoral, with Bök as "herd boy" and bacterium as "nymphette." In this frame, if Bök takes the stance of Christopher Marlowe's Passionate Shepherd, pleading "Come live with me and be my love," the bacterium can only refute Bök's advances in the style of Sir Walter Raleigh's nymph, who reminds the shepherd that a utopian vision of love (like a poem) cannot last forever because all things must die eventually. This framing of the intimate engagement between Bök and bacterium makes a certain kind of sense, particularly when placed alongside poems that worry about the fate of the planet or the ephemerality of the human. Raleigh reminds Marlowe that love cannot last forever, and Orpheus looks backward only to find Eurydice gone. Reading through this staged encounter, I begin to reflect on what the bacteria want to say to Bök, only to remember the material ways in which water or toxic metals speak for Wong. And like Wong I start to worry that these poetic frames begin to script and limit how we can think about our meetings and exchanges with the nonhuman.

In a critical review of *The Xenotext*, Andreae Callanan offers a resistant reading of this pastoral relation as it shapes how Bök relates to the bacteria. Callanan catalogues the feminine figures of Bök's text — "nursemaids, handmaidens, hamadryads, concubines, courtesans, odalisques, that is, figures of domestic and sexual servitude." For Callanan, "the 'feminine' response [to Bök's poem] is only a success if it tells him [Bök] what he wants to hear, and what he wants to hear are the words he has written for the female speaker to tell him." If Bök's predesigned scientific encipherment marks one valence of the kind of response available to the bacteria, Callanan marks another valence of the way that the bacteria are doubly articulated — caught in both the material procedures of genetic science and the expressive regimes of poetic history that further harden the bacteria's response.

Is this the way that we want to think about the bacteria's agency? Are

the bacteria's actions legible only in response to Bök's? Claiming for the bacteria a kind of co-authorship makes a great deal of sense when read alongside Jane Bennett's distributive agency or Karen Barad's agential realism, but introducing distributive agency and assemblage requires one more turn of Bök's relational screw. We need to remember that *The Xenotext* is not an *imaginary solution* to a scientific problem. Bök is not performing a thought exercise to help us reflect on the anthropocene. Instead, he carries out a *technical procedure* on a body (however minor) to solve a largely aesthetic problem. The fact that his engagement with the bacteria happens in and is enabled by a larger assemblage requires us to ask how that instrumentalizing assemblage shapes his engagement. I find it hard to accept the autonomous agency of the individual author in the middle of such a mess of interconnections and interdependencies. "Authorship" becomes a collective enterprise not limited to Bök (despite his name on the cover of the book) or Bök and the bacteria (despite his claims of co-authorship); rather, it is the result of a whole assemblage of actors, most of whom are oriented to achieving his aesthetic goal. Through the necessary dependence of actors, his composition is allotelic not autotelic. Bök's work is limited by the constraining physiology of the bacteria, not only in his mimicking of DNA/RNA replication through the linguistic constraint of mutual encipherment, but also through the bacteria's ability to incorporate new genetic information. There is an ironic note of grace in the way that his desire for immortality has been refused, to date, by the bacterium/nymph. But even if he were successful, just because Bök can compose with the bacteria's biological processes does not mean that he *listens* to the bacteria. If this sounds silly, then it might be because bacteria are routinely worked with in scientific labs, found deep down the animacy hierarchy right above lifeless rocks and minerals. They are just bacteria, after all, assigned little value even as we live in close relation to them and depend on them for our own biological processes.

In claiming agency and authorship for the bacteria, Bök fails to acknowledge that he and the bacteria are not the only agents in the assemblage, or at least he fails to acknowledge the pressures that those agents exert on the shape of his engagement with the bacteria. In the process of producing the poem, every part of the assemblage around it has agency. Every scientist, every theory, every piece of equipment in the laboratory bears down on the bodies of the bacteria. This shared agency generates a thick logic that diagrams and shapes the paths available to

the bacteria. Success, for Bök, involves a single choice that the bacteria must make: encipher. Bacteria have agency but not in the authorial sense on which Bök insists. Under the imperative weight of the agential field, however, the bacteria are able to respond in ways other than prescripted call-and-response through their rejection of scientific instrumentalization — bacteria as superweed. Like Wong, who imagines herself as being subject to an experiment to which she *did not consent*, we need to ask how consensual is Bök's relationship to the bacteria. Treating *The Xenotext* as part of a material assemblage (rather than merely as an aesthetic experiment) requires that any failed attempt to bring the bacterium to hand and to heel be read as a response from the bacterium itself as both valid assertion of its own presence and resistance to Bök's technical procedure. If the bacterium *speaks* to us, then it is through a story that it tells with its body and movement rather than in the language of Virgil and the classical myth of Orpheus and Eurydice. The bacterium's story is in its reproduction and proliferation. Bök's is in the capture and exploitation of those reproductive processes.

Meeting the Material Halfway

Barad's insistence on the non-analogical poses a set of limits for a poetic project like Bök's, particularly since Bök imagines bacteria as collaborators. To work non-analogically is to insist on the materiality and material agency of all the actors in a spatial field (while acknowledging that the kinds of analogies to which Bök appeals also circulate in and shape material territories). At the heart of my critique of Bök's project is this question of how poetry affects space and relation through an unresolvable tension between analogy and non-analogy. On the one hand, analogy can help us to understand the complex relationships in which we are caught up but can also feel inadequate for the larger problem of material justice. On the other, perhaps because they feel this inadequacy, poets such as Bök (or Collis/Scott or Dickinson) have leapt off the page while having to grapple with the as-yet-unarticulated limits of poetry as a mode of ethical engagement with the world in all of its materiality.

If Wong provides an exemplary case study for thinking about an ecological poetics invested in ethical engagement, then it is because she explicitly struggles with this tension between poetic form and material relation. When Wong discusses the importance of water in "Waters as

Potential Paths to Peace," she focuses on water's materiality, ending with a call to act ethically and in solidarity with other human and nonhuman actors:

> It is very late, but not too late, to find a focus for solidarity and peacemaking through the water-based ecology that connects, not just humans, but animals, plants, and life at the micro and macro scales. We inhabit a historical moment where it is increasingly urgent to reconsider the implications of water's materiality; if we adapt our ways of knowing to learn from and respect the fluidity that constitutes us both individually and socially, a humble, joyful, meaningful future-in-commons could still be generated together. (219)

If building these kinds of material solidarities is central to Wong's project, then how does this shape her formal choices, particularly as they change between *forage* and *undercurrent*? We should ask how Wong's activist approach responds to a contemporary situation that includes resistance to extractivist projects such as the Alberta tar sands, the network of proposed pipelines across the continent, and, recently, resistance to the Site C dam in northern British Columbia.

Her focus on materiality and material action pushes Wong to take a different formal approach, particularly in *undercurrent*, that openly critiques the unethical engagements at the junction of capitalism and colonialism while affirming a commitment to the kinds of solidarities detailed in "Waters as Potential Paths to Peace." For example, in the poem "Declaration of Intent," Wong outlines a sense of how she plans to engage with others through a shared relationship with water:

> i will apprentice myself to creeks and tributaries, groundwater & glaciers
> listen for the salty pulse within, the blood that recognizes marine ancestry
> in its chemical composition & intuitive pull
> i will learn through immersion, flotation & transformation
> as water expands & contracts, i will fit myself to its ever-changing dimensions
> molecular & spectacular, water will return what we give it, be that
> arrogance & poison, reverence & light, ambivalence & respect
> let our societies be revived as watersheds (*undercurrent* 14)

Barad's non-analogical thinking resonates with Wong's clear argument that the watershed is not a metaphor for society but a set of relations that she needs not only to apprentice herself to but also to recognize how her "salty pulse" is already part of the watershed. Her formal approach is more careful about linguistic play (a key component of *forage*), instead privileging directness over ambiguity. This move to directness comes out of Wong's desire to put things back together rather than break them apart, creating solidarities through a poetics that imagines and even attends reciprocally to its relationships off the page.

So, how can ecologically invested poets organize their approaches to material engagement and experimentation with reciprocity with nonhuman actors, particularly when those actors are not always easy to understand? This failure to act reciprocally is perhaps the failure of Bök's project since how Bök listens to the bacteria is overdetermined by a combination of the scientific discourse on genetic engineering and the analogies of pastoral poetry. Reading generously (and fatally in a Baudrillardian sense), we might prop up Bök and his bacteria under the proscenium arch and ask how they are performing the failure of anthropocentrism to really listen to the nonhuman. Reflecting on this failure is useful, important even, but in materially insisting that the bacteria encipher his poem, doesn't Bök also fail to do anything about his failure to listen? That leaves us to wonder where the roots of all this failure might lie.

Instead, I wonder whether Bök's bacteria do not instead show us a kind of hope in failure — a slim hope that the immensity of our shared crises will not just shock us into a sad compliance. What can ecopoetry do to amplify this very material hope? Spahr's critique of nature poetry, as quoted by Dickinson, points us toward an ecopoetry based on a kind of rigorous, analytical attentiveness to the ways that human and nonhuman systems are unevenly entangled. Shouldn't poetic experimentation with the materiality of the world try to undo not only the logics of exploitation that shape our material relations but also those relations themselves? I think that this is why I am drawn to how Wong's poetic directness attempts — to paraphrase Barad — to meet the material halfway, working as both a form of research and pedagogy on actors, starting with Wong, as they engage one another in and through the watershed. In this sense, *undercurrent* relays Wong's findings, looking not just to provide an ambiguous point where a reader might abstractly reflect on the issues — a "pause for thought," as Jon Gordon puts it in

his reading of Wong — but also to provide an account of her engagements off the page, mapping the material solidarities that she and others work toward with the hope that we, as readers, will be inspired or jolted into action, able to identify the emergent solidarities that often seem to be so invisible, despite the thick relations that make hope unguaranteed.

Notes

[1] Within Anand and Dickinson's framing, ecopoetry's interrogation of the relationship between ecological dynamics and poetic procedures brings to mind critical debates about the co-productivity of matter and expression that ask pointedly how matter and language meet one another. There is a loose but useful triad among Judith Butler's theorizations of the ways that language categories shape bodies and performance, Manuel DeLanda's Deleuzian assertions that language adopts a secondary coding function within the emergence of material assemblages, and how Karen Barad's agential realism proposes a middle-ground sense of co-productivity between human and nonhuman, material and discursive, and natural and cultural factors.

[2] Bök's *The Xenotext* has seen the name it goes by shift several times. While I've largely defaulted to *The Xenotext* as a name for the project, it was also called, at various points in its long public gestation, the Xenotext Experiment and the Xenotext Project. This shifting nomenclature produces some necessary inconsistency that I hope the reader can forgive.

[3] In *Memory Serves: Oratories*, Maracle ties this valuation to history and memory, asking how story affects and codes practices through the absence of some actors, calling for "a sociological imagination that sees all life in its interconnectedness" (56), an imagination that calls into question Western historical practices that actively determine which historical relations are objectively important. Discussing the relative simultaneity of the 11 September 2001 destruction of the World Trade Center and the suicide of nine million sockeye salmon, Maracle wonders why one of those events was framed as a massive historical rupture that reshaped international policy and the other was largely ignored, asserting not only that "The suicide of sockeye is an event worthy of record, worthy of memory, and therefore worthy of study" but also that "Both of these events are tied to a single social and economic system that shares the same history of social and physical degradation of human and salmon habitat" (53).

[4] I am drawing here from Jane Bennett's work on distributive agency and Karen Barad's work on agential realism. In both concepts, agency is the result of actors enabling each other's actions rather than an individualized quality.

[5] This directness is most visible in *Perpetual*, Wong's poetry comic with artist Cindy Mochizuki, which explains Wong's understanding of the hydrocommons in a style meant to educate.

[6] Wong's turn to the fraught agency of leached metals in a global economy echoes Chen's discussion of toxic metals in *Animacies: Biopolitics, Racial Mattering, and Queer Affect*. Chen traces the complex assemblage of metals, turning from the "racialized discourses around lead" to mercury toxicity and "the vulnerability of human subjects in the face of ostensibly inanimate particles" (159). Heavy metals such as lead give Chen a material point around which to articulate a hybrid position for the inanimate since lead both materially threatens fragile bodies through its toxicity and acts as part of a "master toxicity narrative" (164), posing the inherent health risk of Chinese products in a mass media health panic in

2007. As if in response to the same discourses of toxicity that Chen outlines, Wong inverts the panic over toxic products from China into a discussion of how North American consumerism proves to be materially toxic to folks living in spaces such as Guiyu.

[7] In her short essay "Seeds, Streams, See/Pages," Wong argues that "acknowledging the work of indigenous women poets is central to a feminist poetics, an ethical practice, an imagining of a possible future that spirals backward and forward from filaments of collective memory" (21).

[8] Although this analogical play occurs throughout *forage* and *undercurrent*, the most obvious example of it might be *forage*'s "recognition/identification test," a poem that juxtaposes two columns of words — one of plant names, the other of brand names — and asks readers to notice the shared sounds and rhythms across the columns.

[9] This difference in authorship also corresponds to Bök's characterization of the differences between lyrical and conceptual poetry in his essay "Two Dots over a Vowel," in which he argues that conceptual poets "disavow the lyrical mandate of self-conscious self-assertion in order to explore the ready-made potential of uncreative literature" (11). He goes further, closely reading Steve McCaffery's poem "William Tell: A Novel" (a concrete poem in which a lowercase *i* is given an extra dot like an apple on its head) to make an analogy about this difference, loosely aligning the lyrical poet with Tell, who successfully shoots the apple off his son's head (restoring the letter *i* to a marker of the self), and the conceptual poet with William Burroughs, who shot his wife in a barroom game of William Tell. Bök argues that Burroughs gains authorship from killing his wife, becoming a kind of anti-hero who must escape from justice. But it is important to remember that Bök's analogy fails when considering that Burroughs does not shoot *himself* (thereby eliminating *his* self) but shoots the other, a snag that raises ethical issues, particularly in the long shadow of Kenneth Goldsmith's 2015 performance of "The Body of Michael Brown," which controversially reproduced and revised the autopsy of police shooting victim Brown — another example of a writer claiming authorship through someone else's death.

[10] This is the risk inherent in Kurt Wurstwagen's recoding of Port Carling (found in bpNichol and Steve McCaffery's original pataphysics issue of *Open Letter*). When Wershler, in his essay "Canadian Pataphysics: Geognostic Interrogations of a Distant Somewhere," simultaneously celebrates the work of Wurstwagen and announces the potential for pataphysics to become "supplementary to efforts by postcolonial scholars attempting to re-insert the obscured history of indigenous and colonized peoples, by demonstrating the absurdity of the theories and methodologies of the colonizers themselves" (75), he somehow misses the fact that Wurstwagen does not remediate the erasure of spaces and spatial histories but further obscures those histories with his proto-Mayan hijinks.

[11] In part, I am drawing from Zoe Todd's argument that we ought to listen to the material stories told to us by the bodies of sturgeon/namewak in the northern Alberta community where she grew up. Like Maracle's argument that the crises faced by nonhumans are not entered into the annals of Western history, Todd argues that the stories told by prairie fish are not considered proper testimony against extractive industries such as the tar sands.

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