

A Lattice of Chemicalized Kinship: Toxicant Reckoning in a Depressive-Reparative Mode

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Abstract

This essay introduces fourteen essays and artworks comprising this issue's Special Section, Critical Commentary, Critical Perspectives, Lab Meeting, and cover art that address the topic of *Chemical Entanglements: Gender and Exposure*. This introduction emphasizes not only the varied vernaculars of chemicalized knowing highlighted in this scholarship and artwork but also their shared theorization of how specific molecular encounters are propelled by biopolitical systems that extend or curtail relationality amongst humans, other species, and the environment.

Operation Ranch Hand, the mass bombardment of the Vietnamese landscape with a combination of chemicals dubbed the Rainbow Agents from 1961 to 1971, may not be a widely recognized name, but its most famous herbicide, Agent Orange, certainly is.¹ David Zierler's (2011) *The Invention of Ecocide* tells of a coterie of US scientists—those who would coin the term *ecocide*—horrified at the botanical devastation wrought by the Rainbow Agents.² Not only did they reject the US war department's assertion that herbicides targeted plants rather than people as unscientific, they also rejected the idea that Operation Ranch Hand did not violate the 1925 Geneva Protocol's ban on the use of chemical weapons.³ These scientists further claimed that the indiscriminate use of the herbicides increased rather than lessened global insecurity. As Yale botanist Arthur Galston

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stated at the 1971 Senate foreign relations committee hearings on the Geneva Conventions, “[Man] is totally dependent on and cannot substitute for that thin mantle of green matter living precariously on the partially decomposed rock that we call soil... ‘All flesh is as grass.’ [That biblical] statement is as true today as it was when it was written” (US Congress Senate Committee on Foreign Relations, 1972, pp. 325–326).⁴ Asserting that the health effects of chemical contamination on plant and soil could not be contained to a period of active military engagement, Galston emphasized that chemical warfare’s effects bled across both time and species boundaries, rendering humanity and the planetary ecology *less* secure.

The historical period in which these scientists voiced their concern overlapped with environmental activism, as galvanized by Rachel Carson’s *Silent Spring* (1962). Nevertheless, these scientists critical of ecocide, Zierler (2011) stresses, were not part of a larger green movement: “If Ranch Hand was an operation of resource extraction, it would not be ecocide” (p. 18). In short, if linked to increased economic productivity as defined by the industrialized West, the release of toxicant chemicals would not be (as) objectionable. What I want to draw attention to here is the premise inherent in this distinction: that the weaponizing of toxicant chemicals in acts of warfare expressly meant to despoil and eliminate the vital productivity of a habitat for years to come is believed to be categorically different from the spread of similar poisons by mining interests, oil and natural gas extraction, petrochemical refineries, factories, and industrial agriculture, as long as the latter occurs in the name of building and maintaining the infrastructures of big business in the Global North. What is accomplished by this premise?

According to this logic, a kind of border wall exists between acts of war on enemy territory and acts of industry in domestic settings. My claim here is that this border-wall thinking not only fundamentally misunderstands the actions of chemical toxicants as they wend their way through ecological systems—through soil, surface and ground water, air, and bioaccumulation in nonhuman and human species dwelling in those spaces (Blais, 2005; Genuis, 2009)—but, more importantly, that it offers a fiction of comfort for elite subjects of the Global North. That fiction of comfort involves, first, imagining themselves geographically protected from the toxicant spillovers and secondary contaminations that will occur only over “there” (in foreign territory) and not also “here” (in the homeland). Second, it provides further psychic “cover:” for these same elite subjects not to feel morally culpable because no intentional war (by the sovereign nation to which one holds allegiance) has been declared against either the people or habitats that have been so fouled.⁵

By carving out as an exception from “ecocide” those actions of industrial polluters, then, border-wall thinking assumes the self-evident worthiness of pollution-ridden resource extraction to feed the engine of industrialized capitalism.⁶ In addition, it props up what we now know as the dubious sufficiency of “separation, containment, clean up and immunization” (Liboiron, Tironi, & Calvillo, 2018, p. 332), as adequate methods of countering the depletion of health and proliferation of disablement—these certain sequelae not only of war but also of “industrialization, economic growth and capitalism” (Liboiron, Tironi, & Calvillo, 2018, p. 334). By recalling this history, then, I mean to draw attention to the speciousness of the boundaries asserted between domestic manufacture, agroindustry, and capitalist production qua carbon democracy (Mitchell, 2011), on the one hand, and international warfare,⁷ extraterritorial destruction, and the maiming and killing of human lives, on the other, a necessary first step for mapping out multiple vernaculars of *chemicalized knowing*.

Recalling these events of fifty-years ago may seem an odd way to introduce the collection of fourteen essays and artworks comprising this volume’s Special Section, Critical Commentary, Critical Perspectives, Lab Meeting, and cover art that address the theme of Chemical Entanglements: Gender and Exposure. By starting with the inseparability of industry—that is, the building and expansion of infrastructures of modernity—and ecocidal assaults, this introduction orients toward everyday expertise from communities for whom the “benefits” of industrialization were never primarily intended. For such communities, the pollutant emissions and toxicant exposures inherent to modernization plans are harder to justify (or excuse) as incidental to the functioning of *their* civilizations, notwithstanding the ideological framing of such place-based, non-industrialized modes of living as “primitive.” The essays in this special section employ feminist, Indigenous, decolonial, and postcolonial STS frameworks that help us to develop a vernacular of chemicalized knowing through the lives, theories, practices, and knowledges of women, LGBTQ communities, people of color, and those dreaming of disability justice (Piepzna-Samarsinha, 2018). In particular, three essays in this special section (by Shadaan & Murphy; Fiske; and Barba)—together forming the assemblage “Petro- and Agro-Wars by Chemical Proxy”—focus on the foreclosure of reproductive futurity for Indigenous and Brown settler populations through undeclared “wars by chemical proxy” (my citation of this term, not theirs) conducted by the petrochemical, oil, and agricultural industries.⁸ This trio of essays most clearly proceeds in a mode of argumentation that understands the production and widespread distribution of toxicants as part of the moral compass of Western capitalist industry—a mode of argumentation shared by the majority

of the pieces collected in this issue.

The remainder of the articles and artworks on the theme of Chemical Entanglements are introduced by way of three more assemblages (even as some articles overlap). “Educational Entanglements” brings together an interview, three shorter essays, and a longer research article (see Soto; Lasker & Simcox; Grandia; Bayalaniss & Garnett; and O’Laughlin) on how schools and institutions of higher education are often envisioned as great equalizers, spaces where students regardless of race can study and take part in cutting-edge research that will help government and health practitioners address toxicant trespass. Nevertheless, these works highlight how educational institutions (including university laboratories), in their current dimensions, need reforming so that they do not extend chemical and social injury. The third subgroup, “Vernaculars of Consumption,” is a trio of articles focused on “feminine” consumption circuits involving beauty cream, menstrual technology, and goods that protect the health of prospective babies (Tessaro; Vaughn; and Ford). Last, “Cognizing Chemicals through Aesthetic Forms,” comes together by way of critical reflexivity on art as a mode to materialize and represent lateral movements toward disability justice among intoxicated subjects. Across all four assemblages, I attend to these authors’ and artists’ attentive listening to vernaculars of chemicalized knowing as well as the biopolitical systems propelling molecular encounters that extend or curtail relationality amongst humans, other species, and the environment.⁹

Before detailing further these four subgroupings, let me briefly comment on the mobilization of estrogen in the work of Brooklyn- and Hong Kong-based artist Jes Fan—a photo of whose work graces the cover of this issue.¹⁰ Fan’s 2018 piece, *Mother Is a Woman*—viewable as a four-minute, forty-four-second color video (shot by Asa Westcott)¹¹—gently mocks the vernacular of commercial advertising selling an abundance of commodities to fill the anomie created by attenuated social relationships (and the waning of enchantment) that are also hallmarks of modernity. The video begins with a close up of white cream in a large centrifuge tube—a beauty product infused with estrogen sourced from the urine of Fan’s mother (Figure 1).

The video toggles between scenes in a laboratory—the technician’s blue latex gloves pipetting and injecting various substances into receptacles—and close-ups of various people, ungloved and dabbing the white emollient onto their hands and cheeks. Around the thirty-second mark, a voiceover begins detailing the art and science behind this cream’s manufacture:

Using artisanal technology, we worked closely with laboratories in America to extract the purest estrogen from my mother's urine...Beyond a beauty cream, *Mother Is a Woman* invites you to rethink kinship through the pores of your skin. Can our epidermis be a first contact of kinship?...*Mother Is a Woman* asks, "Who are you to her [my Hong Kong-based mother]?" And, "Who are you to me?"¹²

Rather than using estrogen as an ingredient to abstract into a commodity form the consumer's relationship to their younger self (see Lara Tessaro's related essay in this volume, on how estrogen creams—poorly regulated at mid-century—promised a more youthful, glowing appearance), Fan's artwork torques the vernacular of consumption to purposes of social bonding with and through a wrinkled, elder Asian woman's urine. Those who slowly massage the cream into their skin cutaneously imbibe, so to speak, the sexing powers of Mother—a queer method of "feminiz[ation]" (Figure 2).¹³

Because the mode of consumption is cutaneous rather than oral, *Mother Is a Woman* also reminds us that what we perceive as the human body's largest organ system—the skin—is also an aperture or, rather, a lattice of openings onto the world.¹⁴ My introduction's title, "A Lattice of Chemicalized Kinship," takes inspiration from this artwork's delight in rendering the *epidermal lattice* a positively figured channel of molecular *kinship* through which to counterbalance the segregating tendencies of epidermal racism.¹⁵

This 2018 work solicits the waywardness of a "single-sourced" endocrine-disrupting chemical, refiguring it as a relation-building substance precisely through its feminization powers. In contrast, Fan's work featured on the cover of this issue, *Systems II* (2018), suspends estrogen—as well as testosterone, fat, and melanin—holding them apart in glass orbs, as if to disrupt, not so much their molecular pathways but the marshalling of their phenotypical effects, on the surface of human bodies, towards biopolitical ends—as vectors for profiling, stratifying, and hierarchizing social groups according to skin color and gender presentation (see Figure 3). The work's title, *Systems II*, likely refers to overlapping systems of binary sex/gender, racialized eugenics, and capitalist property and accumulation regimes that parcel populations into those deserving life extension/support and those available for intensified labor exploitation and "maiming" (Puar, 2017) qua varieties of disablement and premature death.



Figures 1 & 2. Installation views, *Mother Is a Woman*, 2018. Image courtesy of the artist and Empty Gallery, Hong Kong. Photo credit: Michael Yu.



Figure 3. *Systems II*, 2018. Composite resin, glass, melanin, estradiol, depo-testosterone, silicone, wood. Image courtesy of the artist.

Systems II performs and provokes this alchemical fantasy: to extract those systems and place them behind observation glass rather than what we have historically done—placed fleshly bodies into glass cages (i.e., a caste system of stratified political categories such as citizen vs. noncitizen; white, propertied, male, and enfranchised vs. Black, alien immigrant, female, and disenfranchised), so as to stare at those bodies as if they were the puzzling phenomena, and not those systems. As this pair of art pieces would indicate, becoming (again) chemically entangled can be figured as an affirmative practice—a relationship-building one—even as chemical deployments are themselves entangled in

biopolitical systems of social stratification, imperialism, and extractive accumulation. The fourteen assembled essays and artworks highlighted here epitomize careful listening to vernaculars, metaphors, and models that attempt to grapple with that conundrum.

Assemblage I: Petro- and Agro-Wars by Chemical Proxy

This cluster of articles, as will become clear, proceeds by way of closely listening to the voices of Indigenous, poor, and colored communities, structurally positioned as most proximate to (accidental-deliberate) toxicant violence. As they testify to their visceral, sometimes multigenerational encounters with toxicants, a portrait of these communities emerges: they are nonconsensual human enrollees in field-based experiments conducted by the aforementioned industries. Second, these articles variously identify how the chronic releases of chemical pollutants are not so much unique forms of violence but function as a part of overlapping systems—such as, settler colonialism, exploitation of racialized labor, scientific-governmental underregulation of chemical hazards, and corporate impunity—that collude with a white supremacist biopolitics. This white supremacist biopolitics, at best, regards indifferently the premature death of Black and Brown populations and at worst hastens the foreclosure of these communities' futures.

My reference to vernacular is indebted to an article in this section, Amelia Fiske's "Naked in the Face of Contamination: Thinking Models and Metaphors of Toxicity Together."¹⁶ In this piece, Fiske establishes the importance of understanding toxicity in the "chemically saturated present" through the stories told by those living at ground zero of one of the world's worst environmental disasters—the site of Texaco's oil operations at the Ecuador-Columbia border. As indicated by her subtitle, Fiske forwards a critique of the limitations of Environmental Protection Agency (EPA) *models* for understanding and standardizing toxicity prevention with respect to the lives of the residents of Lago Agrio. Because EPA toxicological assessments are calibrated to the First-World subject who wears shoes (*metaphor*, too, for having the luxury to pick up and leave a chemically contaminated area), they are deficient in modeling the health effects consequent upon oil extraction for those walking barefoot on roads slicked with oil (those who are stuck to and in place). Because of the tremendous power and authority of technoscientific modeling, Fiske does not claim that expert discourse should be discarded. After all, the legal judgment obtained in Ecuador against Texaco relies upon that modeling and calculation of harm. Nevertheless, we might ask, "Must grief and loss speak in the *lingua franca* of economic commerce?" Indeed, to convey the scale of Texaco's malfeasance is to cite the size of the monetary judgment against them: US\$9.5 billion. How is it that these numbers become the way to figure the

moral crimes of oil and petrochemical conglomerates? Could one, instead, listen without instrumentalizing the vernacular metaphors recounting grief, such as a Lago Agrio resident's figuring the sharp pains she endures as between an insect sting and a guided missile—"tsaaac!" (say it aloud)? Why is the untranslatability into a tidy sum the extent and texture of disablements and afflictions—from headaches, rashes, miscarriages, and sharp pains, to lost fur on dogs who go into seizure upon drinking the contaminated water—not enough?¹⁷

In Reena Shadaan and Michelle Murphy's article in this section, "Endocrine-Disrupting Chemicals (EDCs) as Industrial and Settler Colonial Structures: Towards a Decolonial Feminist Approach," the authors link endocrine-disrupting chemical pollution to oil extraction in Ontario's Chemical Valley. They stress the importance of cultivating a decolonial feminist STS framework that is, like Fiske's article, deeply engaged with epistemologies tied to place and to indigeneity. Taking issue with well-meaning but flawed feminist environmental emphasis on hormone disrupters intruding into what are perceived as the most sacrosanct of spaces—the domestic nest, the bathroom and beauty cabinet, and the maternal womb—these authors underscore that this "heteronormative domesticated understanding of [endocrine-disrupting chemicals]" emphasizes the materialized greater burden on women to "manage environmental harms" via precautionary consumerism. Yet such narrow programs to shepherd the health of one's individual family "absolves the state of its responsibilities to regulate harmful toxicants, erases structural violence" and colludes with settler colonial infrastructures committed to Indigenous elimination. Shadaan and Murphy thus argue for a move away from "molecular, damage-centered, individualized or body-centered" frameworks, so as to recognize that pollution via endocrine disrupting chemicals is colonialism, part of the disruption of land-and-body relations made possible by "permission to pollute" regimes.

Also attending to epistemological insights from communities structurally positioned to be "swimming" in chemicals (a vernacular phrase quoted by Fiske), Mayra Barba's "Keeping Them Down: Neurotoxic Pesticides, Race, and Disabling Biopolitics," outlines the activism and care of a group of special education teachers and scientist-activists in California's Central Valley, who want flourishing futures for the children of predominantly low-wage Mexican American farmworkers. These educators focus on the EPA's 2017 refusal to ban from agricultural production the use of the pesticide chlorpyrifos, which works through inhibiting an enzyme important to brain function, an enzyme operative in both insects and humans—even fifteen years after the banning of this same neurotoxin from residential use because it presented "unacceptable risks to children." That

American-grown crops would not be available to US consumers or turned into global commodities without the metabolic overdrive of Latinx farmworkers' kidneys and livers is both a scandal and no longer news (Horton 2016). Most concerning to these communities themselves is the de facto maintenance of a transgenerational caste system through the mass cognitive disabling of Mexican American youth, what health scientists have dubbed a "chemical warfare on children's brains" (Rauh, et al, 2006, cited by Barba). Latinx and Mexican American communities, who have been placed at the forefront of agroindustrial poisoning, theorize the ongoing processes of their disabling as an issue of environmental justice and educational justice (Anesi, 2019).

Assemblage II: Educational Entanglements

In addition to the efforts of the special education teachers and environmental scientists highlighted by Barba, an autoethnographic narrative by Liza Grandia, a white woman, relays a parallel story of environmental engagement by parents concerned over poor indoor-air quality at another elementary school (also, in California's Central Valley). Grandia's activism had its roots in her own embodied sensing of suspected sources of toxicant chemicals—the ubiquitous synthetic carpet covering the floors of her college offices. A chemotherapy survivor, Grandia conducted her own citizen science when she and some of her colleagues found themselves beset with a host of strange symptoms on days when they had been to their offices. "Carpet Bombings: A Drama of Chemical Injury in Three Acts" sketches the iterative struggles—replete with small victories and setbacks—with environmental hazards research published just in time to counterweigh the skepticism of school board officials who at first mistake the "green labels" on carpets for more than what they are—a marketing scheme.¹⁸ As this story emphasizes, the hazards faced by Central Valley communities come not only from aerial sprays of neurotoxic pesticides in the fields but from the ordinary, mundane materials underfoot inside the schools; the pleasures come from alliances with other parents and makers of non-chemically infused alternative flooring who understand that "green" labeled carpet also presents a surplus waste because the quantity of their contaminants make them unsuitable for recycling.

Interestingly, it may be among those not wedded to or trained for the elite medical specialties that there lies greater openness to listening to vernaculars of chemicalized knowledge. Training those who will pursue careers in nursing and health studies, as well as environmental and occupational health, Grace Lasker and Nancy Simcox's essay in this issue's Lab Meeting speaks to the importance of seeding the curriculum of university chemistry courses with the precautionary

principle. Feminist and social justice pedagogies, they argue, offer methods and principles to encourage future chemists to reflect upon the downstream waste chains of their invention of new materials, so as to prioritize better human health outcomes. The optimism of these authors may be a function of starting this reeducation effort with professional careworkers (nurses, public health officials)—a population already open-eyed with respect to the underregulated and underestimated impact of chemical pollutants as contributors to chronic disease (see National Conversation on Public Health and Chemical Exposures Leadership Council, 2011).

As the essays of Barba, Grandia, and Lasker and Simcox together indicate, structurally vulnerable communities and their allies in environmental justice work regard preparation for and training at educational institutions as a priority pathway to intervene in settler-colonialist and racialized wars of attrition that occur by chemical proxy. Ironically, as stressed by Ana Soto—whose interview by graduate student researcher at the UCLA Center for the Study of Women Gracen Brilmyer appears in this issue’s Lab Meeting—institutions of research and learning are not, themselves, immune from the freely moving operations of rogue chemicals (a point also made by Grandia). A key historical event important to the field of endocrine disruption research occurred when cellular, molecular, and developmental biologist Ana Soto and her co-researcher, Carl Sonnenschein, discovered a problem with their laboratory research apparatus—eventually finding out that the manufacturer of a plastic centrifuge tube in which they had stored cell nutrient had made a change in the chemical composition of the containers. Eventually, Soto and Sonnenschein did some reverse engineering to identify nonylphenol as the endocrine disrupter (Soto et al., 1991). In Brilmyer’s interview with Soto, who participated in the UCLA Center for the Study of Women symposium in 2017 on the topic of “Chemical Entanglements: Gender and Exposure,” Soto reflects on feminism and vernaculars (different languages, metaphor, and conceptual systems) as they shape the questions asked in science and materialize modes of being in the world.

In a related but distinct register, Logan O’Laughlin’s article in this special section, “Troubling Figures: Endocrine Disrupters, Intersex Frogs, and the Logics of Environmental Science,” also makes the laboratory process its object of analysis, specifically opening up the black box wherein the African clawed frog has become a preferred indicator species for experiments testing for endocrine disruptors. Through careful intersectional analysis of the arduous material construction of the maleness of *Xenopus laevis*, O’Laughlin historicizes not only how these test subjects become animal capital but also how the African origins of this particular

species contributes to its nomination as invasive. That nomination also allows for the later resignification by Black chemist Tyrone Hayes of *X. laevis* as a vulnerable “brother” on a continuum with other people of color, who racialized systems of labor exploitation and immigration legislation, render available for chemical exposures in the field (see Barba). O’Laughlin deftly dissects the way in which “slandering rhetoric of non-normative sex organs” operates in the reporting out on test results from toxicological assays vis-à-vis endocrine-disrupting chemicals. Thus, while Hayes and his students pose the question of how it is that the United States thinks its relationality to certain crops overrides the importance of its relationality to farmworkers’ health, O’Laughlin implicitly points out that the relationality of endocrine experts to those who identify as intersex, trans, and nonbinary also consistently stays broken and frayed when those who are cis-male or cis-female fail to take into account how hormone interacting chemicals can also be figured as welcome and affirming (see Pollock, 2016).

Finally, in “Chemical Kinship: Interdisciplinary Experiments with Pollution,” Angeliki Balayannis and Emma Garnett underscore the need to move past the framing of chemicals as strictly “villainous objects with violent effects” in order to “do/design ethical research with chemicals.” In their short piece published as a Critical Commentary in this volume, the authors note that just like “kin, these materials [chemicals] are never entirely good nor bad [;] they can be both enabling and harmful.” They draw attention to three projects of “civic science” (Fortun & Fortun, 2005; Wylie, 2018), involving academicians in partnership with community organizations that exemplify innovative ways of working with chemical relations. Two of these projects are defined in relation to geographic regions (Air South Asia and MEXPOS) and one orbits around a disease endpoint (The Asthma Files). These projects help us to “imagine what making good kinship with bad kin might look like.” These efforts at practicing STS in a mode of “making and doing” is performed, as well, in *The Land and the Refinery* project and its Pollution Reporter app organized by Shadaan and Murphy (see their essay in this issue).

Assemblage III: Vernaculars of Consumption

Three of the essays in this issue’s special themed section address the chemical entanglements of “feminine” consumption circuits, in relation to beauty creams, sanitary supplies (menstrual technology), and various body-care and food options scrutinized by pregnant women. Digging through memoranda files newly released from Canada’s Department of National Health (DNH), Lara Tessaro tracks the administrative rulings in the 1940s and early 1950s—a period in which estrogen’s

potency as a drug caused confusion as to the conditions under which it could circulate safely, if at all, as a component of cosmetic creams. Tessaro's "Potency and Power: Estrogen, Cosmetics, and Labeling in Canadian Regulatory Practices, 1939–1953" points out, first, how an omnibus label of "use with care," shifted the burden of safety onto female consumers (to whom these creams were primarily marketed) and acted as an alibi for regulatory institutions like Canada's DNH to forgo setting safety standards. Second, the article traces the way in which, even after the passage of regulatory amendments intended to ensure that hormone-containing cosmetic products would *not* circulate if they were shown to have systemic effects, these products were still allowed to be sold and bought. Tessaro details the way in which Canada's DNH seemed mostly to want to avoid adjudicating the mismatch between commercial interests (to infuse emollients with magical properties of youthful regeneration) and scientific studies (which landed on estrogen's systemic effects, rendering any determination of small enough doses impossible) in this period of regulatory indecision over estrogen's potency.

Precautionary consumerism has been critiqued by decolonial feminists as a liberal band-aid that diverts attention from more trenchant, collective interventions aimed at protecting populations made structurally vulnerable to toxic trespasses because of their poverty; racialized minority, immigrant or undocumented status; or Indigenous ties to place, as well as combinations of those factors. Nevertheless, in "Purity Is Not the Point: Chemical Toxicity, Childbearing, and Consumer Politics of Care," birth doula Andrea Ford underscores in her research on childbearing in the San Francisco Bay Area that precautionary consumerism is very much the vernacular through which many pregnant women first express an awakening consciousness to their embeddedness in a "permanently polluted world" (Liboiron, Tironi, & Calvillo, 2018). These women's efforts to buy better on behalf of their progeny-to-be not only suggests their intimations that regulatory bodies, like the EPA, have not done enough in the way of modeling safety to protect newborns, but also witnesses a degree of mainstreaming of endocrine disruption science (the awareness that the old toxicological wisdom of dose making the poison fails in relation to EDCs where the emphasis has turned toward critical windows of exposure—such as in utero—where small dose exposures can make an outsized impact) (Gore et al., 2015; see also Ashford & Miller, 1998). Ford argues, moreover, that "childbearing can be a catalyst for ecological approaches to politics—that is, approaches in which relations of responsibility and vulnerability are foregrounded over individual rights."

At the other end of habitual turns toward consumerism practiced in wealthy

nations of the Global North are the circuits of disposal for commodities not fully metabolized in processes of their intended use. In her cross-regional comparative analysis of the handling of menstrual waste, “Compost and Menstrual Blood: Women Waste Pickers and the Work of Waste Futurity,” Rachel Vaughn takes a temporally elongated or systems view that dials out toward production design and waste futurity, rather than focusing strictly on the point of consumption. Feminine technologies—those managing the disposal of menses and that would lie adjacent to the uterus—become sites of anxiety regarding contamination by chemical hazards (e.g., possible endocrine disrupters contained in the masking fragrances added to sanitary napkins and tampons, and carcinogens like dioxin, a by-product of bleaching processes that whiten absorption materials). Attuning to those anxieties, eco-feminist entrepreneurs based in the Global North have taken a twofold tactic: redesigning menstrual technologies using, for instance, organic cotton in tampons so as to appeal to “green” consumers and working to destigmatize menstrual bleeding overall. In contrast, campaigns around menstrual waste launched by labor unions of SWaCH (Solid Waste Collection and Handling) in India, forward a vernacular of “dignity” in their campaigns to highlight waste picking as recycling work that necessitates labeling with a red dot disposal bags containing absorptive materials filled with menstrual waste. The Red Dot Campaign allows waster pickers to decide how to handle (or avoid) such bags unopened, but also extends narratives of uterine blood discharge as health hazard. Noting the contradictions in these positions, Vaughn wonders after what kind of feminist approach to menstrual waste could forge a bridge between these distinctly situated stakeholders.

Assemblage IV: Cognizing Chemicals through Aesthetics

The two pieces comprising this subsection proceed by way of reflecting upon and revising sensory systems of aesthetic persuasion. Key to the science and technology engagement in disability blogger Peggy Munson’s poem, “Paeon to Bicillin L-A[®] and the End of Harry Harlow’s Rhesus Monkey Experiments” (hereafter “Paeon”) featured as this volume’s Critical Perspective, is its citation of Vorticism, an artistic movement of the 1910s associated with Wyndham Lewis and his “belief that artists should observe the energy of modern society as if from a still point at the center of a whirling vortex.” It was related to the artistic movement of the Italian Futurists, enamored with the dynamism, speed, and forces of industrialized modernity.

Munson has been an activist in the Chronic Fatigue Immune Deficiency Syndrome (CFIDS) and Multiple Chemical Sensitivity (MCS) communities for close to two decades.¹⁹ Her “Paeon’s” vortex appears both as a swirling, recombinant style and

as a specific historical reference to an EF₄ tornado that swept through Washington, Illinois, in 2013, killing three people and destroying over a thousand homes.²⁰ As a cartoonist will often draw a tornado as a tight spiral that widens out into a tangle of swirls, “Paean” imitates the intensity of motion—the sweeping up of ordered (white-picketed) dwellings into a chaos of proximity—to suggest bonds of relatedness among a host of seemingly unrelated actors: white settler residents of the US prairie who live on a “hard-fracked hem” of earth where hazardous chemicals have been pumped into the soil (leaching into wells and groundwater to work their slow poisonings; see Wylie, 2018); those in the deep south, northeast, and Great Lakes regions, neuro-affected by combinations of pesticides, herbicides, heavy metals, and parasitic spirochetes; and those made worse, or at least not made better, by clinicians and scientists curious to see the results of withholding palliative medications and tactile comfort from primate species.²¹

If early twentieth-century Futurism oriented towards both fascism and the idealization of human-harnessed mechanical forces (tied to the combustion of carbon-rich chemicals),²² the swirling style of Munson’s poem recognizes, as a perhaps greater primeval force, not only the “felt” pressure associated with air shears, weather, and human touch but also a host of animate agencies from below—and of those laid low with fatigue. Those animacies (Chen, 2012) include the penicillium mold’s capacity to produce mycotoxins—from which humankind has derived antibiotics such as the long-lasting bicillin of the poem’s title. And they also include the vortacist action of the CFIDS poet’s “chemical enfleshment” inseparable from her neuro-Lyme “alterlife” (Murphy 2017a, 2017b). Munson’s poem metaphorically asks why it is that we underestimate care work through touch, the companionate dwelling beside (and bedside) the disabled, as a crucial feature necessary to surviving the wake of modernization’s turbulence.

While Munson revises vortacist style for purposes of twenty-first-century bonding—that is, that which a sustainable (rather than fascist) futurity depends—Allison Morgan and Kim Fortun begin their essay with a reproduction of Jasper Johns’s *Flag (Moratorium)* (1969), which renders the US’s Stars and Stripes in green, black, and orange (complementary colors to red, white, and blue). After staring at Johns’s piece, a sighted individual can look at a grey background and see the afterimage of the US flag, now perceived with the original colors. This afterimage is both perceptible and immaterial (a function of optical memory). For Morgan and Fortun, the “flickering” afterimage metaphorizes the toggling between knowing and uncertainty that results from former soldiers’ processing many different kinds of news and data sources—public journalism, veteran group web pages, denial of coverage from the Veterans Administration and Department

of Defense—that variously affirm and deny the reality of their toxicant related illnesses.

Morgan and Fortun's "Toxic Soldiers, Flickering Knowledge, and Enlisted Care: Dispossession and Environmental Injustice" focuses on US military veterans with chronic illnesses tied to service in Vietnam, the Gulf War, and deployments in Iraq and Afghanistan. Curious as to why veterans of the recent wars in Iraq and Afghanistan, who claim chronic illnesses due to the toxicant emissions from burn pits, compare themselves more readily to the "Agent Orange guys" rather than the more geographically and temporally proximate veterans of the Gulf War, the authors hear the following explanation from a leader of a prominent advocacy group: "Everyone knows that Agent Orange was a giant cover-up. The government decided to spray even when they had evidence it was harmful. Burn pits are the same thing." State institutions charged with protecting the health and wellbeing of its citizens ignore or actively suppress information that could have been used to maintain health, precisely because the revelations of this information could be too costly to industry and government. Agent Orange, in short, is a code word for the amplified injury that comes when government and industry continue "hiding the truth," as one veteran puts it, regarding both immediate and transgenerational disablements from chemical toxicants.

In the phrase, "If you think they were hiding the truth from us about it during the war, just look at how they're hiding the truth from us [now]," a veteran intimates that tactics of cover-up have gotten more sophisticated over time, even as he may not have dialed into the complexity of what Sara Wylie (2018)—with regard to the fracking industry—calls "enclaving tactics" that sequester "information, spaces, and peoples" (loc. 445), making it difficult to aggregate all the intelligence needed to get a ruling against the agents causing harm (often private entities—oilfield services companies or private military contractors). Morgan and Fortun point to Agent Orange, then, as an umbrella figuration bespeaking serial chemical exposures specific to US soldiers and the subsequent "cover-ups"—obstructed information needed by veterans in their attempt to get covered care. This reference to Agent Orange returns us to this Introduction's emphasis on ecocide with an additional psychic twist. Agent Orange might constitute part of the vernacular of our toxicant times, bespeaking chemically delivered disablements coupled by amplified psychic and material trauma that occurs upon realizing that the institutions supposed to protect against harms—or to which to appeal for restitution when harms have occurred—are in bed with and/or are selfsame with the agents of harm. Johns's artwork (with its green and orange hues) might also be considered a chemicalized figuration—an Agent Green and Orange—that

affirms, parallel to the operations of the vortex in Munson's poem, the unconscious (not quite conscious) cognizing modes solicited by artwork that aid in moving research from a position fixated on warding off further toxicant harms toward a position that builds alternative disability care networks led by those already disabled.

On Toxicant Reckoning in a Depressive-Reparative Mode

To return to my opening paragraphs on ecocide and its mystifyingly restricted labeling in the 1970s as a crime in war but not as a crime when done within a nation's borders, I would return to my earlier claim regarding how that mystification works on a psychic and moral level. To recap, restricting ecocide to a crime only when carried out during the course of a declared international war operates to normalize (and thereby quell legitimate outrage at) industry's theft of the atmospheric and hydrological commons—using those planetary regions as if they were private garbage dumps. The agro and petro industries, which benefit from this “border-wall thinking” (to recall my earlier phrasing), mobilize various practices to extend this mystification including informational enclaving, public relations campaigns (DuPont's “Better Things for Better Living...Through Chemistry”), tactics of diversion and incitement of doubt (Oreskes and Conway, 2010), and the undermining of scientific independence of regulatory agencies, to name a few strategies. If, at this current historical moment, there appears heightened awareness about our “permanently polluted world” (and climate change as an articulation of one of the effects of that pollution), does this herald a waning of the hegemonic idea (Gramsci, 1971) of chemicalized modernity—that is, the equation of modern living with a chemicalized “prosperity” (of intensive farming, fossil fuel extraction, incorporation into global supply-finance-debt chains, digital communications and its toxicant e-waste, and so forth)? And if so, should we be mindful that hegemonies don't simply go gently into that good night, but are often succeeded by often oppressive acts meant to reassert dominance over—rather than lead with the consent of—the governed? Whichever way we speculate answers to those questions, the call to action in the present may involve building spaces and channels for supporting what Liboiron, Tironi, and Calvillo (2018) have called “hypo-interventions” and “slow activism,” which accords with action in a depressive-reparative mode.

As suggested in this Introduction's subtitle, the tenor of these pieces might be described as “depressive-reparative” in the sense outlined by the late queer theorist Eve Sedgwick (2003), who differentiated that mood of cognizing (i.e., thinking-feeling) from a paranoid disposition.²³ Lamenting the homogeneity of a large amount of critical theory—operating to expose the hidden interests behind

cultural productions and processes (via a hermeneutics of suspicion)—Sedgwick drew upon the work of Melanie Klein and Sylvan Tomkins to mine alternatives toward these critical habits of paranoia that ramp up anxiety and are primarily oriented toward warding off harm (or testifying to harm, cf. Tuck, 2013). To be clear, there is psychic reward to staying in the paranoid position, even as it is riven with anxiety. That is, at least, one *knows* about the uncaring disposition of the state-corporate-carceral-imperialist nexus and will not be surprised by its continued deprivations. However, because the paranoid disposition is so subsumed by warding off negative affects (humiliation, pain, harm), the paranoid psyche cannot fathom the possibility of seeking positive affects.

The reparative mode, in Sedgwick's (2003) articulation, is an achieved position that attempts to ask what pleasures and desires might be pursued if one could move orthogonal to the habit of preempting harm.²⁴ It is from the depressive position that there might emerge a reparative turn toward hope (and vulnerability) to surprises in the future: "Hope, often a fracturing, even a traumatic thing to experience, is among the energies by which the reparatively positioned [actant] tries to organize the fragments...she encounters or creates" (Sedgwick, 2003, p. 146). Action in a depressive-reparative mode begins articulating the joy in caring for others and seeks out the affordances and capacities of those who have been harmed, not to excuse the state-industry nexus but also not to buttress its power by looking to it as the sole or primary source of remedy. Such pleasures afforded to and by crip people of color who "dream disability justice" through their own care work for each other have been lyrically expressed recently by Leah Lakshmi Piepzna-Samarsinha (2018). Such pleasures also live in cover artist's Jes Fan's affinal deployment of estrogen cream for purposes of reparatively materializing "epidermal" as modifier of kinship qua felt relationality rather than of racism qua broken relationality, practiced as the visual profiling and surveillance of people of color to white supremacist ends.

Returning to Sedgwick, some will recall that this formidable literary scholar wrote her essay on paranoia, and depressive-reparative alternatives, as a means of contemplating queer kinship in a time of proliferating HIV/AIDS and with respect to her own breast cancer diagnosis.²⁴ Key to her desire to reorient her own and others' scholarship toward a different way of thinking-feeling were her reflections on her regular close contact with two disabled friends—one of whom was HIV positive. Her other friend, Sedgwick (2003) noted, was ill with "advanced cancer caused by a massive environmental trauma (basically, he grew up on top of a toxic waste site)" (p. 149). Toxicant reckoning—the grappling with the defilement of relations of land-water-air-and-body through chemical hazards—happens, too, in

the syntax of this sentence where “massive environmental trauma” mutes the criminality—the excessive war-like aggression of ecocide—more clearly conveyed in the parenthetical. The vernacular of the depressive reparative, in short, has its genealogies, too, in a lattice of chemicalized relations. This special issue on Chemical Entanglements challenges us to maintain, remember, and materialize epidermal openness to disabled kin, to those structurally positioned as proximate to toxicant risks, as “pleasure and nourishment” (Sedgwick, 2003, p. 137) even in environments with both bad and good systems as also our kin (our responsibility).

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Notes

¹ According to Martin (2008), “The U.S. military sprayed approximately 11–12 million gallons of Agent Orange over nearly 10% of then-South Vietnam between 1961 and 1971. One scientific study estimated that between 2.1 million and 4.8 million Vietnamese were directly exposed to Agent Orange. Vietnamese advocacy groups claim that there are over 3 million Vietnamese suffering from health problems caused by exposure to the dioxin in Agent Orange” (p. ii).

² Decades later, the Scottish attorney Polly Higgins took up the mantle of ecocide, attempting to incorporate laws to protect the earth’s interests in the Rome statutes, the code establishing an international criminal court. Arguing that because corporate governance makes CEOs accountable to stockholders (i.e., it prioritizes the maximization of their investment returns), Higgins explained that this financial infrastructure assured that short-term profits would be favored over long-term stewardship of resources for future use or gain. (See <https://ecocidelaw.com/about-polly/>.) Saying that the earth needs a good lawyer, Higgins made clear that the voice of “self-interest” had become narrowed to the language of finances (two-, five-, and ten-year gains and losses), a calculus in which the unrecognized (and certainly unwaged and underreproduced) ecological

wealth of earth, water, air, alongside the manifold creatures coexisting, supported in, and transforming these spaces/places, was regarded as a never-ending box of treasures—supporting human life and, somehow not needing its own replenishments.

³The Geneva Conventions contain a protocol banning from international conflict the use of “asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices” as well as biological weapons. While the United States was a signatory to the protocol in 1925, the US Congress did not ratify the protocol until 1975. The Kennedy administration interpreted the Geneva Protocol not to apply to tear gas and herbicides. The conventions have been interpreted also to not apply to instances where states’ “security forces” internally police civilians within a nation.

⁴Galston went on to stress that annually green plants convert “without fanfare” 700 billion tons of carbon dioxide, produce 500 billion tons of plant material potentially consumable by man, and release 500 billion tons of oxygen for the “respiration of man and almost all forms of life” (US Congress Senate Committee on Foreign Relations, 1972, p. 326).

⁵There may exist more blatant outrage, recognition, and protest (perhaps because anti-war sentiments mobilize many kinds of actors) when ecocidal acts— toxicant release into the commons—are framed as explicit war tactics. Put another way, if corporations, whose stockholders reside primarily in global metropolises, are the ones committing ecocidal acts in Ogoni-land (Nigeria), the Ecuadorian Amazon, or Bhopal, India, no nation is at fault for such so-called accidents, even though the poisonings that do occur are eminently predictable.

⁶ It would be a mistake to construe Galston as an apologist for industrial pollutants. At a 1970 conference called War Crimes and the American Conscience, where he coined the term *ecocide*, Galston noted that “most highly developed nations have already committed autoecocide over large parts of their own countries” (quoted in Zierler, 2011, p. 19). Galston seems to have been keen both to distance his own expertise from what he perceived as the “dilettant[ism]” and unscientific “kook[iness]” of popular environmentalism (Zierler 2011, p. 18), and to consider, as a graver moral crime, ecocide when “committed [by one nation, the USA] against another country” than when the US committed it against itself (Zierler 2011, p. 19). To complicate matters further, in the context of the US, it is impossible to differentiate what is autoecocide and what is part of three centuries of Anglo-European ecocidal warfare on Indigenous sovereign lands in the

Americas.

⁷ Indeed, the US's propping up of autocrat foreign leaders (Wylie, 2018, loc 6210-6221; Mitchell 2009) has been part of the militarized strategy of oil and petroleum extraction.

⁸ "War by chemical proxy" is the term used by the Kennedy administration in its first phase of undeclared military actions in Vietnam/Indochina prior to 1965.

⁹ My use of the term *relationality* is informed by Jessica Kolopenuk's (2020) "Miskâsowin: Indigenous Science, Technology, and Society." See also Gerlach (2018).

¹⁰ Fascinated with material trans-formations, Jes Fan speaks of his training in glass-making as key to both his apprehension of the liveliness of inorganic art materials and his inspiration to draw out the transformative capacities of other media—including his own fleshy matter (Jes Fan In Flux | Art 21, 2019). Performing his own gender transition as a combination of molecular and behavioral applications (masculinizing through cutaneous testosterone and learning to box), Fan compares himself to both the sculptor carving out a solid form and "glass in [its] liquid [state]...perpetually in flux." To be clear, Fan has not framed his transition as one of his art projects. Instead, the experience of transitioning influenced the biomaterials—for example, testosterone and melanin—that Fan began incorporating into his art practice. See Jes Fan In Flux | Art 21 (2019).

¹¹ *Mother Is a Woman* is also the name of the mock commercial product the video infomercial sells. See Fan (2018).

¹² I am indebted to Ari Heinrich for his gorgeous experimental glossary that is "co-enmeshed" with Fan's work. Heinrich explores the role that speculative figurings of melanin's future by queer artists of color play in resisting the machine of capitalism and environmental devastation. See his forthcoming *Decolonial Melanin: Jes Fan's Contagious Xenophobia (A Glossary)*, funded by the 2019 Creative Capital/Andy Warhol Arts Writers Grant.

¹³ I use "feminization" here to echo the phrasing in *Mother Is a Woman*: "Freshly harvested from a single source origin, [*Mother Is a Woman*] invites you to be feminized by my mother." According to recent research, estrogen masculinizes the brain—a finding that unsettles lay notions of estrogen as strictly that which feminizes. Specifically, testosterone is converted at specific local sites in the brain

by aromatase into estrogen; this estrogen promotes a density of cell growth particularly in the medial pre-optic area of the brain, with “the density of one type of brain cell in [this area]...twice as great in males as it is in females” (Davis 2015).

¹⁴ “Lattice” is the term Fan uses to describe the system of conduit (modeled in rectilinear connective fashion) upon which glass orbs are propped and from which they hang in the artwork featured on this issue’s cover, *Systems II* (“Jes Fan in Flux”).

¹⁵ On epidermal racism, see Lee 2014, pp. 52–57. At the 2015 Technoscience Salon at the University of Toronto, I had the pleasure of hearing Vanessa Agard-Jones introduce her work on chlordecone in Martinique using the framework of “chemical kin” (see also Agard-Jones 2016). “Chemical kinship” is also the title of an essay by Bayalaniss and Garnett in this volume.

¹⁶ I expand the meaning of *vernaculars* beyond vocal expressions to include quotidian practices and habits. Listening to vernaculars recognizes what I call visceral and decolonial knowledge from below, a locational modifier referring to a political-economic positioning, placing these populations proximal and others more distal, to the disabling effects of chemical pollutants.

¹⁷ While Lago Agrio residents obtained a legal judgement of US\$9.5 billion against Chevron (which acquired Texaco’s holding) in an Ecuadorian court, no monies have been paid out, as Chevron continues to contest the judgment itself as corrupt. The importance of listening to vernaculars of loss, however, goes beyond this particular historical instance of stalled monetary judgement. As Waichee Dimock (1997) argues in *Residues of Justice*, the US justice system relies upon an erroneous but convenient logic of adequation. What does that mean? Where across two languages there exist no cognate term for the idea or word one would translate, that translator reaches for a metaphor that would approximate the meaning of the original term. Even so, a residue of untranslatability remains. For humanists, this lack of adequation—here, a one-to-one (terminological) correspondence—can inspire creativity, prompting the translator to weave more poetic figures which constitute inexact but possibly delightful substitutions. Bringing these insights on language to the courts, Dimock argues that American justice (both in civil and criminal suits) relies upon the dream of the fullness of adequation for a set of losses—such as, Lidia’s three miscarriages and the intensity of her intermittent but chronic pain (*tsaac!*)—by some monetary sum. But the eventual settlement intended to bring closure, even when finally paid out, Dimock argues, will prove anything but settling; for what is deeply unsatisfactory, in the end, is the idea that a species of commerce (the language of US\$) can pay

for (is equivalent to) the destruction of a mode of living, which is to say, the reckless contamination of soil, water, forest, and bodies effected by Texaco/Chevron. In short, listening carefully to the residues contained in these vernaculars becomes very much a part of assisting in the ongoing project of justice.

¹⁸ At the time of Grandia's submission of her original essay, the story of collective carework to improve ventilation and removal of intoxicating sources from elementary school indoor spaces looked like it would be one of "slow activism" (Liboiron, Tironi, & Calvillo, 2018); as we've wended our way through production, changes on the ground have rewritten the ending of this story for now as a victory.

¹⁹ See her anthology *Stricken: Voices from the Hidden Epidemic of Chronic Fatigue Syndrome* (2000).

²⁰ EF refers to the Enhanced Fujita tornado damage scale; EF₄ means winds speeds of 207 to 260 mph and "devastating" damage such as "blown down" buildings (Storm Prediction Center, 2014).

²¹ Munson references Harry Harlow's monkeys, the Black men of Tuskegee, and the speaker who cannot get insurance approved access to the expensive drug, Bicillin LA (LA = long-acting).

²² Though space constraints prevent a fuller analysis, let me just note here that a "molecular feminist's" (Roy, 2018) reconsideration of the Futurists might frame their enchantment with representing force and dynamism equated with symbols of fossil-fueled locomotion—motor boats, trains, industrial gears—as a fascination and fetishization of energies released through the literal *breaking of highly stable bonds* on the molecular level. Thanks, here, to Anne Pollock's verbal account of the energies released from molecules with extremely tight bonds.

²³ Sedgwick described paranoia as a theory of negative affects that places faith in exposure (in the dynamic of hidden-shown). Seeking positive affects is necessary to cultivate reparative energy.

²⁴ It is from the depressive position that a reparative energy might emerge. The reparatively positioned scholar, ally, maker-doer, and canary surrenders the outraged position of (full well-)knowing for the depressive position (which still has knowledge but realizes its insufficiencies). Knowledge is not the fortress or shield

one had hoped; and the problem may be with the whole concept of fortress immunity.

²⁵ The peak years of death from HIV/AIDS were 1995 for the United States and 2005 globally. Sedgwick published her essay on paranoia in 2003.

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