

Naked in the Face of Contamination: Thinking Models and Metaphors of Toxicity Together

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Abstract

While chemicals are often described and acted upon in technoscientific forums as isolated, discrete entities, vernacular experience points to possibilities of experiencing, speaking about, and imagining chemical exposures that have otherwise been rendered politically obsolete. Drawing from ethnographic fieldwork in the Ecuadorian Amazon, this article invokes accounts of daily life in order to argue that vernacular experience is necessary for understanding what it means to live in a place of environmental hazard, and for building a more inclusive politics of knowledge production in models and assessments of toxicity. Descriptions such as “naked in the face of contamination,” “swimming in oil,” “smoke thick like marmalade,” or exclamations of pain re-lived “*tsaac!*” refuse hegemonic assumptions about how chemicals alter and enable life. To take these descriptions of life seriously is to recognize the ways that chemical concentrations often far exceed the expected forms and quantities modeled in risk assessments of standard oil operations. The chemically saturated present demands a reconfiguration of toxicity – as a socio-material process, epistemic concept, and embodied experience – in order to work towards political and environmental, as well as epistemological, justice.

Introduction

In his Quito office, Camilo was showing me slides from a presentation he delivered at Brown University a few years before to explain how people in

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Amazon come in contact with the toxic substances involved in oil production.¹ A trained biologist, he lived in the Amazon in the 1990s and has since worked on environmental issues associated with oil production, including in relation to the *Aguinda v. Texaco* lawsuit. As we spoke, he stopped, hovering over a slide in which he had juxtaposed two images.

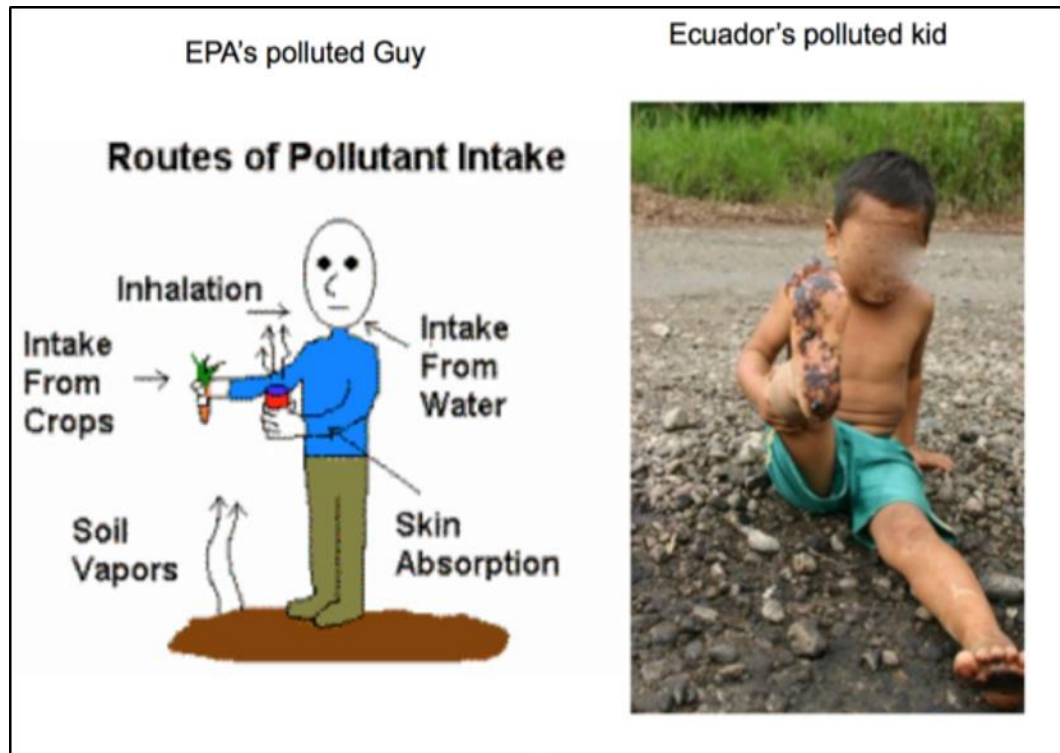


Figure 1. Camilo's PowerPoint slide depicting the contrast between universal models of exposure and everyday exposures for individuals living in oil producing areas of the Amazon.

The first image reads "EPA's polluted guy." It is a graphic intended to summarize for a lay audience the different means by which an average individual could be exposed to toxicants in a generically contaminated site, the kind you might find in a pamphlet about environmental contamination. The second, a photograph of a young child sitting on a dirt road with oil residue in an unidentified location in the Amazon, he has titled "Ecuador's polluted kid." These two images, he says, are essential for understanding the nature of toxic exposure in Ecuador, and underscore the relationship between ongoing problems with oil contamination in the Amazon and the history of US companies who have operated there:

This for me is important. Because this is how the EPA sees people who are exposed to contamination. And this is how it is here. He has no shoes and no shirt...If you're in the United States on a contaminated

site, normally you're like this [pointing to "EPA's polluted guy"], and not like this [pointing to "Ecuador's polluted kid"]. Thus, the contact that our people have with contamination is much closer...Whatever scientific study you might do on contamination, or whatever you might know from the US, well it's different here because we live differently. People here are much more naked in the face of contamination.²

"Naked in the face of contamination" makes bare the vulnerability of residents of the Amazon who live alongside oil. *Naked* refers to the ways that unprotected human bodies—such as the extended crude-stained foot of the boy, or his hands and uncovered upper body—come in contact with chemicals. But *naked* also refers beyond the skin to the proximity of people's homes to waste pits; to the unfiltered water in their wells that, for lack of better option, they drink despite the smell of oil; or to the limited resources to protect themselves from exposures within this industrial-natural landscape, all of which give shape to toxicity in the Amazon. To be "naked" is not necessarily contingent on a lack of knowledge about toxicity, but rather has to do first and foremost with the social, material, historical conditions that make some more vulnerable than others in the extractive present.

This article explores connections between toxicants and their corporeal presences, using the language invoked by interlocutors to query models of toxicity as consequential interventions into the visibility and invisibility of pollutants. As Camilo illustrated through his contrast between the "EPA's polluted guy" and "Ecuador's polluted kid," the nature of exposure in the Ecuadorian Amazon is different from generic models of exposure—such as those I once learned about in a graduate environmental health course, or those you might find in public education materials produced by environmental regulatory agencies. The juxtaposition of the two images articulates a direct relationship between the Amazon and the United States, histories of extraction under Texaco, and the profoundly unequal burdens of exposure and toxic presences that continue to characterize life today. Drawing from ethnographic research and the accounts of one woman in particular, whom I will call Lidia, I aim to illustrate that vernacular experience—such as the knowledge that in the past children and adults were routinely barefoot on crude-slicked roads—is necessary not only for understanding what it means to live in a place of environmental hazard, but also for building a more inclusive politics of knowledge production in models and assessments of toxicity.

While chemicals are often described and acted upon as isolated, discrete entities

in technoscientific forums (such as the “EPA’s polluted guy” who summarizes possible routes of exposure through his universality in a summary model of environmental exposure; see Murphy, 2017), vernacular experience points to possibilities of experiencing, speaking about, and imagining chemical exposures that have otherwise been rendered politically obsolete. More than allegory, statements such as “naked in the face of contamination,” or as interlocutors describe later in this article, life as “swimming in oil,” seeing “smoke thick like marmalade,” or exclamations of pain relived “*tsaac!*” refuse hegemonic assumptions about how chemicals alter and enable life. To take these descriptions of life seriously is to recognize the ways that chemical concentrations often exceed the expected forms and quantities modeled in risk assessments of oil operations, pointing to the failure of normative models of toxicity to capture experiences of exposure that inundate daily life. The chemically saturated present demands a reconfiguration of toxicity—as a sociomaterial process, epistemic concept, and embodied experience—one that, I will argue, requires attending to quotidian experience with toxicants in order to work towards not only political and environmental, but also epistemological justice.

Oil Production in the Age of Toxicity

The evidence for the infiltration of human-made, toxic chemicals into the fabric of biological and social life is extensive. From the proliferation of toxic compounds in our soil (Lyons, 2016), water (Davis, 2003), air (Harrison, 2011), bodies (Lundqvist et al., 2006; Wahlberg, 2018), and future generations (Keller 2014), to the flame retardants sprayed on baby mattresses and couches (Liboiron, 2016; Miller, 2017), the formaldehyde-derived adhesives in the flooring, walls, and carpentry of the average American home (Shapiro, 2015), the plastic particles found in most tap water worldwide (Carrington, 2017), or the routine, authorized use of chemical agents and violence against protesters at Standing Rock (Estes, 2019), the chemical constitution of post-industrial life has become at once extraordinary and, at the same time, utterly commonplace. We are living in the “age of toxicity” (Walker, 2011, p. ix).

Petrochemical production in particular is rife with potential danger posed by toxicants, those found in hydrocarbons as well as chemicals used during the extraction, transport, and refinement (Appel, Mason, & Watts, 2015). By toxicants, I am referring to human-made, toxic chemicals that are defined by their central role in economic production and increasing ubiquity in bodies, homes, and environments (Liboiron, 2017). Following Liboiron, use of the term *toxicant* traces the global shift in public concern at the end of the twentieth century away from

naturally occurring toxic substances, such as arsenic, and towards the proliferation of manufactured chemicals. As a natural resource, some might argue that crude oil is a “toxin.” Yet quotidian encounters with crude in the Amazon also illustrate the ways that oil is also a “toxicant”—a substance that is encountered through human and industrial production that is harmful, even poisonous, to life. Importantly, as Liboiron (2017) notes, toxicants differ from toxins not only because of their synthetic rather than “natural” genesis, but also because of their “mass tonnage, wide economic production and distribution processes.” By extension, I argue that the produced forms through which oil is encountered—as sludge in waste pits or as separated gas that is combusted in direct proximity to homes—give rise to its near ubiquitous presence in everyday life in this region. To live in the Amazon is to live alongside, underneath, and submerged within oil production as well as its infrastructure, marking widespread transformations of space, practice, and exchange in everyday life in the past half century. Here, to be in relation to oil is unavoidable; this is “anthropocentric exposure,” where preventing permeation by the continual, residual, overwhelming onslaught of industrial toxicants is neither possible nor expected (Roberts, 2017a).

The toxic substances that interlocutors encounter in their everyday life in the Amazon are rarely “pure” crude—such as the bitumen recalled in accounts by Indigenous residents that would seep through the soil in the Amazon or on the coast of Santa Elena (Cepek 2018; Sovacool & Scarpaci, 2016). Instead, what most residents encounter in the everyday are toxic composites or chemical mixtures composed of “natural” substances entangled with synthetic and industrially produced additives-- admixtures of potentially poisonous components and the life-sustaining fuel of the contemporary moment. Let me provide one example: When oil is extracted from the ground, it is part of a hybrid mixture of crude oil, gas, and water that exists as slurry in underground pockets. The water that is part of this underground solution is referred to as “production” or “formation waters”; it varies in composition by location, and is characterized by high salinity, the presence of hydrocarbons, and naturally occurring radioactive material. It also contains high levels of benzene, chromium-6, and mercury. Importantly, to coax this slurry out of the underground depths and separate out the crude that can then be sent to refineries, various chemical compounds are added in the drilling process. These can include radioactive materials and other chemical cocktails that are added to the muds to make them more viscous and more stable, and to reduce fluid loss, among other effects (Borchardt, 1989). During my research, residents recounted that routine practices under Texaco and state companies included dumping the production waters, drilling muds, crude oil, added

chemicals, and other forms of industrial trash into nearby waste pits created alongside the oil wells. Over the years, the chemicals from this *mélange* flooded their banks, were intentionally lit on fire, or slowly seeped through the unlined walls of the waste pits. Thus, when residents encounter contamination from oil in their streams, farms, homes, and places they traverse throughout the day, this contamination far exceeds its “natural” origins: it is most often in the form of toxicant mixtures that are only made possible through the political-economic and ideological structures that have enabled and encouraged oil extraction in the Amazon since the early 1960s.

Oil extraction, as one of the principal drivers of anthropogenic change, chemical onslaught, and natural cultural transformation in this place, thus exists as a hybrid form of toxin and toxicant: it is a natural resource, but only attains its toxic potency through the systems of production, consumption, and fabricated chemicals of the twentieth century that bring it to the surface of the Amazon forest in historically unprecedented scales and intensities. I intentionally engage with the term *toxicant* and situate my ethnographic work in relation to scholarship on toxicants and chemo-ethnography in order to draw attention to these forms of labor, production, and consumption that have brought the people living in the Amazon into daily, unavoidable relation with oil. The very compounds used in the extraction and production of petrochemical products that produce harm are also what sustain our lives today. Importantly, scholars have argued that toxicants have fueled colonialist histories and enabled the extractive present, and, as such, demand rethinking of the rhetorical and political tools used to combat contamination (Widger, 2017). This includes, I argue, attending to quotidian experiences of toxicity in order to draw attention to the forms of harm that oil extraction—and the limits of our regulatory models for capturing its effects—have entailed.

Dominant modes of addressing pollution’s effects—regulatory science and law—have proven unsatisfactory for stemming the wake of twentieth-century industrial toxicants in our lives (Boudia & Jas, 2014). Such officially sanctioned modes of response are also increasingly less equipped to respond to questions of responsibility and remediation as toxic problems grow in scope and frequency. The examples of this abound: Union Carbide in Bhopal, 1984; Chernobyl, 1986; Exxon Valdez, 1989; BP Deepwater Horizon explosion, 2010; Fukushima Daiichi nuclear disaster, 2011; Soma mine disaster in Turkey, 2014; Dakota Access Pipeline Protests at Standing Rock, 2016, among the many other ongoing, deadly problems of exposures to pesticides, formaldehyde, dioxins, radiation, and more.

This failure to capture and address the myriad effects of toxic substances in our lives reflects, in part, a fundamental shift in toxicity. As scholarship across anthropology, feminist science studies, and epigenomics has shown, the problem of toxicity is no longer a question of individuals being affected by rogue chemical particles, but rather entails a radical change in what it means to be human: we are now co-constituted by the toxicants of the twentieth century. Yet, as environmental justice scholars have repeatedly shown, while toxicants might be a universal problem, their distribution and burden is never borne equally (Bohme, 2014; Brulle & Pellow, 2006; Bullard, 2001; Checker, 2005; Harrison, 2011). While Indigenous communities have long been living alongside sites of contamination and extraction (Hoover, 2017; Hoover et al., 2012; Estes, 2017, 2019), and poor communities of color have historically and repeatedly borne undue burdens of toxic waste and environmental racism (Checker, 2005; Pulido, 2000; Commission for Racial Justice, 1987), there is also an increasing awareness that the problem of toxicity, although profoundly distorted in its burdens, is not limited to “other” places and peoples. The distribution of poor health and industrial waste traverse pre-existing contours of position and power, including race, class, gender, and political-economic position.

Increasingly, scholarship that explores human and nonhuman entanglements has turned to chemicals and their lifeworlds (Shapiro & Kirksey, 2017). From accounts of industrial disasters (Fortun, 2001; Petryna, 2002) to pharmaceutical markets (Dumit, 2012; Hayden, 2003) and experiences of medical conditions (Chen, 2012; Jain, 2013), chemicals have proven particularly productive figures for tracing the contours and threads of complex phenomena, such as the oil and gas industries. Referred to by some as “chemo-ethnography,” such work investigates the political-economic and personal relationships that have emerged through modern chemistry, following a “suite of chemicals that create possibilities for life while simultaneously enfeebling bodies or multispecies worlds” (Shapiro & Kirksey, 2017, p. 482). The focus of this work is attuned to the micro-level, low-dose, chronic, multiple, and cumulative effects of toxic chemical compounds, interrogating the boundaries of bodies, environments, and the materials and violence of everyday life (Murphy, 2016; Povinelli, 2017; Roberts, 2017b; Shapiro & Kirksey, 2017; Simmons, 2017). Shapiro (2015), for instance, describes tracking indistinct and distributed changes to bodies and environments as the “chemical sublime” (p. 369), in which even minor encounters demand ethical consideration and practical intervention. Other work has shown how the concerns of toxicity extend beyond the material into the contamination of the social fabric (Ofrias,

2018), and the violence of chemical exposures as part of the settler project of the Dakota Access Pipeline (Simmons, 2017). A critical advancement of this work has been the move to consider chemical effects and relations with more-than-human spheres, and to point to the ways that focusing only on the molecular can have the effect of displacing other forms of harm, disavowing the violence of colonial projects, strangling relational politics, or obfuscating the concerns of those most effected.

The toxicants used and produced in oil production cross boundaries, from the plastic industrial membranes installed to retain the contents of waste pits, to the fleshy ones covering human bodies. The movement of toxic substances throughout environments—in soil, water, and air—and in bodies of organisms—across skin, or the blood-brain barrier—is one of their distinguishing features. Toxicants effect changes that are unanticipated and forceful. However, identifying, measuring, and demonstrating exposures to toxic substances outside of the laboratory is a problem: combinations of chemicals, changes in industry practices, the dispersion of chemicals throughout air or water over time, the movements of people between jobs and daily activities, all make tracking exposure exceedingly difficult. Given that it is enormously difficult to determine the effects of a toxic substance within a landscape of potential, repeated exposures, or the relationship between multiple toxicants and adverse health effects, it is often necessary to reduce the variables of study at the expense of attending to differential particularity. For instance, the question of why, and through what processes, some bodies become subject to industrial waste while others do not (Auyero & Swistun, 2009), or the ways in which pollution is becomes an externality, even a profitable one (Ofrias, 2017), has been divorced from the question of how exposure occurs.

In her call for anti-colonial feminist tactics to take on toxicity, Murphy (2017) describes how technoscientific approaches to portraying chemicals as “discrete entities, as isolated molecules, often represented through abstract structural diagrams” (p. 495) has supplanted approaches that foreground complexity and entanglements between the living and nonliving. Such technoscientific explanations of how toxicity is manifest are largely incompatible with accounts that track the ways that sexuality, race, and gender shape the effects of chemicals on our bodies, and the irrevocable ways that toxicity is unequally embodied (Agard-Jones, 2014; Murphy, 2008). The failure of discrete mechanisms of chemical pathways to capture the effects of everyday life alongside oil production is seen in Camilo’s contrast between “EPA’s polluted guy” and “Ecuador’s polluted

kid,” and as I will focus on in what follows, is also seen in Lidia’s retelling of how oil production has given shape to everyday life.

There are many examples of disjunctures between scientific models and the entanglements of toxicants and injustice. In places of environmental hazard, scientific and legal endeavors are generally called upon to parse precise distinctions between chemicals and their effects, between one oil company and another, between bodies and environments, between the synthetic and the organic. Contemporary methods in toxicology are rarely able to demonstrate causality between individual toxicants and human harm, and even less so for “cocktails” of toxicants (Boudia & Jas, 2014; Goldstein & Hall, 2015; Langston, 2010; Van der Schalie et al., 1999). Further, while scientists acknowledge that toxins and toxicants play an important role in acute and chronic diseases, many of the relations between exposure and disease are poorly understood due to individual variation, the cumulative effects of multiple toxic substances, and complex interplay between genetics and environment (Miller, 2013; Nash, 2007; Wild, 2005). Due to the political-economic weight given to the methods of regulatory science, it becomes increasingly difficult to talk about toxicants in any other way. Toxicity—like oil—is at once all around us, and at the same time, increasingly difficult to pin down (Cepek 2018).

The conjoined development of industry and chemistry (Bensaude-Vincent & Stengers, 1996) and the resulting restrictive techno-scientific rationalities for understanding the chemical effects of environmental hazards (Murphy, 2017) has had serious consequences for everyday life from the twentieth into the twenty-first century. The assumption of a “fixed” natural substrata against which subjective interpretations of toxicity are compared, or the generalizability of the “average” body, or the overreliance on models of toxicity (rather than the explicit recognition of the limits of modeling, see Tsing, 2004), have coalesced into taken-for-granted ways of imagining, speaking, and acting on toxicants. While recognizing the many difficulties of accounting for toxicity in a given place, and acknowledging the necessity of privileging stable boundaries over entanglements in particular instances (Roberts, 2017b), this article is borne out of the concern raised by interlocutors like Camilo that the assumptions built into scientific models have been used to marginalize voices who have insisted on the more-than-causal, not-yet-verified effects of toxicants, and to obscure the political-economic structures that allow some to produce and profit from pollution.

In my fieldwork in the Amazon, I found that assumptions built into studies of

toxicity about the “average” body, and “residential” versus “industrial” divisions of space in Environmental Impact Studies, as well as a limited notion of quantifiable “impact” in regulatory measures (Fiske, 2017) can minimize the dangers of oil operations in official assessments. In an effort to counter this tendency, here I turn to the ordinary, quotidian experiences of Lidia and her accounts of life in a landscape of contamination. After decades in the Amazon, such stories and experiences accrete, and it is impossible to distinguish singular moments of hazard. I aim to show through what might otherwise be dismissed as individual instances or anecdotes that vernacular experiences can offer critical insight into the particularities of exposures, and raise questions about what standard means of assessing toxic exposures may exclude, overlook, or obscure. Following Murphy’s (2017) call for approaches to toxicity that “refuse the hegemonic sense of what chemicals and life are” while “honor[ing] the inseparability of bodies and land” (p. 497), in what follows I explore how attention to the vernacular experiences of life alongside toxicants may point to ways that the corporeal presences of toxicants seep well beyond their given modes of action in exposure “pathways.”

Fieldwork

The field research for this project took place over twenty-seven months between 2011 and 2013. Throughout this time, I lived in Lago Agrio—located around fifteen miles south of the Colombian border in the northeastern corner of the Amazon. The city marks the site of the first exploratory wells drilled by the Texaco Company, from which they struck the so-called black gold in 1964.

Oil and settlement occurred in tandem, and today daily life is thoroughly entangled with the industry. As a result of a drought in the southern highlands and increasing land crowding throughout the Sierra in the 1960s, government officials hoped that the Amazon could become the next breadbasket of the nation (Wasserstrom & Southgate, 2013). At the same time, the government was pursuing oil extraction as the next step for national development. Politicians hoped that oil—through the infrastructure and revenue it would bring—would help to facilitate colonization of unconquered border territory in the Amazon. All told, the processes of oil development and state-sponsored colonization resulted in the arrival of more than 300,000 colonists to the Amazon (Watts, 2005), who claimed more than 4.5 million hectares of land (Lucero, 2008; Sawyer, 2004) that was the ancestral territory of Indigenous nationalities living in the region, such as the Cofán, Waorani, Siona, and Sekoya. The history of oil development in the region falls within the continuation of extractive logics that accompanied, for

example, prior waves of rubber extraction in the nineteenth and twentieth centuries (Fontaine, 2007; Wasserstrom, 2014). This period was marked by a significant territorial expansion of industry, which has resulted in an immensely unequal distribution of both the harmful effects of toxicants and the national benefits of revenues resulting from oil production. Additionally, oil extraction was facilitated by governmental policies that profoundly transformed Indigenous relationships to nature, created dependencies on institutionalized energy production, and reshaped the roles of women in social reproduction and production (Cielo, Coba, & Vallejo, 2016; Vallejo, 2014).

In the 1960s, Ecuador entered in a joint venture with the Texaco Company of the US to begin oil operations. Initially a consortium formed between Texaco, Gulf, and the nascent *Corporación Estatal de Petroleos de Ecuador* (Ecuadorian State Petroleum Company), later Texaco and Gulf delegated their work to the subsidiary company Texpet (a move that was subsequently used to argue that the parent company does not bear responsibility for wrongdoing (see also Sawyer, 2002). Over the course of twenty years of operations, Texaco drilled 339 wells and built eighteen production stations, to extract an estimated 1.5 billion barrels of crude (Kimerling, 2006). Rampant dumping of crude oil and production waters into waste pits and local streams, and the routine burning of oil byproducts in pits and gas flares resulted not only in massive environmental contamination but also health problems for Indigenous and settler farmer communities (Beristain, Páez Rovira, & Fernández, 2009; Fiske, 2018; Kimerling, 1991, 2006; San Sebastián & Córdoba, 2000; San Sebastián, Armstrong, Córdoba, & Stephens, 2001; San Sebastián & Hurtig, 2004a, 2004b, 2005). It is important to note that because tracking the effects of toxicants in soil, water, air, and bodies over the course of decades is exceptionally difficult, there has been significant controversy surrounding claims of harm to human health under Texaco's operations, including industry-sponsored scientific studies and rebuttals to public health studies (Kelsh, McHugh, & Tomasi, 2008; Kelsh, Morimoto, & Lau, 2009; Sever, 2005). These controversies underscore the limitations of conventional exposure and risk assessment in decades-long environmental disaster.

Thus, the arrival of oil in the Amazon carried with it many familiar colonial tropes. State-sponsored displacement of Indigenous nationalities, the precarious settlement of colonist communities alongside oil operations, and utter lack of industry regulation and adequate health services in the first two decades of operations compounded emerging inequalities in health, wealth, and education in the region. Lago Agrio, the city founded alongside the first well drilled in the

Amazon (reportedly named by Texaco workers after the company's city of origin, Sour Lake, Texas), was located in Cofán territory at the time, an area that was colonized by settler communities who arrived with the oil boom (Cepek, 2012; Cepek, 2018). Following Texaco's exit from Ecuador in 1993, national and foreign oil companies expanded operations, and extraction has become an object of growing political and social controversy. Ecuador introduced its first comprehensive environmental regulations in the 1990s, resulting in new audit practices and increased state involvement in industry operations (Fiske, 2017). In the decades since, Cofán, Sekyoa, Siona, Waorani, and Kichwa nationalities have continued to struggle with entrenched disparities in relation to extractivism (Cielo & Coba, 2018), for territorial rights to land and survival (Riederer, 2019), as well as the right to free, prior, and informed consent to oil operations (Brown, 2019).

In 1993 a group of lawyers launched a lawsuit on behalf of thirty thousand Amazonians against Texaco (*Aguinda v. Texaco*), demanding reparations for environmental, health, and cultural damages. The suit brought unprecedented international attention to the region. In 2011 the court found Chevron (which purchased Texaco in 2001 in a \$45 billion merger) guilty of "gross negligence" and extensive contamination throughout the region, and fined the company \$9.5 billion (Zambrano Lozada, 2011). However, despite the landmark ruling, the case has not yet been brought to a close, in part because Chevron no longer has any holdings in Ecuador. As a result, the *Aguinda* sentence could not be executed in the country. In the years since, the plaintiffs have taken the case to countries such as Argentina and Canada where Chevron has operations, seeking a ruling by a third-party court to claim the financial settlement. Since the 2011 ruling, there has been a lengthy appeals process, including several additional lawsuits (one in which Chevron successfully sued the Ecuadorian state for interference in the *Aguinda* legal process, and brought successful a Racketeer Influenced and Corrupt Organizations Act lawsuit against plaintiff attorney Steven Donziger for fraud in 2014; see also Barrett, 2014). During this period, former President Rafael Correa and the Alianza País party pushed for a post-neoliberal economy that, through the redistribution and continued generation of oil rents, sought to bring the Amazon out of poverty and expand infrastructure and public services. Despite such efforts, the effects of territorial dispossession, continued problems of contamination resulting from ongoing and prior oil production, and socio-economic inequalities have arguably become more acute (Vallejo, Cielo, & García, 2019). In the case of the plaintiffs living in the former Texaco Concession area, the effects of contamination have generated significant public and scientific controversy (Acosta, 2011; Alexander, 2014; Barrett, 2014; Dematteis, 2012); whether or not

the plaintiffs will ultimately be able to collect the settlement for damages occurred remained uncertain at the time of writing this text.

When oil extraction commenced, thousands of colonists headed to Lago Agrio and the surrounding area from Ecuador's southern and highland regions. Settlers followed the newly laid oil access roads in search of land to claim, staking out plots along the road and turning forest into farms. This history has given a particular shape to life in the area. The towns and small cities that have grown up follow the contours of the roads intended to connect oil wells. The logic of oil permeates every aspect of life here. As settlers expanded, they built houses next to wells, platforms, and stations—occupying ancestral territory that was rapidly being exploited by the oil industry. Today, this means that many people have to cross pipelines just to reach their front doors. Others dry their laundry on pipelines, or tie animals to them to graze. In some cases, arriving after waste pits had been covered over with dirt, settlers built houses directly on top of the pits next to wells. Some did not know there was a waste pit below and simply thought they had found a nice, flat space ready for construction; others told me that they did not realize that waste pits were hazardous to their health.

In spite of the ubiquity of fences, security guards, and physical as well as bureaucratic boundaries that demarcate space in the Amazon, it is due to this knotted history of settlement and industrial development that distinctions between industrial and residential spaces are particularly porous here. The proximity of settler and Indigenous communities to unregulated operations during the first decades of oil development exacerbated health and social problems and has had important repercussions for disputes over harm. In legal and scientific forums, boundaries must be drawn to demarcate where industry ends and life begins. Such an exercise has proven difficult in a place where life and oil, like dense jungle vines, have grown together.

In what follows, I draw principally from the accounts of Lidia, one of the first settlers to the region. Her story, on the one hand, represents a singular experience of life in this place. However, while honoring the specifics of her narrative, I also want to point out that her account has much in common with the life histories told to me by her neighbors and even those living further away in region. In her case, the labor to carve a life out of contaminated land has propelled her into broader struggles for justice in the *Aguinda* lawsuit, through which she traveled to the US to share her story with other environmental justice activists and Chevron shareholders. She illustrates the importance of attending to vernacular, intimate,

sensory experiences when tracing the material presences of toxicants. Yet, her story also points us to ways that the colonialist project of state-sponsored settlement displaced Indigenous communities that hunted, fished, and called this territory home, and at the same time, created new forms of as trees were felled, wells were drilled, and settler communities grew. I turn to her story now with the hope of demonstrating the importance of finding ways to accommodate these unrecorded seepages of industrial toxicants and unofficial erasures of lives and land in models of toxicity. Yet, in working with stories of embodied experience of exposures, I do not aim to privilege a more authentic “local” body over numbers, samples, or other forms of evidence of harm. Bodies are also suggestible, and even misleading; most relevant to the discussion here, they are situated. This article seeks to contribute to scholarship that insists on the situatedness of all accounts: from the technical to the experiential, from relative positions of power and proximity to pollution, and from critical histories of colonization, settlement, and extraction. The point of positionality in relation to toxicity is not to insist that boundaries and contours of difference do not exist, but rather to be accountable for the ways in which we draw them in our work, and the consequences they have for peoples’ everyday lives.

Swimming in Oil

“Well, I’m from Loja. And I tell you, I didn’t know anything, didn’t know what petroleum was.” For those settlers who came to Lago Agrio from the southern highlands after ongoing struggles with drought, land crowding, and poverty in the 1970s, the Amazon was a source of wonder. Lidia describes her initial delight at the natural abundance, coupled with a fear of the unknown: “I tell you we came here to see something new, to feel what it was like to live in another world here in our own country...the fauna, the flora, the jungle. There were some huge trees, tremendous trees. And different flowers too.” She goes on to list the size of the fish they could catch even in small streams, and the abundant game of *paujiles*, turkeys, or even a fat *guatusa*.³ This was the divine providence that many, like Lidia, felt was a gift from god, made possible by the invitation of the government and longstanding declaration of these lands as “vacant” and ready to be worked (Wasserstrom & Southgate, 2013). As Jorge Añazco Castillo (2008), a trader who spent years traveling throughout the region and led one of the first groups of settlers to claim land, wrote in his autobiographical account of life in the “Oriente,” “Thus, between drinks, the project of colonization of the *NorOriente* was born, the place where oil had burst forth and there were millions of hectares of vacant lands that would accommodate thousands of *campesinos* who had no land to farm” (p. 131).

Yet they were not alone in this wild. Settling on the ancestral lands of the Cofán nationality north of what is today the bustling city of Lago Agrio, Lidia's family took up land that would soon become the home of a Texaco oil station and multiple wells. And that, she says, is when it all began to change: "After this, the oil started to spill. A substance, black, started spreading. First, the machine would come by, removing the rocks from the roads...and then they'd put down the oil. And everything would be coated." Lidia was describing a common practice of the time called "road oiling." For the first two decades of Texaco operations, crude oil was distributed over dirt roads to keep the dust down. The abundant Amazonian rains made this a sinisterly efficient way for the crude oil to permeate water sources and farmlands. The feet of families like Lidia's were coated in crude as they walked to town, to school, or to their farmland. As Camilo emphasized in the opening of this article, paying attention to the particulars of how crude oil production unfolded in this region, among a population that often went barefoot, begins to illustrate how toxicity is not a scientific "given" as mobilized in the generic models of exposure in Camilo's example. Rather, toxicity is a sociomaterial process that emerges in distinct formations entangled with the particulars of history, place, settler colonialism, scientific knowledges, and political economy.

Early tales of rivers that ran black with crude, waste pits that overflowed and filled streams and swamps downstream, or the many documented and undocumented spills in rivers—often from pipelines—are indicative of the widespread contamination of land, waterways, and air as a result of oil operations in this region. Exposure to chemicals in the water was amplified by the absence of piped water in residents' homes; people relied on rivers for all their basic needs, and ingested toxicants directly through drinking, cooking, and bathing.

For Lidia, these early years of life in the Amazon are riddled with memories of the materiality of oil—how its viscosity changed under the hot sun, how it stuck to skin, impervious to any amount of soap, scrubbing, or swearing. She describes how these corporeal presences and permutations are connected to experiences of illness:

Oil is sticky and, when it was hot out, because the sun is strong here, there was no way to walk because the oil [on the roads] burned your feet. It would cause blisters, all of that. So, that's how things started, first our legs started to hurt, we started to get cramps. And we said to the engineers from Texaco, "Why do you spill oil?" And they said, "No,

no, oil is not harmful. Petroleum is a form of medicine. Petroleum can be used for pain, for pain in your bones, for whatever.” So we were unconcerned, out there swimming in oil.

In the process of conducting fieldwork, I found that Lidia’s account was remarkably similar to other residents in the region who emphasized the settlers’ initial ignorance of the health problems that can result from oil operations. This anecdote of the exchange with Texaco workers was repeated to me frequently throughout research. Lidia and others recounted that Texaco workers told residents at the time that petroleum was good for curing the aches and pains of arthritis, instructing them to place it directly on their joints. Stories like this encapsulate a common view of those in charge of oil operations: at best, they left an ignorant population in the dark, and at worst, they intentionally exposed residents to harmful contamination.

As Lidia tells it, the settlers’ collective ignorance of petroleum’s harmful effects was so great—and their resources to seek out alternatives once they began to experience damages so poor—that when the oil from spills and overflowing waste pits became so thick that it formed a skim floating on the rivers or in the rain buckets, she and others would simply scrape it off and proceed:

No, we weren’t worried because they told us that petroleum wasn’t harmful...We used the water in these streams to wash...for cooking, for drinking, for everything...There was a skim, a thick covering, sometimes two or three centimeters thick, sometimes up to five centimeters thick—a layer that was made out of crude. So that’s why I tell you, it was hard. It was hard, really hard, for us.⁴

Lidia’s words echo in my head after our meetings. Swimming in oil. An apt summary of the lengthy accounts she would tell of her experience in this place. While doubling as a semantic description, there is also a literal truth embedded here, I argue, that is instructive in understanding the material manifestations of toxicity: she and her family have indeed swum, bathed, walked upon, breathed, and ingested the toxic components of oil production over the course of decades. Lidia’s reality—one of memories of pain and struggle, joys and new delights in this place—exceeds any model of “normal” exposure from oil operations. Rather than pathways of exposure, what might we learn from thinking with the explanatory metaphors used by those living alongside extraction? How could an understanding of toxicity based on the premise of bodies submerged, swimming in the toxic substances of their lifeworlds, differently inform political, regulatory, or scientific action? Following Camilo and Lidia, we could begin by questioning

the assumption that everyone wears shoes when walking in “industrial sites,” or that all homes have treated water running through their taps, or that clothes are washed in machines and not by women who are submerged in polluted rivers, in order to better capture the cumulative, layered, kaleidoscopic effects of exposures over decades of life in this place.

Smoke Thick Like Marmalade

Today, close to where she first settled, Lidia lives at the end of a dirt path on the rise of a hill overlooking her grown children’s homes. The road and pipeline form a parallel horizon as she gazes out her front door. Her immediate neighbors are the now state-run oil station on one side and a sherbet-colored hourly motel to the other. She has lived here for over four decades. Over time, the boundaries of her property, the places where she keeps her pigs and grows her cacao, have shifted as various industrial incidents have rendered land unsuitable for planting or raising animals. The soundscape of Lidia’s home is filled with the insistent squawk of chickens and the grunts of her favorite fat sow tethered close to the door. In the background is the constant drone of motors and gas flares from the station. By 6 p.m., the flares flash through the treetops against the lavender light of Amazonian dusk. The noise, in the relative quiet of the evening hours, is amplified. The flares are always lit. Depending on the direction of the wind, the smell of gas is unmistakable.

When I asked Lidia about life next to the gas flares, her story was one of unrelenting adversity. In years prior, a black film coated everything: rooftops, rain barrels, the leaves of planted crops, clothing hung on the line. Sometimes, she notes, this still happens, though not as often. Today, the flare leaves ashy traces that Lidia and her family touch and inadvertently ingest by drinking from water tanks or harvesting crops. The flares emits gasses: sulfur dioxide, hydrogen sulfide, nitrogen dioxide. Present too are other substances: carbon dioxide, methane, ethane, propane, butane, pentane, heptane, carbon monoxide. Although she can never be sure on a given day what combination of chemicals they happen to be surrounded by, Lidia is certain that these gasses sometimes cause headaches that render her and her family unable to work; for others they make eyes red and itchy, throats scratchy, or chests too tight to breathe. Each person’s response is a bit different. The proximity of Lidia’s home to these flares—while exceptional in its assiduous onslaught against their health—is common here.

As we spoke, occasionally Lidia’s adult children would come by to collect their

children, whom she had been watching while they were at work. They would stop to listen, leaning on the doorframe to add any additional details she had neglected. During one visit, one of her sons sat down to describe the debris that would catch fire in the gas flares and fall down on them, like flaming bits of smoldering rain. There were other times too, her son noted, when the oil workers would light the waste pits on fire, and the smoke descended upon them like a thick blanket. He recalled,

They would light the waste pits on fire where they would store the oil.⁵ And the fire would make these terrible columns of smoke. Black, but thick, like when you're making marmalade. And in each part of these columns, you could see this big thick cloud. That's how it was. It would start like that and then within an hour and a half or so, then it would rain. And with the rain, all of this smoke fell over the plants. Stained all the plants, the clothes too if they were outside. Sometimes we weren't at home, and when we got back all of the clothes would be stained black. The plants were bathed in this, it would damage the roofs of the houses and we wouldn't have any water. And in the water tanks that we had started to build would be covered too.

Lidia's son went on to describe how their animals began to lose their fur. For Lidia and her children, the health problems of their numerous dogs were clear signs of what the toxicants were doing their bodies as well. Her son stuck his chin in the direction of one dog who was sleeping in the sun of the courtyard, pointing my attention the mangy patches where much of the fur on the haunches had fallen out: "he went over to the river and was crossing near the station when he went in river...The water was hot, and doubtless had a lot of chemicals in it." The loss of fur, moments of seizure-like shaking, the effects of toxicity on animal counterparts are registered in family histories among overlapping memories of clouds thick with black smoke.

Stories of animals lost to contamination here abound: from cows who gave birth to malformed calves, to chickens who ran around just before dying in a frenetic, fanatical dance after drinking contaminated water. Animals died after drinking water in the rivers and streams; on occasion, they would fall into open waste pits and drown, stuck in the oily slop. Tales of animals lost or injured by oil operations, or those deformed or de-furred after crossing a nearby river, circulate here as evidence of the continuum of human and nonhuman vulnerabilities alongside extraction. The chicken in the yard or the hunting dog on the run becomes a sentinel of the dangers that lurk in the smoke that clouds the horizon, settling around them like the remains of the incinerated waste pits that light up the skies.

A Horrible Smell, and Then *Tsaac!*

Living next to industry places Lidia and her family in relation to toxicants. These are not voluntary relations, rather more along the lines of “chemical kinships” (Agard-Jones, 2016), illustrating the non-linear effects of chemicals on those least equipped to prevent toxicants from penetrating bodily limits (Roberts, 2017b). Exposures in the Amazon are multiple, differentiated, and infrequently recorded when they occur. From the time they arrived in the Amazon, Lidia and other women spent hours washing laundry by hand in the streams nearby. Sitting on the riverbank, partially or completely submerged in the water, women’s bodies were awash in toxicants running with the current. She described countless days when the water changed color to a frothy gray, or when they would arrive at the stream to find an awful stench flowing downstream; contamination from formation waters, crude oil, and other production chemicals ran across their bodies: barium, mercury, arsenic, selenium, antimony, chromium, cadmium, cobalt, lead, manganese, vanadium, and zinc. Formation waters contain many salts and heavy metals, which are highly toxic to humans and can bio-accumulate in fish and other animals. Other radioactive elements, such as strontium 90 or radium 226, flowed in and around them, linking the daily routines of scrubbing laundry to aromatic hydrocarbons of benzene, xylene, and toluene.

It did not take long before people in the area started experiencing health problems. Others living in the areas outside of Lago Agrio told me of skin rashes from bathing in the river, persistent coughs and respiratory problems, miscarriages and malformed infants. For some, ill health began as a vague series of complaints. When they went to the river to bathe, Lidia and others noted, rashes and skin spots would coat the arms, bellies, and backs of their young children.

Lidia’s story is marked by the pain of three miscarriages. Each is remembered in exacting relation to the industrial operations and daily routines at the time, bringing her to tears as she recalls these days decades later:

The first miscarriage was because I crossed the stream. I had been washing [laundry]. I was washing when before we knew it a stain of black oil was floating downstream. And we got out of the water. But since I had left the clothes on the other side, a whole tub of clothes on the other side, I risked crossing the stream. I got wet up to here [indicating the height with her hand] on my legs, covered in oil. The water was floating down with a black layer on top, but underneath the

water was a gray color. It stunk. A horrible smell. And then I started getting dizzy, vomiting, dizziness with vomiting, and then *tsaac!* All of a sudden I had pain in my stomach, pain in my hips, all through the middle of the night.

In another instance, she went on to describe how at just over three months pregnant, she miscarried. Each miscarriage is inextricable from an oil spill, a river crossing, or, in one case, pulling a fallen bull out of a waste pit. The experience of poisoning—from headaches, to vomiting, to the sensation of feeling like she was going crazy from the ensuing pain, to the loss of each child—is permeated with memories of specific industrial events and encounters with toxicants. Moments of agony mark this history of routine oil spills and industrial accidents; these are accounts that have no official traces within legal or scientific reckonings with the history of contamination in this place.

The capacity of toxic substances to transgress boundaries (Tuana, 2008), whether through their accumulation in the fatty tissue of fish to their movement through the air and into our lungs, have other effects as well. Exposures remind us that distinctions between subject and object, human and nonhuman, mother and river, memory and the present, are not fixed. Here, Lidia and her neighbors' bodies were submerged, surrounded, and infiltrated by industrial contaminants while working and bathing in the river. This capacity for toxic particles to affect us, as Chen (2012) suggests, involves the shifting relations of both *affect* and being *affected* that are central to the experience of being exposed to a chemical. This is the "viscous porosity of flesh" (Tuana, 2008, p. 199); those moments when we are made sick by toxic substances that remind us of the ways that we are in and of the world. Such porosity, in the words of Simmons (2017), "becomes a site of potential, exposure, and entanglement all at once, questioning the stability of our worlds, human and nonhuman." Here, there is no way to extract the bodily memories of loss, pain, and agony from the industrial register of this place.

Once, I asked Lidia if she had ever considered leaving the home she had made in the Amazon. This was a question that I dreaded asking, for it smacked of the convenience of the transient, foreign researcher who presumed that one could simply pack life into a bag and move away from adversity. Yet when I asked, Lidia and others interlocutors always answered with a definitive no: some stated that they were proud of the lives they had carved out of nothing; others stated that they felt that god had chosen this place for them and they would persevere; others told me that it would be far too difficult to move. "Where would I go?" one man asked me rhetorically, telling me how some twenty years prior he and his

family had moved to their current farm in an effort to escape the contamination they were facing in a different community—only to find that the contamination, struggles with oil in their well, and health problems followed them with dogged insistence. For many of the settlers living here, their livelihoods and financial resources are tied up in their farms; some families only had one person making a salary of \$400 per month, others had to sell farm animals when medical emergencies came up. Economic constraints, as well as personal feelings of attachment, a devout resolution in the face of adversity, or even resignation to life's course, led families to stay.

The complexity of settler relations to the place—often informed by feelings of initial audacity they recalled when setting off to colonize the Amazon—both made it difficult to leave and underlined the burdens of working poor farmers occupying the region. The lived knowledge they now possessed of the difficulty of life alongside an industry whose effects they had not previously contemplated had opened their eyes to exposure but had left them no better protected in its wake. To be naked in the face of contamination, after all these years, is not contingent on a lack of knowledge of the potential risks like when they first arrived, but rather the social, material, historical conditions that make some more vulnerable than others. While Lidia makes different choices today than when she first moved to the Amazon based on her accumulated knowledge and experience alongside oil extraction, the principal health risks to her and her family remain unavoidable as they farm and eat vegetables grown in contaminated land, bathe and wash clothes in contaminated rivers, or breathe poisonous gases from the flares next door. Avoiding toxic exposures altogether is not possible.

The examples offered by Lidia, her son, and other residents illustrate how difficult it is to encapsulate exposure as a bounded moment; these are accounts that center on the permeability of bodies, rivers, houses, and animal kin to chemical agents. Toxicants flow around Lidia and her family in the water and the air; the flash of pain in her womb and *tšaac!* refracts the lived burden of chemical onslaught through moments of loss. If, following Mol (2002), “to be is to be related” (p. 54), then to live here is to live in relation to industry.

Conclusions: Ecuador's Polluted Kid

Sitting on the side of the road, the bare feet of “Ecuador's polluted kid” in the PowerPoint image illustrate the differential ways that individuals are exposed to industrial chemicals in the Amazon. In contrast to traditional models of risk assessment that involve “pathways” of exposure, what we see from Lidia's life history is that toxic exposure cannot be isolated from the place and history in

which it occurs. This is not only a matter of differentiating chronic, long-term exposures from acute chemical intoxications, nor of asserting that there are multiple variables at play. Rather, in order to understand the nature of exposure in the Amazon, we must also consider how settlement and oil extraction unfolded together such that homes were built in close proximity to wells and flares while displacing Indigenous inhabitants from ancestral territory; how backyards today have come to include waste pits; how habitual movements such as walking to school meant traversing slicked roads and oil pipelines; how memories of washing laundry are filtered through the pain of miscarriages; or how poverty means that some families continue to drink unsafe well water today.

Reflecting on these relations as toxic becomings (Chen, 2012; Tuana, 2008), scholars and activists have seized the moment to contemplate new possibilities for figuring toxicity: "Between the rising tides and chemical burns, our bodies are stew pots cooking up a new form of posthuman politics with new forms of posthuman corporealities" (Povinelli, 2017, p. 509). What emerges in this process is that current models of toxicity employed in regulatory science and law are insufficient for conceptualizing and acting upon the role of toxicants in our lives.

Drawing on scholarship that has insisted on the spatially and temporally specific nature of toxicity, I read Lidia's account as a call to recognize the plurality of ways of knowing the toxicants in the worlds in which we live. Thinking with Tuck and Yang's (2012) argument on decolonization, the deconstruction of models of exposure that marginalize and maintain the status quo cannot occur in abstract or metaphorical terms; advancing more nuanced concepts of toxicity is both a material and epistemological struggle over the relationship between knowledge, power, and struggles for justice. The continued insistence on defining the effects of toxicity through techno-scientific, mechanistic chemical pathways and market-oriented understandings of risk is another space through which the experiences, suffering, and struggles of communities affected by industrial toxicants have been repeatedly marginalized. Reframing toxicity prompts us to ask questions of whose bodies are visible, valued, or imagined as "toxic," as well as who is able to speak from and within geopolitical centers of knowledge production.

Far from insisting that vernacular knowledge demonstrate equivalence with modern sciences, this article has explored how experiences of toxic exposures are tied up in histories of extraction and inequality. Understanding exposure requires appreciating how history and inequality are woven into the very fabric of toxicity, yet often ignored or rationalized in official determinations. Given the tangled

relations of toxic exposures illustrated in the accounts of someone like Lidia, or the contrasts of ways of understanding those exposures presented by Camilo, we must be more attentive to the epistemic limits of tools for accounting for the harm resulting from oil. Attending to everyday experience can point us to those places where our assumptions cause us to miss vital elements of toxicity. How is exposure minimized, for instance, if we assume that exposed subjects all wear shoes? What are the cumulative effects of consuming plant and animal products that were grown and fed with contaminated water sources? Or where washing the laundry means one's body is completely submerged in chemicals?

In seeking to move towards a more expansive concept of toxicity, it is time to ask what we might learn from the explanatory metaphors used by those living alongside extraction: How could an understanding of toxicity, based on the premise of bodies submerged and swimming in the toxic substances of their lifeworlds, differently inform political, regulatory, or scientific action? All our means of assessment—legal, technoscientific, or anthropological—must attend to the ways that poverty, history, and profit are woven into the relations of who is exposed to toxic substances, and how certain relations are rationalized through distinctions between what is natural, cultural, technological, or material (Tuana, 2008). Toxicity must be refigured—not as a property of chemicals alone—but as emerging within particular relations between people and places that hinge on everyday experience.

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Notes

¹ All names and identifying features have been changed.

² His words in Spanish were, "la gente aquí está mucho más desnuda frente a la contaminación."

³ A *paujil* is a curassow, and *guatusa* is an agouti.

⁴ For similar accounts among the Cofán people of Dureno, see Cepek 2018.

⁵ Lighting waste pits on fire was a means of emptying the pits when they became too full and was reportedly common practice from the 1970s to 2000. Burning pits is not permitted under current regulations.

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