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LIKE OIL AND WATER: FRACKING, GROUNDWATER, AND RACIALIZED LANDSCAPES IN CALIFORNIA'S SAN JOAQUIN VALLEY

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Abstract

Like Oil and Water: Fracking, Groundwater, and Racialized Landscapes in California's San Joaquin Valley

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California's arid San Joaquin Valley was once inundated by lakes and wetlands. Through settler colonial and racial capitalist formations of contamination and private property, a range of canals and aqueducts drained those lakes in the late nineteenth century. Now, the Valley's air and water are contaminated by pesticides, nitrates, and hydrocarbons from oil extraction and large-scale agriculture. Building from archival research and participant observation with environmental justice activists, I trace the emergence of contamination as a material-discursive formation that shifts through time and space. This approach brings together settler colonial, racial capitalist, and feminist science studies in order to trace both the impacts of racial logics on environments, and the consistent re-articulation of those racial logics *through* environmental projects. Hydraulic infrastructure, then, was not only an economic project but functioned within a larger logic of contamination that further articulated racial formations and settler sovereignty claims. Yet chemical contamination can also induce responses, intimacies, and collectivities in powerful ways; environmental justice activists consistently highlight the intimacies, relationships, and futurities that propel them. I trace two related themes: (a) the production of knowledge and doubt, and (b) the production of racialized landscapes of disposability or value, within US imperial and settler colonial formations. Ultimately, I argue that a critical analytic of

contamination can trace how racial categories are ecologically produced and reconfigured, not only through differential relationships to land, but through changes in the land itself. Further, rather than assuming that with enough data or knowledge, justice can be served through the state apparatus, I show that attending to what is produced as unknown opens a frame to go beyond asking for a more responsible or reliable account of what is or was, toward purposefully asking what could have been or what could be.

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Introduction

> In 1907, during the night, high winds caused large waves to batter a breach in the six-mile long east levee. The lake was filled to capacity which caused a huge rush of water to spill out into the eighteen square miles of crops planted in the reclaimed land of the old Kern Lake bed. Three to four hundred men fought to close the breach in the dike for two days, even hastily building another dike four feet high by four miles long in their struggle to stop the inundation upon the homes, barns, farm equipment, and fields of ripe grain. Every attempt failed to stop the flood before it could wash out the newly built Sunset Railroad along the top of the levee. (Lynch 2009, 4–5)

> Hundreds of men and teams were rushed to the scene to dig ditches, build dams across gulleys and scrape reservoirs in the earth to catch and hold the oil…Finally after some months of effort, when the well was largely cleared of sand and the upward force of the oil was less, an embankment was built about the gusher with sacks of sand and earth to a height of twenty or thirty feet, thus confining the oil over the mouth of the well and forming a cushion against which the big, black geyser could beat. By that time every vestige of the derrick was gone, and the well looked like an inky fountain playing in an inky pool. Meantime, down on the flat a half mile or farther away, lakes of oil were accumulating. By September 5,000,000 barrels of oil had been stored in these makeshift reservoirs. The seepage was great, and the evaporation was greater, and the danger of accidental fire turning the whole into a flood of flame to go farther down the valley was the greatest anxiety of all. (Morgan 1914, 142)

The Lakeview Gusher and Buena Vista Lake, only about 10 miles from each other as the crow flies, are central sites of two of the largest infrastructural projects—and infrastructural failures—of the San Joaquin Valley at the turn of the twentieth century. I begin with these examples because they highlight the two liquids that animate colonial infrastructure in the San Joaquin Valley, the work of managing them, and the inevitable failures and excesses of those colonial infrastructures.

Part of what would become Chevron's oil fields on the Valley's west side, the Lakeview Gusher blew in 1910 and, over the next eighteen months, formed one of the largest accidental oil breaches in California history. Workers worked day and night in "suffocating gas and drenching oil" to constrain the rivers of oil coming from the Gusher (Morgan 1914, 142) before it contaminated nearby Buena Vista Lake, for which the Gusher was named.

Buena Vista Lake, in turn, was named for the *buena vista* of wetlands, shimmering water, and tule reeds that Pedro Fages described when he entered the Valley in 1772 looking for deserters from the Spanish army. In 1889, settlers re-shaped Buena Vista Lake and its surrounding sloughs and wetlands into a reservoir for water storage and flood control, resulting in "the largest artificial reservoir-irrigation complex in the United States at that time" (Lynch 2009, 5). In 1907, just three years before the Lakeview Gusher blew, Buena Vista Lake overflowed its own levee and flooded the farmland that its earlier draining and re-shaping had produced.

Beyond their geographic proximity, these two overflows also point to the broader relationships between oil and water. These two liquids undergirded the production of the contemporary San Joaquin Valley's ecology and economy in the nineteenth and twentieth centuries, and they continue to connect the Valley to global flows of capital and carbon. Now, Buena Vista Lake's eponymous wetlands no longer exist there, nor does the version of Buena Vista Lake after which the Lakeview

Gusher was named.[1] The Gusher itself ran dry within the year and has since been filled in, leaving only remnants of oil-soaked sandbags, scattered wooden supports, and a historic marker.

In the San Joaquin Valley, as much as oil and water are ostensibly separated, there is much more to connect them. It is still as easy to talk about lakes and rivers of oil as of water, and both are often ephemeral, contingent, and produced. Water is co-mingled with oil in the deepest formations, but in fracking operations, water—often as steam—is also intentionally used to fracture rock formations and to lubricate the oil within them. Afterward, they are separated again; the oil is refined and the water is redirected to grow crops, valuable as "produced water" in the water-scarce region (Cart 2015; Onishi 2014). Oil not only escapes in oil field accidents but has also always seeped to the surface in pools and channels. Meanwhile, in the hydrologically over-allocated San Joaquin Valley, groundwater is often more important than surface water. Both are expensive and deeply in demand, and drill rigs put enormous effort into pumping both up from below.

This dissertation begins from the relationship between oil and water in the San Joaquin Valley, and the ways they are separated or combined, to investigate the production of the contemporary San Joaquin Valley through colonial modes of oil and water infrastructure and management—and their failures. Through archival research and collaborative ethnographic engagements with community-led environmental

[1] Buena Vista Lake has undergone several remakings; today, the Buena Vista Aquatic Recreation Area comprises two different lakes: Lake Evans and Lake Webb.

justice groups, I connect contemporary evidence about groundwater contamination to racialized understandings of contamination as the San Joaquin Valley was remade from a series of inland lakes into investible agricultural property in the nineteenth century. These dynamics also produced the San Joaquin Valley as a site of systematic economic disinvestment and as a sink for the contaminants from large-scale agriculture and oil extraction that requires the exploitation of migratory and racialized labor including workers of Japanese, Filipino, Chinese, California Native, and Mexican descent. Today, these groups are also disproportionately exposed to air and water contamination, which I argue can be seen as racism at the level of the body in material-discursive ways.

Although policymakers and the public generally accept the urgency of surface and groundwater contamination, attempted solutions often focus on technological solutions, maintain the primacy of property rights and capital accumulation, and reduce the racial and colonial histories of contamination to the flattened category of "disadvantaged communities."[2] Meanwhile, however, small San Joaquin Valley communities such as Arvin and Shafter have been organizing for decades for cleaner air and water, often using strategies forged in the United Farm Workers' decades of labor and environmental organizing (Aguirre 2021). Their work centers relationships, leadership development, and community building, and points to a historical analysis of race, labor, and property within contemporary environmental contamination. I

[2] The term "disadvantaged communities" is used in the 2014 Sustainable Groundwater Management Act (SGMA).

argue that understanding the infrastructures through which oil and water are managed and come to have meaning requires understanding the work of settler colonialism and racial capitalism in producing the contemporary landscapes of the San Joaquin Valley.

While regulatory agencies often dismiss residents' lived experiences of contamination, I draw on collaborative fieldwork and feminist and critical race scholarship to trace how, and on what terms, federal scientists, community activists, and industry produce evidence about contamination and its migration. For instance, while Valley-wide air monitors have trouble distinguishing the hyper-local effects of oil wells next to schools or homes, organizers and residents have trained their smell and vision to measure contamination at much higher resolution. "Besides," one organizer told me, "We still have to breathe in either way." This scientific evidence production, embedded as it is in discourses around oil and water, their mixture, and separation, is deeply politicized, and I trace some of these valences in the chapters that follow.

Yet articulations of whether water and oil combine in particular formations, under particular conditions, and whether those combinations should be considered contamination, are also articulations of larger claims about belonging and normative

values.[3] Therefore, I consider infrastructures to be not only material but also legal, affective, and intellectual. In this sense they are material-discursive, by which I don't simply mean that they are simultaneously material *and* discursive, but rather are co-constitutively faceted, as further discussed below. I address oil field machinery and aqueducts, modes of knowledge production, forms of memory, and senses of belonging as facets of material-discursive infrastructures.

In looking at oil and water, their management, and the failures of that management, I engage contamination as an analytic. This entails not assuming that contamination is a stable fact or self-obvious process; to the contrary, understandings of contamination and its meanings have shifted profoundly through the last few centuries. Instead, I trace the emergence of contamination as a material-discursive formation that shifts through time and space. This approach brings together settler colonial, racial capitalist, and feminist science studies in order to trace both the impacts of racial logics on environments, and the consistent re-articulation of those racial logics *through* environmental projects.

In what follows, I give a brief context for the San Joaquin Valley, describe my methods and methodological approach, and then expand on my approach to

[3] For instance, as she works through what it means to consider oil as kin in the aftermath of the Husky oil spill in the North Saskatchewan River, Zoe Todd asserts that "these oily materials are not, in and of themselves, violent or dangerous. Rather, the ways that they are weaponised through petro-capitalist extraction and production turn them into settler-colonial-industrial-capitalist contaminants and pollutants" (Todd 2017, 107).

knowledge and unknowing and orientation to contamination as a material-discursive formation. Finally, I sketch the trajectory of the dissertation.

Regional Context

This dissertation is situated in and around the city of Bakersfield and the surrounding small towns, such as Arvin, Shafter, and Delano. Bakersfield is an urban center at the far south end of the San Joaquin Valley, just east of I-5 before it climbs over the Tehachapi mountains to Los Angeles. The San Joaquin Valley refers to the southern portion of California's Central Valley, south of the Sacramento-San Joaquin Delta. It is drained by the San Joaquin River and is surrounded by the Tehachapi mountains to the south, the Diablo and Temblor ranges to the west, and the Sierras to the east.

Historically, much of the San Joaquin Valley was covered in wetlands and inland lakes. It was originally home to the Yokuts, a group of about fifty dialect groups who lived along the waterways that flowed from the Sierras into what historically was Tulare Lake (Tule River Tribe 2018). Today, the descendants of the Yokuts from around Bakersfield, along with others who were brought to the Fort Tejon Reservation, are now part of the Tule River Indian Tribe, a federally recognized tribe with land located in the Sierra Nevada to the east of Fresno.[4] As I expand further in Chapter 1, these wetlands were dried and the surrounding arid lands were irrigated by a series of hydraulic projects in the late nineteenth century that

[4] The Tribe is currently engaged in a settlement negotiation process with the United States to build a storage dam and confirm their water rights under federal law.

produced an expanse of irrigable agricultural land and privatized land into property owned by white settlers.

Today, the San Joaquin Valley is home to one of the most intensive agricultural economies in the nation; the Central Valley (both the San Joaquin and Sacramento Valleys) produces twenty five percent of the nation's food supply on one percent of the nation's land (Galloway and Riley 1999). In addition, the southern San Joaquin Valley is dominated by oil extraction. When oil was found in what would become the Kern River Oil Field in 1899, it catalyzed a major boom in oil exploration around Kern County. Today, major oil fields extend around the Kern River; to the west of the small town of Lost Hills; and surround the towns of Taft, McKittrick, and Buttonwillow in the hills on the west side of the Valley, where the Lakeview Gusher blew in 1910.

These intensive industries have also made the San Joaquin Valley one of the poorest and most polluted areas in California, described as a site of "poverty amidst prosperity" (P. Martin and Taylor 1998). The Valley's economy relies on the exploitation of immigrant farm workers (Pulido 1996; London et al. 2011), who live and work in close proximity to the toxicities of both intensive agriculture and oil extraction (Harrison 2006; Garoupa White 2016). In 2021 Bakersfield had the highest year-round particle pollution (American Lung Association 2021), and many residents have high rates of asthma and other respiratory ailments (Ngo et al. 2010), leading many environmental justice groups to focus on air quality specifically (Garoupa White 2016). Latinx communities, the predominant population in the San Joaquin

Valley, experience disproportionate exposure to health and environmental hazards, as has been well-documented by scholars in the last 10 years (Huang and London 2012; London, Sze, and Lievanos 2008).

Surface water is also far overallocated; in increasingly common drought years, groundwater is used to make up water budgets, leading to extreme groundwater overdraft. Parts of the San Joaquin Valley have subsided up to thirty-five feet over the last hundred years, forming what scientists at the US Geological Survey (USGS) have called "one of the single largest alterations of the land surface attributed to humankind" (Galloway and Riley 1999, 23). Groundwater is also often contaminated with pollutants such as nitrates, pesticides, and hydrocarbons, though the exact contaminants depend on location (Schoups et al. 2005; Burow, Shelton, and Dubrovsky 2008; Burow et al. 2013; Gillespie et al. 2019; State Water Resources Control Board 2019).

In response, communities have long organized against this range of toxicities and disproportionate exposure. The UFW was one of the earliest movements toward not only economic justice but also environmental justice (Pulido 1996); now, building from their work, there is a network of community groups and nonprofits who work on a range of environmental and community-empowerment issues (Garoupa White 2016; Cole and Foster 2001; Harrison 2011; Aguirre 2021; Underhill and Esparza 2021). Nonprofits such as the Center on Race, Poverty, and the Environment (CRPE); the Central California Environmental Justice Network (CCEJN); the Central Valley Air Quality (CVAQ) Coalition; and the Community Water Center (CWC), among others,

form a network across the San Joaquin Valley that work in coalition with community groups, such as CBA; the Committee for a Better Shafter; Comite Civico del Valle, and many others, which I describe in more detail in this dissertation.

Methods

The core of this dissertation is based on almost two years of participant observation with environmental justice activists around Bakersfield. I attended community meetings, planning sessions, celebrations, and County and City hearings. I also conducted almost twenty-five semi-structured interviews during this time with residents, nonprofit staff, independent activists, regulators, oil proponents, and environmental scientists. These relationships have since developed into collaborations, and this dissertation also emerges from the collaborative work we did together after my formal participant-observation and interviews were over.[5]

I was first introduced to the Valley through a collaboration with FracTracker, a national organization that uses data and GIS mapping to track the impacts and effects of fracking nationwide. I participated as they, in collaboration with CCEJN and EarthJustice, another nationwide environmental justice group, filmed oil and gas sites with a FLIR (Forward-Looking Infrared Camera), further elaborated in Chapter 2. On a subsequent call with CCEJN, I met Dr. Rosanna Esparza, a clinical

[5] For example, for the last year I have worked with many of the San Joaquin Valley's environmental justice leaders representing organizations including CVAQ, CCEJN, and CRPE on public art approaches to environmental justice issues, funded by the Mural Arts Initiative of Philadelphia. Our work will culminate in a series of "toxic tours" and public events in 2022.

gerontologist and environmental justice organizer, who became my closest collaborator and mentor. As our friendship deepened, she invited me to meetings and introduced me to her network of collaborators.

My approach to participant observation was primarily guided by Indigenous feminist theory on the relationality involved in research and knowledge production. For instance, Kim TallBear's description of research as not speaking on behalf of, but rather "standing with" others, helped me open a sense of research as based in building relationships, "an opportunity for conversation and sharing of knowledge" (TallBear 2014, 2). Similarly, I worked with Eve Tuck's formulation of "desire-based research," which proceeds from the presumption of complex personhood within and across communities. Further, as Tuck writes, "Desire, yes, accounts for the loss and despair, but also the hope, the visions, the wisdom of lived lives and communities" (Tuck 2009, 417). This attention to not only loss or environmental harm but also wisdom, hope, and collective vision came to deeply inform my research process. A research process that prioritizes relationship-building over specific outcomes requires room for each facet of our histories, perspectives, and personalities, rather than flattening each other into differentially positioned subjects of the environmental harms that we had been drawn together to document.[6]

Thinking carefully about the nature of these relationships was also crucial. I am a white academic who comes from and still lives within marked environmental

[6] This line of thinking is further expanded in Underhill and Esparza (2021).

privilege in relation to the "riskscapes" (Morello-Frosch, Pastor, and Sadd 2001) that Kern County residents and activists experience. These differences in access, economic stability, education, racial privilege, and environmental exposure framed every interaction I had in the Valley in both explicit and implicit ways. Therefore, I developed a research plan that would account for some of these differences while neither centering nor ignoring them. I don't claim to describe the experience of living in proximity to environmental hazards, nor do I aim to produce a totalizing description of their practices per se. Instead, I aimed to produce a project that worked with and alongside the insights of my collaborators toward environmental justice goals. Kern County's environmental justice activism has a strong history of working in collaboration with academic researchers (e.g., Richter 2018; Saxton 2015; Garoupa White 2016; London et al. 2011). Building on that legacy, I conceptualized my presence as offering the tools of academic research and access, finding ways to contribute to their work, and learning from their wisdom about the tools and methods necessary to combat environmental injustice.

I expanded this ethnographic work with archival research at the Huntington Library and the Kern County Library's archives. I further worked with sources from local Native historians where possible, including one book written in collaboration with the Tule River Indian Tribe (Frank and Goldberg 2011). However, the status of these primary archives as settler archives is a central limitation of this dissertation.

In both my archival research and ethnographic research, I traced two related themes: (a) the production of knowledge and doubt, and (b) the production of

racialized landscapes of disposability or value, within US imperial and settler colonial formations. I aimed to both study the dynamics of power that structure (often scientific) knowledge production or its impossibility and make claims that are useful in struggles for justice. By observing the practices of environmental justice activists and the impossibilities of data collection for industries whose impacts have been made invisible (S. Wylie 2018), I aimed to study the conditions of possibility within US settler colonialism and imperialism for both the production of racialized landscapes of disposability or value, and the production of doubt and unknowing. In what follows I expand on these two threads: first, feminist and critical race theorizations of knowledge and objectivity, and second, literature within racial capitalist, settler colonial, and feminist thought that brings together a critical orientation to contamination.

Feminist Science Studies and Objectivity

Feminist science studies has long offered robust ways of retheorizing objectivity to make it more accountable to feminist, antiracist, and anticolonial struggles—as opposed to refusing it altogether. For instance, Donna Haraway's influential frame of "situated knowledges" argues that a more responsible and accountable form of objectivity requires taking into account the situatedness of our knowledge (Haraway 1988). The absence of attention to this situatedness is not only an absence, but a productive one that becomes materially meaningful in how scientific projects approach their work and what results they can produce. Haraway, and other feminist science studies scholars, are interested in "enforceable, reliable

accounts of things," beyond social constructivist or feminist empiricist models, with which to engage or oppose "hierarchical and positivist orderings of what can count as knowledge" (Haraway 1988, 580; Harding 1986; Barad 1996; Longino 1987; Keller 1982).

Haraway's writing is in some ways as apropos of the present as it is of the late 1980s, when she wrote "Situated Knowledges" in response to Sandra Harding's (1986) *The Science Question in Feminism.*[7] The central paragraph of her text is worth quoting at length:

> So, I think my problem, and "our" problem, is how to have simultaneously an account of radical historical contingency for all knowledge claims and knowing subjects, a critical practice for recognizing our own "semiotic technologies" for making meanings, and a no-nonsense commitment to faithful accounts of a "real" world, one that can be partially shared and that is friendly to earthwide projects of finite freedom, adequate material abundance, modest meaning in suffering, and limited happiness. (Haraway 1988, 579)

In this passage, she identifies an overarching similarity between "radical constructivism" and "feminist critical empiricism" (Haraway 1988, 188),[8] arguing that, in opposing the totalizing positivitism of classic approaches to science, both social constructivism and the feminist empiricism also put forward totalizing frameworks in that they aim to find overarching definitions of objectivity. Haraway

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[7] Harding then wrote *Whose Science? Whose Knowledge?* (1991), in large part, in response to Haraway (Barad, personal communication, October 31 2021). While I focus on one passage from Haraway here, other important contributions include Helen Longino's (1990) *Science as Social Knowledge* and Evelyn Fox Keller's (1985) work on gender and science.

[8] Though Harding's feminist standpoint theory and Longino's feminist empiricism are distinct, Haraway refers to both as "feminist critical empiricism," which she contrasts with the "radical constructivism" of the social studies of science.

moves, instead, toward partiality and situated knowledges: working against the essentialism of identity within some versions of standpoint theory, she argues that we all are split and contradictory subjects, and the knowing self is also always partial and embodied, dependent on specific prosthesis and partial translation.

Haraway then proposes a return to the metaphor of vision to think about objectivity—not through the "god's-eye view" of traditional scientific objectivity, but rather the embodied and material nature of all vision, which requires elaborate material and semiotic apparatuses for seeing and is strongly constrained by positioning. For Haraway, objectivity is premised on the partiality of all connections and knowledge claims. In refusing the temptations of simple, rational, god's eye view objectivity, she turns instead to contradictory, multiply formed experience as more reliable.

Karen Barad's work has also had major implications for feminist theories of objectivity. Within their framework, agential realism, scientific practices do not reveal pre-existing reality; rather, they, like all practices, are intra-actions which participate in the world's differential becoming. In that sense, they are part of an ontological inseparability between the observer and the observed, or the subject and the object of knowledge. This is a formulation that fundamentally destabilizes traditional notions of objectivity (as within classical physics) premised on a complete separation between observer and observed.

For Barad, objectivity is based instead on accounting for agential separability, which is always contingent and in flux. In consonance with Haraway, objectivity for

Barad becomes about accountability and response-ability: it "requires an accounting of the constitutive practices in the fullness of their materialities, including the enactment of boundaries and exclusions, the production of phenomena in their sedimenting historiality, and the ongoing reconfiguring of the space of possibilities for future enactments" (Barad 2007, 391).

Their work suggests the implications of scientific work beyond the positivist frameworks in which they are often expressed: though scientific questions tend to be framed around simply describing the real (what is), they play an active role in framing the speculative and the historical (what can be, could have been, might have been.) Objectivity is not about separating the political or the ethical from the scientific, which is an impossible task anyway, but rather about being accountable to what comes into being, and the conditions of possibility for what *can* be. This is a fully material-discursive form of objectivity: it means not only attending to "correct" scientific practice, but rather, requires accounting for the full apparatus in which phenomena are produced and investigate. How does one account for the historical forces that in part shape how entanglements happen?

These theorizations of objectivity as a material-discursive formation are crucially necessary for understanding the different forms of knowledge that are produced about contamination. They help us see that it is not that *all* claims to knowledge are equally valid, but rather that we must evaluate every approach not only in terms of the specific scientific methods used, but also the formations of power and of historicity in which they are undertaken. Working with objectivity, then, as

accounting for the full apparatus in which phenomena are produced and investigated, helps us address not only the explicitly "scientific" aspects of knowledge production, but also accounting for the historical forces that in part shape how entanglements happen.

Building on these theorizations, this dissertation emphasizes the absences and impossibilities of knowledge. Therefore, it offers an opportunity to theorize feminist approaches to objectivity in the realm of those absences: not only what and how we know, but also what we *don't* or can't know, and why. Feminist science studies has long shown that traditional scientific objectivity is not a possibility, instead emphasizing the productive power of knowledge and the effects it produces. Building on that tradition, theorists have also engaged the constitutive absences within archival and scientific knowledge, the ways in which affirmations can simultaneously be disavowals, and the potentials for deconstructive, speculative, and fictional methods to open different kinds of questions that destabilize dominant regimes of truth (Byrd 2015; Murphy 2006; Benjamin 2016b; S. Hartman 2006; Benjamin 2016a; Andrews 2015).[9] Though at first glance Murphy's "regimes of imperceptibility," or Jodi Byrd's "colonial agnosia," both of which I engage in this text, might appear to be discursive descriptions, I argue here that they are also fundamentally material-discursive formations in line with feminist theorizations of objectivity. I return in the Conclusion to these questions of the material-discursivity of objectivity.

[9] I expand a genealogy of the coloniality of unknowings in Chapter 3.

For instance, Barad's emphasis on the politics of in/determinacy—in which the slash suggests the acts of cutting together-apart required for making particular aspects of particular phenomena determinate—speaks to how scientific knowledge practices create temporal matrices that write out other histories. These intra-actions impact what is possible—or impossible—to know.[10] In Byrd's formulation of colonial agnosia, similarly, the production of ignorance is never only a discursive happening, but is fundamental to the propagation of colonial worlds and histories. Even as emptiness or nothingness often seem powerfully static, active and ongoing work of erasure and elimination are required to make it so. In the San Joaquin Valley, the immense amount of work put into hydraulic engineering, monuments like the Discovery Well or the West Kern Oil Museum, and the ongoing quotidian practices of regulatory oversight are all part of this production of ignorance.

As I show, a material-discursive approach to contamination provides the foundation for research that is capable of asking after the lack of scientific detail, incomplete datasets, or research questions that obfuscate conclusions—but does not stop there. Rather than assuming that with enough data or knowledge, justice can be served through the state apparatus, it allows us to ask after what happens when the

[10] As one example, in "Troubling Time/s and Ecologies of Nothingness: On the Im/Possibilities of Living and Dying in the Void" (Barad 2017), Barad uses quantum field theory to think about the present absence of colonial erasures. Barad notes that the logic of terra nullius, central to imperial projects of land occupation, is premised on larger logics of the void. Though the void often symbolizes the erasures and constitutive absences of the modern world, in quantum field theory, the void is not empty, but rather full of indeterminacies. It is in fact a lively space: "filled with all possible indeterminate yearnings of time-being…the vacuum is filled with the indeterminate murmurings of all possible sounds: it is a speaking silence" (Barad 2017, 25).

colonial and racial histories of worldmaking that lead up to what Jodi Byrd calls "the vanishing history of the present moment" are resolved into singular statements of truth. It opens a frame to go beyond asking for a more responsible or reliable account of what is or was, toward purposefully asking what could have been or what could be.

A Critical Orientation to Contamination

Environmental justice scholarship has importantly documented the disproportionate exposure of low-income communities and communities of color to toxicity and contamination. However, an approach that exclusively sets out to document this disproportionate exposure can stabilize categories of race and class as pre-existing and fixed, rather than historically co-produced.[11] More recent environmental justice literatures have instead argued that we must see current environmental racism in historical context as the product of racist land use and planning and have argued for rigorous theorizations of race beyond policy-oriented definitions (Pulido 1996; Pellow 2016). As these scholars point out, race and racism are not static but rather are consistently in circulation and reproduction, in tandem with shifting geographies of environmental pollution. Therefore, one of the goals of this dissertation has been to theorize the role of hydraulic engineering and environmental change in racialization, and vice versa: the role of racial logics in the production of white settler ecologies. As I show, an attention to contamination as a material-discursive formation helps us think about race and racialization as produced

[11] Laura Pulido importantly articulated these concerns in her 1996 paper "A Critical Review of the Methodologies of Environmental Racism Research."

in and through their consistent circulation and reproduction with environmental projects.

Discourses of contamination have long been used to frame racialized and queered migrants as threatening to the white heterosexual body and nation (Chen 2011). Meanwhile, for groundwater hydrology, "contaminant migration" registers the movement of toxins along pre-existing groundwater flow paths. Yet today, San Joaquin Valley environmental justice organizers rely on understandings of contamination to articulate the disproportionate chemical exposures of predominantly Latinx farmworkers. These multiple meanings—as well as the fact that understandings of contamination have profoundly shifted over time—call for a closer attention to what we mean by contamination itself.

Rather than signaling simple mixing or combination, contamination implies the stability of a "pure" something that requires protection against potential invasion or incursion. Therefore, we can also ask how something is *made* contaminable or contaminating. What emerges as requiring protection from the outside world, and what emerges as—by its very presence—potentially harmful to what it meets? In other words, contamination is not only a set of discourses (whether in the realm of public health, environmental justice, or racial purity), and not only the literal accumulation of toxins within water, sediment, and bodies. Instead, I argue that contamination can be seen as a material-discursive analytic that shows how racial logics, colonial dispossession, and settler understandings of land as waste or valuable co-produce each other.

By material-discursive, I don't simply mean that contamination can be seen to work both materially (at the level of chemicals and bodies) and discursively (at the level of ideas) —a distinction which can be deconstructed even when considering chemicals, bodies, or ideas. Instead, I draw on feminist science studies scholar Karen Barad's (2007) description of material-discursivity to emphasize that the "material" and the "discursive" are themselves intra-actively co-constituted. In this context, I attend to the material-discursive ways in which lands, peoples, and objects have been produced as contaminated or contaminating in co-constitutive and shifting ways.

I attend not only to material-discursive shifts in contamination, but further, how a *logic* of contamination—in which the border between pure and contaminating must be repetitively maintained—has functioned in the co-constitution of racial thinking and the San Joaquin Valley's ecological present. I track how this racialized sense of bordered purity moves and evolves through land and people over time. This approach draws together critical Indigenous studies' emphasis on colonial land dispossession, racial capitalist theorizations of racial difference, and feminist and queer scholarship on material-discursivity and performativity.

Racial Capitalist and Settler Colonial Approaches to Land

The framework of racial capitalism describes how populations are stratified to produce differentially exploitable work forces, locating race as a product of the racial capitalist state rather than a static category (Robinson 1983). In its relentless search for accumulation, capitalism produces a continual differentiation of value. As Jodi Melamed writes, "These antinomies of accumulation require loss, disposability, and

the unequal differentiation of human value, and racism enshrines the inequalities that capitalism requires" (Melamed 2015, 77).

Building on Cedric Robinson's framework, as well as Stuart Hall's idea of racism as the fatal coupling of power and difference, geographer Ruth Wilson Gilmore develops a theorization of the political geography of race. As she writes,

> Racism is a practice of abstraction, a death-dealing displacement of difference into hierarchies that organize relations within and between the planet's sovereign political territories…The process of abstraction that signifies racism produces effects at the most intimately "sovereign" scale, insofar as particular kinds of bodies, one by one, are materially (if not always visibly) configured by racism into a hierarchy of human and inhuman persons that in sum form the category "human being." (Gilmore 2002, 16)

In *Golden Gulag,* Gilmore situates the prison industrial complex in California as part of the US racial state's spatial fix in response to the moments of crisis that emerge from the welfare-warfare or military Keynesian state. For her, race and racism are made by "making some people, and their biological and fictive kin, vulnerable to forces that make premature death likely and in some ways distinctive" (Gilmore 2007, 244). Here she develops her famous definition of racism as "the state-sanctioned or extralegal production and exploitation of group-differentiated vulnerability to premature death" (Gilmore 2007, 28).

Gilmore's definition is particularly useful because she locates race as a *product* of the racial capitalist state and its structure of power through the production of difference, rather than a static and self-obvious category. As Laura Pulido (2017) has also articulated, this definition is useful because, in its focus on differential bodily vulnerability, not necessarily on an individual but a collective level, it also

encompasses environmental injustices: group-differentiated exposure to polluted air and water is inseparable from the death-dealing effects of police violence or geographies of incarceration (Dillon and Sze 2016). It also helps us to think beyond the questions of discriminatory intent that characterized early environmental justice research and policy, and to a more relational investigation of multiple, and multiply scaled, forms of contamination and expendability.

In other words, chemical contamination—its differential nature and connection to premature death—can be seen as a form of racism working at the material level of the body. Further, if racial capitalism produces racial difference as a form of differential human value, it does the same with land, and by extension with water: both through the ongoing dispossession of indigenous nations, and through the reproduction of precarious and racialized labor and restricted ownership.

Meanwhile, racial capitalism has always acted in tandem with the primitive accumulation of colonialism, settler colonialism, and imperialism worldwide. As many scholars have shown, indigeneity and race have been constituted as different in and through imperial logics (P. Wolfe 2006; Moreton-Robinson 2015; Day 2016). For instance, as Maria Saldaña-Portillo articulates in her (2016) book *Indian Given,* divergent ways of racializing Indigeneity, and divergent modes of governmentality, produced very different senses of racialized space across the US-Mexico border.

Scholars within settler colonial and critical Indigenous studies have worked to center land, and the racialized work of turning land into property, in discussions of environmental injustice (Coulthard 2014; Day 2016; Harris 1993; Moreton-Robinson

2015).[12] Building on work long done by indigenous people, scholars within settler colonial and indigenous studies have articulated the role of settler colonialism in environmental issues, citing settler colonialism as a structured form of dispossession that produces settler access to land and resources (Coulthard 2014; P. Wolfe 2006; Kauanui 2018; Rowe and Tuck 2017; Barker 2019; Arvin, Tuck, and Morrill 2013). Scholars such as Coulthard have demonstrated the impact of centering a colonial, rather than capitalist, relation, and how it opens ways of thinking about struggles for land and living in right relationship with it. Much of this literature has also contended with the interrelated physical, geographical, and epistemic violence of settler colonialism as human and more-than-human relationships are constrained to property and relationships to it (Tuck and Yang 2012). If differential *relationships* to land and property are important in processes of racialization (Moreton-Robinson 2015; Bhandar 2018), so are the fundamental shifts to the land that were entailed in the process of making land into property.

Scholars such as Traci Brynne Voyles have shown that the production of deserts or marshes as "wastelands" occurred in iterative co-constitution with the racialization of Indigenous peoples *and* concerns over the white race (Voyles 2015; Kuletz 1998). This work is very much in consonance with historians' important work on the making of whiteness in settler colonial contexts (Anderson 2006; O'Brien

[12] For instance, while Cheryl Harris (1993) describes the work of property logics in producing blackness as property, Glen Coulthard (2014) centers land and the production of property through Indigenous dispossession as a key but undertheorized aspect of the racial capitalist accumulation of settler states.

2010), the scientific production of "race" as a biological concept (Benjamin 2016b; Subramaniam 2001; Browne 2015), and the differential racialization of Indigeneity (TallBear 2013; Kauanui 2008; Saldaña-Portillo 2016).

This profound reduction of land to property, along with indigenous dispossession and settler access to resources, has been central to the settler colonial remaking of the San Joaquin Valley. For instance, Kyle Powys Whyte is talking about the Anishinaabe territory around what are now called the Great Lakes, but he could easily be talking about the San Joaquin Valley as well, as he articulates, "As a means of carving out settler homelands from indigenous homelands, waves of settlers harnessed industrial means, from military technologies to large-scale mineral and fossil fuel extraction operations to sweeping, landscape-transforming regimes of commodity agriculture" (Whyte 2017, 3).

Racialized notions of land as "productive" or "waste" then became integral to rationalizing and propelling hydraulic projects across the US West (Middleton-Manning 2018; Yazzie and Baldy 2018; Yazzie 2013; Sepulveda 2018). As I show, these hydraulic projects had dramatic impacts on Indigenous nations *and* on available modes of racialized labor. In response, critical Indigenous scholarship has focused on *water* as a key analytic of Indigenous feminisms (Barker 2019) and as a central aspect of Indigenous survivance (Estes 2017; Todd 2017; Sherwood 2019).

Therefore, the racist impacts of oil extraction and large-scale agriculture are not exceptions that can be fixed within a capitalist framework. Instead, these frameworks help us see that the group-differentiated devaluing of human and more-

than-human life and relations through discourses of race and contamination is not exceptional, but rather is *fundamental* to the capitalist world order and its "conjoined processes of racialized property making and property taking" (Ranganathan 2016).

An analytic of contamination that thinks together the impacts of contamination on bodies and ecosystems, while understanding contamination itself to be a historically specific and contingent formation, is useful because it allows us to focus on the ways in which racialization itself evolves and changes through shifts in lands and ecosystems: how the meanings of racial categories are ecologically produced and reconfigured, not only through differential relationships to land, but through producing shifts in the land itself. It is a way of tracing both the impacts of racial logics on environments, and the consistent re-articulation of those racial logics through environmental projects. Drawing on these thinkers, tracing formations of contamination shows that the specificities of racial formations in the San Joaquin Valley are never isolated to that location, but rather are crucially entangled with the global flows of oil extraction as "the literal and figurative "corpse juice" fueling racial capitalism" (Ahuja 2016, 31).

Feminist Theorizations of Performativity and Material-Discursivity

Performative approaches within feminist and queer theory understand boundaries—and the iterative work of boundary-creating—as central to the constitution of that which they ostensibly separate. Judith Butler (2006, 2011) describes performativity as a process of repetitive citational practices over time, which create knowledges, bodies, genders—but also create consistent openings for

subversion or re-articulation.[13] For instance, in *Bodies that Matter*, Butler argues that the regulatory norms of "sex" as a binary category work performatively to constitute material, sexed bodies; further, the process of undergoing the assumption of a sex is a necessary part of becoming a culturally intelligible subject. For Butler, subjects are created through an "exclusionary matrix" through which the definition of the normal subject is only made possible by the definition of the abnormal abject.

The presence of the constitutive outside is key to her work because it means that the subject must always be grounded in repudiation of the abject; those within the norm are mutually co-constituted with and materially affected by those outside the norm. The constitutive outside is "that which can only be thought—when it can—in relation to that discourse [that constructed the outside], at and as its most tenuous borders" (Butler 2011, 8). Boundaries are contentious spaces, where the work of contestation or re-articulation of norms is enacted through strategically (properly or improperly) citing norms.

Through this iterative process, repeated actions condense over time, and in doing so erase themselves as actions: through the very repetitiveness of actions, those

[13] Performativity itself refers to the idea of the performative speech act from the field of linguistics: speech which actually *enacts* what it declares. The most famous example is the wedding ceremony, in which to be *pronounced* married makes it so, legally and socially. In this sense, speech is not only a descriptive practice but one that brings the world into being in specific ways (Austin 1975).

actions disappear.[14] Therefore, performativity becomes a useful way of considering the ways in which the present—and what is made to appear common-sense, such as sex or passive versions of matter—in fact emerges through iterative re-inscriptions of boundaries. In fact, Butler's performativity conceptualizes matter itself not as a static substance but as a reiterative, citational *process* of materialization in response to relations of productive power.

Feminist science studies scholar Karen Barad has further articulated matter as performative: not a static substance but as a reiterative, citational process of materialization (Barad 2007).[15] Barad, however, replaces the idea of iterative citationality with iterative *intra-activity:* while citation requires the pre-existence of norms to cite, intra-action emphasizes the co-constitutive emergence of phenomena and the agential capacity of matter itself. In other words, matter not only performatively materializes in a subject's process of becoming, but instead has an agential role itself in that emergence. For my purposes, a material-discursive approach to performativity centers the ways in which lands, peoples, or objects have been produced as contaminated or contaminating in co-constitutive and shifting ways,

[14] Feminist scholar Sarah Ahmed describes this process with the phrase, "this paradox—with effort it becomes effortless—is precisely what makes history disappear in the moment of its enactment" (Ahmed 2006, 553).

[15] As Karen Barad (2007) has pointed out, Butler's figuration leaves matter as an "end product" rather than an agential part of becomings. See Schrader (2010) for a more complete discussion of this point.

and how racializing logics of contamination move and evolve through land and people over time.[16]

Contamination as performative and material-discursive

Contamination, then, can be seen as animated by the performative work of boundary maintenance. Fundamentally about some substance, person, or thing crossing a definitional boundary, contamination also becomes an iterative and deeply productive *practice*: what emerges as requiring protection from the outside? And what emerges as—by its very presence—potentially harmful to what it meets? This allows us to think about contamination not as a static object of research, but rather to trace how it has evolved and shifted, in meanings and materialities, depending on historical and geographical context.

One example may help to expand what I mean by contamination as a performative practice of boundary maintenance. Jeremy Bentham, an eighteenth-century English philosopher, described the work of creating private property:

> The interior of that immense region offers only a frightful solitude; impenetrable forests or sterile plains, stagnant waters and impure vapors; such is the earth when left to itself. The fierce tribes which rove through these deserts without fixed habitations, always occupied with the pursuit of game, and animated against each other by implacable rivalries, meet only for combat, and often succeed only in destroying each other. The beasts of the forest are not so dangerous to man as he is to himself. But on the borders of these frightful solitudes, what different sights are seen! We appear to comprehend in the same view *the two empires of good and evil.* Forests give

[16] Ever since Mary Douglas (2003) described dirt as "matter out of place," feminist and queer theorists have not only articulated how discourses of contamination and toxicity produce raced, queered, and gendered differences, but also contribute methodologically to environmental justice literatures with their close attention to how matter performatively materializes (e.g., Barad 2007; Butler 2006; Chen 2011).

> place to cultivated fields, morasses are dried up, and the surface, grown firm, is covered with meadows, pastures, domestic animals, habitations healthy and smiling. Rising cities are built upon regular plans; roads are constructed to communicate between them; everything announces that men, seeking the means of intercourse, have ceased to fear and to murder each other." (Bentham [1843] 1978, 52)

This quote has previously been used to demonstrate the performativity of property, but it also has a deeply ecological valence around contamination. Contamination works here in overlapping ways: Bentham's wild lands are racialized as the "empire of evil" because they are contaminating: "stagnant waters and impure vapors." Yet, more fundamentally, a *logic* of contamination produces the "empire of good" as consistently threatened by the incursions of the wild. The maintenance of the border between them gives internal coherence to both wildness and civilization: it is in this schema that matter *can* be out of place.

As I show, this kind of understanding propelled major hydraulic interventions in California and across the US West. Contamination—as simultaneously a material accumulation and a set of logics—has been a central part of US white settlers' understandings of, and interactions with, the California landscape. As late as the turn of the twentieth century, vast areas of the San Joaquin Valley were considered contaminating to the white body, which formed a major impetus for reclamation activities. These activities, and the apparatuses of hydraulic and public health knowledges that arose with them, in turn reconfigured ideas of contamination altogether.

Yet while *logics* of contamination have shifted over time, its effects have accumulated in the deepening inequalities across California's geography, and in

groundwater basins, tissues, and sediments themselves. Reclamation produced the agricultural land which today requires the pesticides, herbicides, fertilizers, and other chemical toxins that define the contemporary "chemosphere" (Shapiro 2015). Therefore, we can ask not only how communities of color are disproportionately contaminated (though this remains an important aspect of environmental justice research), but also how communities and landscapes are produced *as* contaminating, or contaminable, over time.

Dissertation Trajectory

Each chapter that follows combines a particular site or form of settler infrastructure, a particular combination of oil and water, and a particular orientation to contamination. Chapter 1, "From Kern Island to the Streets of Bakersfield: Two Histories of the Kern River," works to understand the production of Bakersfield materially-discursively through the earliest hydraulic infrastructure projects that diverted and linearized the Kern River, draining the wetlands around what had been known to early settlers as Kern Island and instead producing dry land owned by Colonel Baker. I consider the performative logics of contamination within this profound hydrologic restructuring, focusing on the production of a place as potentially contaminating, and therefore *contaminable*, a potential sink for the byproducts of a range of industries. Or, conversely, between an understanding of a region as contaminating, and therefore an understanding of the people who live there as contaminated. I argue that this early hydraulic infrastructure was not only part of an economic project but also functioned within a larger logic of contamination that

furthered conceptions of racial categories and settler sovereignty claims. Attending to this logic of contamination reveals the racialized boundary-making between private property and settler-defined wastelands as white settlers remade the ecology of Kern County in the late nineteenth century.

Yet people don't only live in a place, nor are they passive recipients of constructions of themselves or their worlds. I spent most of my time with people who register pollution while gathering evidence of its existence. Chapter 2, "Embodied Empiricisms: Sensing Contamination and the Racialized Work of (Non)Attunement," takes up the embodied empiricisms of contamination, tracing environmental activists' and residents' production of evidence about water contamination as it materializes in their own bodies. Working with contamination as a material-discursive analytic also, importantly, requires rethinking what we mean by the body, as I expand below. The modern idea of the body itself is an unstable one and has shifted over the past few centuries (Nash 2007; Schuller 2017). In fact, one of the troubling and unique things about chemical contamination is the way it destabilizes any clear idea of bodily boundaries, and residents and activists today mobilize their embodied experience of contaminants. Yet historically, understandings of bodies' differential sensitivities to their environments were considered a definitional part of someone's race. This is one example of the ways in which logics of contamination were co-constituted with modern racial thinking and understandings of the body. By attending to the historicity of bodily sensitivity within racial thinking and empirical thought, I show that activists' current embodied empirical evidence lies squarely *inside* scientific inquiry,

rather than outside it. This analysis further destabilizes any binary of community versus regulatory science and asks us to reconsider the relationship between professional and community evidence production.

While many regulatory agencies dismiss people's experience as only anecdotal, an analytic of contamination also shows how regulatory moves to discount lived experience also works to stabilize a "pure" science denoted by an objectivity premised on the separability of the knower from their study (Murphy 2006). Feminist science studies scholars have deconstructed this assumption, arguing that a more responsible and accountable form of objectivity requires accounting for the situatedness of our knowledge and all the aspects of our apparatuses of knowing. Therefore, Chapter 3, "Unknowing California's Ancestral Lakes: Data Abundance and Regimes of Imperceptibility," engages with present-day contestations over the very fact of contamination by focusing on infrastructures of scientific knowledge production. I use a close attention to scientific practices and discourses to focus specifically on the uncertainties that emerge around one question: (how) does oil and gas extraction impact groundwater? I draw on feminist and critical race science studies to argue that California's context of relative data abundance*,* as well as the conflation of numbers and data, complicates existing frameworks in environmental justice research and activism that call for more and better data. Instead, scientific attempts to define and measure contamination can propagate uncertainty and unknowing *through* datasets, measurements, and monitoring apparatuses. Ultimately, I show that the overabundance of data on underground injection of oil contaminants

into groundwater reproduces what Murphy (2006) calls "regimes of imperceptibility" through practices of colonial unknowing.

Finally, if exposure to contamination is the thing that makes evidence collection possible, and logics of contamination are a racializing force, contamination is also a thing that produces different forms of intimacies. In fact, the etymology of contamination stems from "con" (together) and "tangere" (to touch): to touch or bring into contact. Chapter 4, "'That American English:' Truth, Lies, and Belonging in California's Oil Country," draws on one conversation with oil proponents who identified as Okies. While our conversations were ostensibly about oil and water, they actually circulated around the shifting terms of truth, lies, and jokes. I bypass any question of *whether* what any of us said was true or not. Instead, I pay attention to the work of truth claims themselves: what does a truth claim do here, and how are truth claims established? I interweave this with further discussion of petromasculinity and the historical formation of Taft, highlighting the intersections of Okie identity and the oil industry. I argue that in each of these truth/lies formations, what we really see are different articulations of belonging and identity that speak to the histories of race and gender within extractive capitalism. I believe they reveal the material-discursive infrastructures of settler colonialism in the present day, and the ways that scientific discourse—and *claims* to scientific discourse—circulate within those infrastructures.

Conclusion: A Note on How We Got Here

One of the common refrains of oil proponents in California is to ask people—specifically environmental or environmental justice advocates— "how did you get

here?" I was asked this question often, and the the inevitable answer is, by car, on the freeway (see figure 1). Similarly, they remind people of how many parts of everyday life are made with fossil fuels—plastics, as they remind us, are only the beginning. Finally, they stress the importance of the oil industry to California's economy broadly, and Bakersfield's economy more specifically.

Figure 1: "Don't be a HIPPYcrite." Image entered into 2018 Arvin City Council deliberations over a setback ordinance mandating 300 feet between homes and schools.

In the image above, for instance, we can see the entanglements of contestations over scientific truth ("Get the facts," #FactsnotFiction), invited identifications with oil (#IAmtheOilIndustry), and the dismissal of environmental

justice work as hypocritical ("Don't be a HIPPYcrite"). By showing that no individual person is separate from a reliance on the oil economy, these refrains are used to discount environmental justice advocates' work to reduce oil extraction in California.

In part, they are useful reflections of dominant (often white) liberal notions of environmentalism and its internal contradictions that work toward protection of individual species or individual areas set aside as "wilderness" at the expense of regionally specific modes of right living (e.g., Cronon 1996). They also reflect a frustration shared by many environmental justice activists at professionals from the urban centers of San Francisco, Oakland, or Los Angeles, often white and middle or upper class, pushing their visions at the expense of local needs and desires.

But individual choices are also always constrained by our geographies and conditions of possibility. Thinking with material-discursive performativity highlights the ways in which the conditions of the present have been iteratively produced through the repetition of particular intra-actions which, over time, makes some things invisible and hard to see–and nonetheless, produces a particular direction or formation of conditions in the present.[17]

[17] As Ahmed describes writes about the phenomenology of performativity, "this paradox—with effort it becomes effortless—is precisely what makes history disappear in the moment of its enactment…it is important that we think not only about what is repeated, but also about how the repetition of actions takes us in certain directions" (Ahmed 2006, 553).

The rise of the oil economy has been so entwined with the political geography of "modernity"[18] that now the present is marked by limited public transportation and individual car travel has been produced as the most effective (and, in some location, the *only*) way to travel.[19] Just as we can trace how the large-scale agriculture industry came to dominate the Valley through the work of reclamation, such that expensive investments in rapidly declining groundwater has been produced as necessary and almost common-sense, a reliance on oil has also been baked into the conditions of the present. In response, our answer to climate change cannot rely on individualized and individualizing frames of personal choice. Instead, we must address it on collective levels that begin by reframing the global (though unevenly distributed) perils of climate change back in their colonial and racial capitalist beginnings (e.g., Whyte 2017; Verges 2019).

Performative and material-discursive approaches offer ways of working precisely with the consistent presence of failures and excesses to understand the work of producing what comes to seem common-sense or normal. They also refocus us on the labor of settler colonialism and racial capitalism in producing landscapes such as the San Joaquin Valley through the production of private property and the extension of settler governance. This history reminds us that none of this was inevitable, and in

[18] I use this term drawing on the genealogy of Latin American decolonial scholarship which situates modernity as always constituted with coloniality (Lugones 2016; Mignolo 2007; Quijano 2007).

[19] For instance, scholars have shown that public transportation in places such as Los Angeles was purposefully hamstrung in favor of automobiles and suburbanization (e.g., Wachs 1984).

fact that there are multiple ways in which there are still cracks, seepages, and other possibilities. Even as the system consistently fails, these failures propel further intervention. So, while water infrastructure does, and did, radically change the land, it also always fails; there is always an excess that remains. And these excesses put the whole framework—and its entrenchedness—into question.

The San Joaquin Valley's profound reshaping over the last 150 years is regularly minimized, occluded, or rewritten within dominant narratives to stabilize the contemporary moment as self-obvious. Yet if history is produced through the repetition of actions, which themselves obscure their conditions of possibility, then it remains important to look for the openings where the produced naturalness of the present is temporarily disoriented or destabilized. I believe that a material-discursive analysis of contamination can do that work.

Chapter 1:

From Kern Island to the Streets of Bakersfield: Two Histories of the Kern River

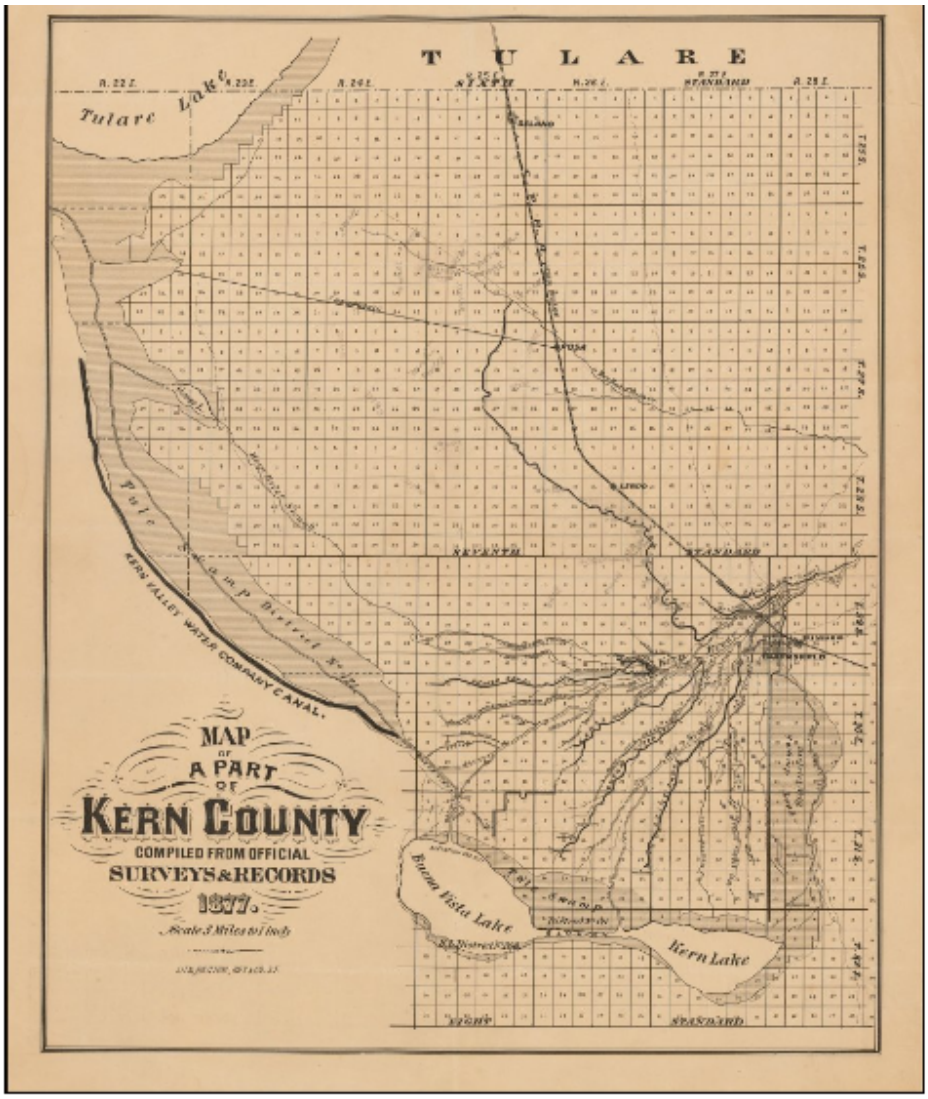

Figure 2: Map of a Part of Kern County Compiled from Official Surveys and Records, (1877). Bancroft library, University of California, Berkeley.

On the northeast edge of Bakersfield, Panorama Park curves along steep bluffs covered in bristly grass, yellow in the summer heat. Above the bluffs, a curving trail runs along the edge dotted by palm trees, benches, and trash cans; large ranch-style

homes line the street. Below the bluffs, two waterways run side by side: the Kern River, and a canal that diverts its water. Both are surrounded by the sudden lushness of riparian vegetation: willows, nettles, deep green foliage, and California sycamores and cottonwoods, deep-rooted remnants from the time when the river regularly flooded high up on the land. Beyond the water, oil derricks dot brown rolling hills that stretch out from the river. On a clear day they extend past the horizon, but usually they fade into ambiguity in the persistent haze. The view from these bluffs, in some ways, pulls together not only the dynamics that produced Bakersfield as it is today, but more broadly, what produced the San Joaquin Valley, and California itself as a settler state: oil extraction and large-scale water infrastructure and agriculture.

At Panorama Park, people walk alone and in pairs, their children play on the lawn, they sit on benches—and all these activities are structured into looking out at the oil field, over and over again. My friends in Bakersfield tell me every time I visit the Bluffs not to walk too long there, because the wind brings air from the oil fields across the bluffs. But most people don't have the same relationship to the oil field that I, or my collaborators, do. Other residents told me that this view from above registers pride and a sense of beauty, in the same way that Bakersfield High School's mascot is the oil driller, and the Bakersfield Museum hosts an extensive oil exhibit. This is why there are iron frames dotted periodically along the trail, which you can stand under and frame your own landscape photo. Yet, like anything that needs to be reproduced discursively, the mascot, the museum, and the bluffs also register an ambivalence: the

very articulation of this pride reveals, in its self-conscious repetition, the need to continually rearticulate it.[20]

This chapter works to understand the material-discursive production of Bakersfield through the expansion of hydraulic infrastructure across the southern San Joaquin Valley (see figure 2 above).[21] As critical historians have pointed out, canals—and the reclamation logics they're a part of—condense the ways in which racial formations, private property structures, and settler colonial governance were co-constituted in California during the mid-1800s (Igler 2005; Worster 1985; Nash 2007). Scholars have long addressed the raced and colonial life of property (Bhandar 2018; Harris 1993; Moreton-Robinson 2015) and more recently taken up the racialized aspects of producing property in California and elsewhere (e.g., Dillon 2021).

I further show that reclamation was not only an economic project (though it was that) but functioned within a larger logic of contamination that furthered the evolution of racial categories and settler sovereignty claims, in and through fundamentally altering the land. I use a critical analytic of contamination to highlight the racialized boundary-making between private property and settler-defined

[20] Museums, public parks, and school mascots are all part of the cultural production of a place as coherent and stable; for Bakersfield, much of this sense of place is entwined with the oil industry, as the double-duty role of the mascot, museum, and bluffs show. Yet this stability and coherence itself remains precarious.

[21] Though the rest of the dissertation focuses more on oil specifically, understanding how the present San Joaquin Valley was produced requires attention to its hydrologic history.

wastelands. From the details of extending water infrastructure over what we now know as Bakersfield, we can see how the material movement and redistribution of water, land, people, and capital were crucially constituted with settler imaginations of water's over- or under-abundance as part of racializing the landscape and racializing modes of living upon it. This highlights the necessity of engaging a material-discursive analysis of the iterative emergence the San Joaquin Valley.

Definitions of contamination have shifted and changed in California's San Joaquin Valley through emergent ideas of race, the liberal subject, and private property (Nash 2007; Shah 2001; Molina 2006). The land that my collaborators and I traversed was once an expanse of shallow lakes filled with tule reeds, but at the turn of the century, a series of hydraulic engineering projects—collectively termed "reclamation projects" —drained these lakes through a series of canals. [22] Today, the San Joaquin Valley is flat and arid, but the town names around Bakersfield—like Old River, Panama, and Kern Lake—still gesture to this historical ecology.

Reclamation projects were guided by understandings of wetlands as swamps that were racially contaminating to the white body (Nash 2007). They were also guided by settler desires to turn land into private property that could be sold and taxed (Bhandar 2018; Harris 1993; Moreton-Robinson 2015). Ultimately, they also produced the conditions in which, today, surface water is overallocated, groundwater

[22] Reclamation referred to irrigating dry lands and draining wetlands through a range of hydraulic engineering interventions, including dams, reservoirs, canals, weirs, and pumping stations.

basins are overdrafted, and both are often contaminated with pollutants such as nitrates, pesticides, and hydrocarbons (Schoups et al. 2005; Burow, Shelton, and Dubrovsky 2008; Burow et al. 2013; Gillespie et al. 2019; State Water Resources Control Board 2019).

Yet the role of reclamation projects in producing the conditions for California's contemporary water scarcity and pollution is not widely articulated. Further, though Indigenous feminist scholarship has demonstrated the centrality of reclamation projects to the settler colonial project, (Middleton-Manning 2018; Yazzie and Baldy 2018; Sherwood 2019; Barker 2019), this history has largely been buried in the San Joaquin Valley's liberal promises of oil and agricultural booms.

In what follows, I first describe the process of reclamation in California generally, with attention to how reclamation processes entangled racial logics, settler colonial structures, private property, and public health discourses. I then delve into the specifics of how these projects materially-discursively remade landscapes by theorizing from three locations along the Kern River that specifically condense these histories. Each location also highlights a particular aspect of California's larger water infrastructure system.

First, I describe the material-discursive work of linearizing the Kern River as it flows through Bakersfield, showing the fundamentally performative aspect of infrastructures such as canals and ditches. Second, I begin from the contemporary Buena Vista Aquatic Recreation Center to describe the original Buena Vista Lake, which served as a center for Indigenous resistance to Spanish and Mexican

colonization. I show the co-constitutive racialization of people and ecosystems as the lake was remade, looking how infrastructures of sovereignty interplay with land. Finally, I describe the Tule Elk Preserve, site of what historically was Buena Vista Slough, which was at the heart of one of the largest legal battles over water rights in the US West. I believe that the ways the Slough appears or disappears in that case demonstrates much about the legal infrastructures that accompanied the material infrastructure of canals, dams, weirs, and reservoirs.

At each site, I utilize what I described in the Introduction as a critical analytic of contamination. In other words, I attend to the ways that logics of contamination shifted or were restabilized through the material remaking of the land. And in each, I look specifically at the performativity of these processes. If history is produced through the repetition of performative actions, which themselves obscure their conditions of possibility, then it remains important to look for the openings where the produced naturalness of the present is temporarily disoriented.[23]

Today, the San Joaquin Valley's late-capitalist extractive economy of regimented orchards and oil fields can feel intransigent and unchangeable. Yet it is fundamentally precarious, requiring consistent and increasing hydrologic and

[23] I think about performativity here as iterative intra-activity: as I expand, actions such as the work of linearizing or drawing boundaries are not simply discursive practices that have material effects, but rather, they are material-discursive practices themselves that brought (and bring) new iterations of the San Joaquin Valley into being. This is one way of thinking about the materiality of the entanglements between racial capitalism and colonialism here: not that they are discursive formations which then have material effects, but that their valences and particular function also shift in co-constitution with the landscape as well.

economic interventions. I believe that beginning from each of these specific locations—and their particular histories of hydrologic and ecological change—is a way to think differently with the performativity of contamination and of reclamation projects in response.

Reclamation: Race, Property, and Public Health in Settler California

Just below the Panorama Bluffs is the historic site of Gordon's Ferry, once used by the Pony Express to cross the Kern River. Along the side of the road there, beyond the dry grasses, the riverbank is a series of muddy shallows where the water both is and isn't, where reeds, willows, tamarisk all choke together. Monarch butterflies balance on stands of grass, and a million tiny swallows flit above the surface of the water, working on their nests under the bridge. This is also where the Kern River Oil Field begins: directly across the river is a dense field of oil derricks. Gordon's Ferry was turned into a railroad bridge for a Southern Pacific Railroad spur that carried oil from the Kern River oilfield to market; by 1903, relying on this railroad's cheaper transportation, the Kern River Oilfield had made California the nation's highest oil-producing state.

Today, the rail bridge is a road, and it's easy to drive across the river and into the oil field without noticing its surroundings. Yet this site is in fact a dense confluence of the land use changes that created Bakersfield today. A mile or so downstream, the Carrier Canal, the Kern Island Canal, and the Eastside Canal all divert water from the Kern River. In a dirt parking lot next to the Gordon's Ferry bridge, a giant statue of a settler imagination of an Indigenous man—painted bright

red—stands saluting the bluffs above: a particularly obvious and offensive example of Bakersfield's status within the settler state. The road that leads from the bluffs to Gordon's Ferry is called China Grade, after a trail that Chinese residents used around the turn of the century first to gather watercress along the riverbanks and later to carry the produce they raised along the river to town (Darling 2003, 26–27). And just upstream of Gordon's Ferry, China Grade, and the saluting statue is the site where, in 1899, the Elwood brothers first began digging for oil. Forty three feet down, they hit oil sand, deposited by the Kern River's meandering flow over millenia, and initiated the first oil extraction of what is today Chevron's Kern River Oil Field. From this vantage point, it is hard to disentangle oil extraction, water infrastructure, Indigenous dispossession, and racialized labor: even as they are so often studied separately, the material configuration of the land itself shows their historical co-constitution. Bakersfield's history of reclamation is one way to articulate these co-constitutions.

Historically, as rivers such as the Kern, Kings, and San Joaquin flowed down from Sierra snowmelt, they had no natural outlet to the sea and instead filled the San Joaquin and Sacramento Valleys, which together form California's Central Valley. In high-water years the entire Valley became an inland sea. Even in drier years, the Valley was still filled with large lakes, wetlands, tule marshes, and hundreds of meandering rivers, streams, and rivulets. Yet at the same time, the area received very little precipitation of its own.

Thus, both marsh and desert conditions could co-exist, and shallow lakes abutted areas of arid scrub brush. Settler considered both swamp and desert

landscapes to be wastelands because each of them exceeded—with either an over- or under-abundance of water—the European ideal of arable agricultural soil (di Palma 2014; Voyles 2015). Though the Yokuts had carefully managed the landscape for thousands of years, US settlers often found this changeable landscape unnerving, as many California historians have shown (Worster 1985; Nash 2007). For instance, Lieutenant George Derby, dispatched as part of a US survey of California upon its annexation, described the area near Bakersfield in 1849 and 1850 as:

> The most miserable country that I ever beheld. The soil was not only of the most wretched description, dry, powdery, and decomposed, but everywhere burrowed by gophers, and a small animal resembling a common house rat…the country presents the appearance of a large city which has been partially overwhelmed by the ashes of volcanic eruptions. (Derby and Farquhar 1932, 255)

Similarly, historian David Igler quotes William Brewer, the leader of a geological survey that traveled across California from 1860-1864, describing the north San Joaquin Valley in October 1861: "We strike out on the plain-oh! What a tedious plain—league after league stretches away, it seems as boundless as the sea…the soil is fertile enough, but destitute of water, save the marshes near the river and near Tulare Lake" (Brewer [1930] 2003, as quoted in Igler 2005, 22).

Yet three months later, he wrote instead, describing the Valley's flood conditions: "the great central valley of the state is under water—the Sacramento and San Joaquin valleys—a region of 250 to 300 miles long and an average of at least twenty miles wide." He described the destruction of the flooding of Sacramento and described steamboats traversing the distance, writing, "there [is] such a body of water

that the winds made high waves which beat the farm homes in pieces" (Brewer [1930] 2003, as quoted in Igler 2005, 22).

Though Brewer was describing a particularly intense flood, enough of the Sacramento and San Joaquin Valleys were regularly inundated by lakes and sloughs that for decades there was a plan to develop a shipping line by steamer from Sacramento to Bakersfield. Similarly, the Bakersfield area was often called "Panama" because of its heavy swamp vegetation and mosquitos.[24] While Panama served as an ecological term—especially once canals began to be built across the California landscape—it is also a reminder that, affectively and experientially, central California in the 1850s and 1860s was still an overseas colony for settlers as much as it was a frontier environment. Before the cross-continental railroad was built in 1869, most European settlers arrived by boat and overland transportation across Panama. The lines they traveled to arrive, and settlers' pre-existing discursive associations, linked wetland places to colonial and racialized conceptions of jungles and swamps as more suited to imperial conquest than white settlement.

As settlers faced this unruly landscape, land reclamation—the practice of draining the wetlands through diversions and dams, and then diverting that water to irrigate drier land—often did the material work of producing dry land for agricultural use. A series of legislation throughout the late 1800s tied racialized ideas of "waste" lands to their reclamation through settlement by promising ownership if settlers

[24] Miller and Lux, one of the largest land-holding companies in the nineteenth century, named their largest ranch Panama, and streets and towns still carry the name.

"improved" the land by either irrigating or draining it. Both state and federal Swamp Land Acts and the federal Desert Land Act added to land alienation acts such as the Homestead Act to transfer land from federal ownership to individual settlers.

Reclamation, though fundamentally a form of dispossession, was articulated as re-claiming the land from a state of wildness, often in the religious discourse of Manifest Destiny. For instance, in 1862, Reverend Thomas Starr King articulated this vision of California:

> The earth is not yet finished…it was not made for nettles, nor for the manzanito (*sic*) and chaparral. It was made for grain, for orchards, for the vine, for the comfort and luxuries of thrifty homes. It was made for these through the educated, organized, and moral labor of man." In this view, the land's ideal state was not yet complete, and King envisioned that farmers could become "an implement of Providence in completing the task of Creation." (as quoted in Worster 1985, 97)

King was writing at a time when the Gold Rush was starting to wane; large amounts of sediment from the Gold Rush had run down into the Valley below, profoundly altering its topography. Simultaneously, those who had flocked to the Sierras for gold were now looking to agriculture as a more sustainable economic activity.

As expanded in Chapter 2, reclamation also condensed a series of racial logics, propelled by scientific understandings of health and evolution at the time. Until the late nineteenth century, many European settlers were concerned about the effects of the climate on their racial constitution. Within this racialized public health discourse, California environments were linked to those in Asian, African, and Latin American colonial contexts. As Linda Nash writes, "If European bodies could in fact

physically change to survive in a new climate, would they still be European? More to the point, would they still be white?" (2007, 30). Swamps were considered a major public-health problem: as Nash writes, "Swamps and tule lands were not merely an unsightly landscape, an inconvenience to travel, and a hindrance to agriculture—though they were all these; they were also a frightening source of disease" (2007, 67).

White settlers saw themselves as *more* susceptible to diseases than nonwhite people, and scientists and public health officials were interested in protecting white settlers from the miasmas that were thought to arise from the swamps and cause malaria. Seen from this vantage point, draining marshes and reducing exposure to malaria and other diseases reflects deep-seated anxieties around maintaining California settlers' whiteness more than California's actual material conditions - though, importantly, not all settlers were white in the same way.

Finally, in logics of reclamation we see the confluences between settler colonial processes and Californian (and, more broadly, US) self-conceptions as an emerging imperial power. Especially in the context of late nineteenth-century concerns over the closure of the frontier, irrigation farming was seen as a morally superior way of extending a form of frontier *and* undergirded the development of US imperialism abroad. For instance, Donald Worster points toward the work of Morris Estee, who chaired the State Board of Trade's Committee on Arid Lands. This report wrote: "The public lands are almost exhausted," and in response, rather than territorial acquisition overseas, "we see what an empire would thus be brought into practical use" by irrigation farming instead (Worster 1985, 116).

As another example, in an 1889 series of articles called "Uncle Sam's Farm," Frank Nimmo, Jr, a Pacific Northwest irrigation expert, argued for the extension of irrigation across the arid West. In his writing, Nimmo explicitly linked the need to irrigate the arid West to the end of the Civil War, US imperial growth more broadly, and the extension of the railroad. "Within the last year the important fact has dawned upon the country that the reclamation of the agricultural lands of the arid region opens up the last, and perhaps the most important chapter in the history of the subjugation of wild lands to the uses of civilized man upon this continent," he wrote in 1890 (Nimmo 1890).

The work of reclamation and settler agriculture was always counterposed to Indigenous ways of being with land. And Morris Estee's claim that extending irrigation farming across California was morally superior to dispossessing populations elsewhere required the erasure of Indigenous presence and survivance in California and across the arid West. Therefore, not only did reclamation form part of what Aileen Moreton-Robinson (2015) calls "possessive logics," it also worked to erase Indigenous sovereignty and re-instate settler ways of relating to land.

Further, not only was private property intimately tied to reclamation, but the civility of ideas of private property was premised on its difference from swamps, deserts, and wastelands more generally. This is part of the work of contamination as a logic: not only did reclamation require a sense of wetlands or deserts as contaminating, but it also required a constitutive different between private property and wastelands, as I showed in the introduction. Through the work of reclamation, not

only was private property produced, but the boundary between civilized and wild was re-articulated and the racialized valences of that boundary were further entrenched. In what follows I focus on three different sites along the Kern River, each of which shows part of this process in a different way.

Yokuts Park and Baker's Field: Linearizing the Kern River

During my fieldwork, I often ran along a bike path that follows the south side of the Kern River, through Yokuts Park, early in the morning before the heat. The bike path and the riverbed wind behind strip malls and chain hotels until they reach the emptiness of Bakersfield's outskirts, sparsely dotted with oil wells on both sides. At Yokuts Park—just off Empire Drive—Google Maps shows the river as wide and blue. However, due to water overallocation, the Kern rarely flows through Bakersfield. Anywhere below Panorama Bluffs, it is usually a dry riverbed. Ripples in the sand show the past presence of water, and scrub willows grow along the side to mark the continuing existence of moisture belowground—yet on the surface, it is only dry sand that sparkles under the sun. In stark contrast, sprinklers run in Yokuts Park in the morning and its grass lawns are bright green.

This contrast belies the fact that, 150 years ago, the land under the strip malls and Yokuts Park was likely all tule marsh and seasonally, if not consistently, flooded. While one distinct Kern River tumbles out of Kern Canyon from the Sierras, in the 1850s and 1860s it spread into the South Fork, the Panama Slough, and later, the New River, all of which were shifting and unpredictable enough that the original location of Bakersfield was called Kern Island: a spot of high land above a series of channels

(Morgan 1914). These shifting channels of the Kern River slowly made their way down to Buena Vista Lake. From there, Buena Vista Slough carried the water to the miles-long Tulare Lake, once the largest body of water west of the Mississippi.

If property is itself performative (e.g., Gregson and Rose 2000), so are paths and lines. As Sara Ahmed describes,

> Lines are both created by being followed and are followed by being created. The lines that direct us, as lines of thought as well as lines of motion, are in this way performative: they depend on the repetition of norms and conventions, of routes and paths taken, but they are also created as an effect of this repetition. (Ahmed 2006, 555)

I further believe that we can look at the lines of constrained rivers and canals as performative: not as simply the *result* of racial capitalist or colonial practices, but also as, in turn, shifting and reiterating those practices as well. In this section I turn from a description of reclamation in California more broadly to a more specific description of reclamation around Bakersfield itself. I show how the production of a single Kern River through hydraulic engineering was a necessary precondition to producing contemporary settler Bakersfield.

Most settler histories of Bakersfield begin with Colonel Baker, a lawyer and colonel in the Ohio state militia who moved to California as part of the Gold Rush. Though a previous German-born settler, Christian Bohna, had first built a small settlement in 1860, Baker moved to the Kern River in 1863 and is credited with draining the land the town is now built on. The town's name comes from Baker's practice of allowing Gold Rush travelers to graze their animals on his fields, some of the only dry land around. However, the Yowlumne Yokuts had ancestrally occupied

the floodplains of the Kern River for thousands of years (Frank and Goldberg 2011; A.L. Hurtado 1990), living along Tulare Lake and the streams and rivers that fed it.[25]

Wallace Morgan, a Bakersfield historian and booster writing in 1914 about the early years of Kern County, insists that Bakersfield was "not, as some reports would make it seem, in the least like a swamp in the [18]50s" (Morgan 1914, 47). His insistence stands in contrast to the facts he himself presents, and perhaps registers his desire to distance Bakersfield from racialized discourses of swamps.[26] But if not a swamp, it was a very wet landscape, covered by a network of sloughs, rivers, and rivulets. There are records of the Kern River being the furthest reach of Pacific salmon from San Francisco Bay in wet years, and the land was covered with riparian vegetation, including willow groves and cottonwoods, though further from the channels it was "open, sage-brush country" (Morgan 1914, 56). The Yokuts had long made tule boats to travel across and along the waterways, fishing for salmon, hunting waterfowl, and collecting plants and seeds (Rolle 1996). Settlers also built similar boats or used boats made by the Yokuts.

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[25] While the Spanish mission system had drastic consequences for coastal populations, Indigenous groups who lived in the interior were at first relatively shielded by the complexity of travel through tule marshes and floodplain ecosystems, as described further in the following section.

[26] At the time of Morgan's writing, people in Bakersfield still imagined the possibility of a time when it would be practicable to build a transportation canal, using steamships, from Bakersfield to San Francisco Bay. It was not the availability of water that intervened in its construction, he argued, but rather that the current population of the valley wasn't sufficient to make such a canal profitable or practical.

Morgan works to depict several distinct rivers: "The main channel of the river was down what later came to be known as Panama slough, leaving the present river channel a little way west of the point of Panorama Heights and crossing the present intersection of nineteenth and B streets" (Morgan 1914, 47).[27] Meanwhile, the South Fork was the second largest of the many channels, flowing slightly west of the location of the current Kern Island Canal. He goes on to describe the other channels and sloughs: "unimportant except as they encouraged the growth of willows on their banks and tules in their beds and helped the process of sub-irrigation which caused sunflowers, cockleburs, tumbleweed, and other riotous wild vegetation to grow to fabulous heights all over the intervening land" (Morgan 1914, 47).

At the time of Baker's arrival, Yokuts families lived along the riverbanks along with a few settler families, all of whom used boats as their dominant mode of transportation along the river channels and sloughs. Morgan describes many Indigenous families living there as well, hunting deer, antelope, and other wild game, growing corn, and fishing in the lower Kern River. He references a recollection from Mrs. Van Orman, who remembered a "considerable" village of Yowlumne near current-day Chester Lane, which is about one and a half miles southeast of the

[27] Today, the intersection of nineteenth and B streets is downtown, near Bakersfield High School and the railroad station. It is also about 1.5 miles east of where the Kern River runs through Yokuts Park. It is all dry land, having been reclaimed from its original slough conditions. The Kern Island Canal diverges from the Kern River at a common diversion just west of Panorama Bluffs, and travels south to irrigate farmlands located in the Kern Lakebed.

present-day Kern River and Yokuts Park, likely near where Panama Slough ran.[28] Other records note the existence of Woilu, a village upon a hill high enough that it was protected from the Kern River's flooding.

The story of how this area was reclaimed shows both the precarity of reclamation practices, as well as their performative nature. An 1857 Swamp Reclamation Act by the California legislature gave a group of settlers the rights to drain the swamp land between Tulare, Buena Vista, and Kern Lakes. However, they had difficulty attracting the capital required. In 1862, Colonel Baker and Harvey S. Brown acquired the rights from them and set about trying to find the capital themselves. In 1863, Baker hired thirty Indigenous laborers from nearby Fort Tejon and arrived to begin digging canals.[29]

Even with the labor of thirty men, however, this might have been an impossible task, if not for a large flood in 1861 that, ironically, did much of Baker's work for him before he had even acquired the rights to reclaim the land. 1861-1862

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[28] I am largely restricted to using settler histories to describe original Indigenous presence here. Though they just use the term "Indian," Morgan and Van Orman are likely referencing the Yowlumne Yokuts, who had lived on the early floodplains of the Kern River for thousands of years (Frank and Goldberg 2011).

[29] Indigenous peoples from across the San Joaquin Valley, including some of the Yowlumne, had been forced to move to Fort Tejon, south of Bakersfield, throughout the 1850s and 1860s. Indigenous labor had long been necessary within the colonial economy. Many Yokuts men were employed as vaqueros raising longhorn cattle during both the Mexican and early US periods. They also worked panning gold and doing other camp labor in American gold-mining camps during the Gold Rush (A. L. Hurtado 1990). Later, many canals were dug with underpaid Chinese labor, until anti-Chinese sentiment was so high that companies like Miller and Lux explicitly and publicly hired only white labor—usually Italian or German—to do the work of digging, hiring Chinese workers only as cooks (Igler 2005).

was a major flood year across the Central Valley; earlier in this chapter, for instance, I have quoted other settlers describing the effects of the 1861-1862 flooding in the Sacramento area.

Wallace Morgan describes the flood from the point of view of the Gilberts family. On Christmas day, 1861, one family had made a supper for the whole "neighborhood." As Morgan relates, "the Gilberts, returning just as the first swelling of Panama channel began to make the banks boggy, mired down in the foamy brown water, and friendly Indians waded in and carried Mrs. Gilbert and her infant ashore" (Morgan 1914, 53). After they crossed the first rush of the flood down Panama Channel with the help of the Yokuts, he continues:

> Their house of poles and tules stood in a thicket of willows, but a little way to the north was the open sage brush country, through which Tom Barnes and the Harris brothers had begun to build an irrigation ditch…the Gilberts had seen high water before, and they went to bed with little concern after they had been rescued from the river by the Indians. Along in the night, however, there arose a great squealing from the pen where some forty porkers fattened, and when Gilbert rolled out of bed to see what was the matter, he splashed to his knees in icy water. By the time Gilbert and a couple of men who were stopping at the place could carry the children and the provisions to a little knoll of high ground farther north, the melted snow water was lapping around their waists. (Morgan 1914, 55–56)

Their house was carried away, but the flood waters had found the Barnes ditch and were eroding it into a new channel,

> Scooping it deeper and wider at a faster rate than Barnes could have done had he been loaned all the horses and plows in the state of California…Not many days passed before the larger of the two streams was to the north of the Gilberts instead of to the south of them, and at frequent intervals a dozen tons or more of earth would cave from the bank of the new channel and fall into the brown and boiling flood with a roar that did not sound good to the damp and shivering refugees perched on their island knoll only a few rods away. (Morgan 1914, 56)

With the New River being diverted north of town, all Baker had to do in 1863 was put a headgate in what remained of the old South Fork; this became the town ditch. In the following drought year of 1864, he took advantage of low water levels and scraped the Baker dam at the north end of Buena Vista Lake. The resultant dry lands became the emergent settler town of Bakersfield.

This history exemplifies the material-discursive performative work of logics of disease and contamination within reclamation projects: both the impact of racializing a landscape as contaminating and doing the work to separate it from the civilized fields of private property. Not only were landscape formations racialized, but emergent formations of race were also rearticulated by shifts in the landscape, in the co-constitutive interplay of the wild/inhuman and the civilized/human.

For instance, Morgan reports that many of the Yowlumne left the area after the flood of 1861: it destroyed much of the wild game they relied on and washed the fish back out to the lakes. As he writes, the flood left "the land dryer and rather more suitable for the habitation of civilized men. It made it less desirable for the Indians" (1914, 57). Morgan's description implies that the flood itself civilized the landscape, remaking the land in the image of white settler land use. In doing so, he naturalizes settler agriculture as Bentham's "healthy and smiling habitations," as I quoted in the Introduction, and naturalizes Yowlumne dispossession through their ostensible incompatibility with the post-1862 flood landscape.

Instead, what Morgan describes as the sudden departure of a few families was only one moment in a series of colonial processes that had begun long before Baker

arrived. The Gold Rush increased settler presence significantly: they let their pigs and sheep graze freely, destroying the tule bulbs and wetland ecosystem required for traditional food gathering and land management. Settler militias led violent assaults against Indigenous villages, and laws such as the 1850 Act for the Government and Protection of Indians legalized the enslavement of Indigenous children within white homes (Frank and Goldberg 2011; A.L. Hurtado 1990; Sepulveda 2018). I describe much of this history in the following section. For now, suffice to say that by the 1861 flood, the US government had already been forcibly moving communities—many of whom had already moved once to Fort Tejon—to the Tule River Farm, a nascent reservation closer to the Yokuts' actual homelands. Yet the Tule River Indian Tribe's own records remember that many refused to go at all, or repeatedly returned from the reservations to their homelands (Frank and Goldberg 2011).[30]

Now, the Kern River's old water levels and shifting paths are almost unimaginable: the land around the old Kern River became Bakersfield itself, and the land around the new Kern River became the Kern River Oil Field after the Elwood Brothers struck oil in 1899 (Francis 2016). The canals that now flank the Kern River are part of a network that irrigates the fields planted in the rich soil laid down by the historical wetlands. Woilu is under a parking lot along 16th St, between A and F

[30] Space precludes a more thorough discussion of these dynamics. For a more detailed history of this process, Gelya Frank and Carole Goldberg (2011) worked with the Tule River Indian Tribe for decades and detail both the US government's willful dispossession of California Indigenous nations, and the Tule River Indian Tribe's ongoing resistance to this dispossession.

streets; the hill it stood on was leveled in 1898 for construction of the Santa Fe railroad depot, and bones, utensils, arrowheads, and other objects were uncovered. The railroad depot no longer exists either; it, in turn, was cleared to make way for a parking lot now in downtown Bakersfield.[31] Meanwhile the dry land that was "reclaimed" through delineating the Kern River's flow is watered by sprinklers and named *after* the Yokuts—only accessible, ironically, by Empire Drive.

But while Baker's reclamation is narrated as part of white progress here, no part of the reclamation process was inevitable. Instead, it progressed through fits and starts, more at the mercy of natural conditions than through planned and coordinated action. It was not only the material effects of discursive practices; but, as this example shows, the materiality of the river itself—and its seasonal shifts—fundamentally affected the modes of linearization and reclamation that spread across the San Joaquin Valley. Through the flood of 1861-1862 and then the dry years until 1867, reclamation grew and spread, with the canals themselves as a performative part of producing the dry land and property of Bakersfield. Over time, they were made possible by—and made possible—the delineation of a singular Kern River, and a

[31] In some ways it is no coincidence that Woilu was at first leveled for a train station: the train was a major vehicle for US imperialism and indigenous dispossession, and the cross-continental railroad was a major way in which California was articulated into the rest of the US nation (Karuka 2019). Railroad land grants were also a central mode—in addition to swamp and desert reclamation—of land alienation. For instance, James Ben Ali Haggin, one of the wealthiest land and water owners in Bakersfield in the late 1800s, bought the odd-numbered tracts of land through railroad land grants, and then used dummymen to buy the even-numbered ones adjoining it under the Swampland Act to amass hundreds of thousands of square miles.

network of canals, in contradistinction to dry land. In turn this also delineated the distinctions between "civilization" and "wildness," whiteness and Indigeneity. These dry lands became the basis for the emergent settler town of Bakersfield.

Buena Vista Lake and Settler Sovereignty

Today, the Buena Vista Aquatic Recreation Center is composed of two reservoirs, Lake Evans and Lake Webb. The area's website advertises the lakes as "designed" for sailing, fishing, jet-skiing, and water-skiing. Along the edges are campsites for RVs and tents with picnic table and electrical hookups. There is a shooting range on the other side of the fence from the road to drive in. There is a specific swimming area where I waded in, the water tepid and murky. From halfway in, I could almost imagine I had been transported back in time: the tule reeds swayed and moved in the breeze and the small waves from jet skis further out. Red-winged blackbirds alighted on the reeds and owl pellets covered the grass around the lake, which is now irrigated by an orderly array of sprinklers. The lakes are large, open, and well-defined. Buena Vista Lake is also the drinking water source for oil towns on the West side of the Valley such as Taft and McKittrick.

This is not the same version of Buena Vista Lake that was threatened by the Lakeview Gusher, as described in the Introduction. It is also not the same version of Buena Vista Lake that originally covered the San Joaquin Valley. The history of how Buena Vista Lake shifted and changed shows the entangled processes of Indigenous dispossession, assertions of US sovereignty, and the work of logics of contamination in reclamation processes—both prior to and after Colonel Baker's work. Again, the

materiality of Buena Vista Lake itself was an integral part of these entanglements, highlighting the material-discursive nature of contamination as a *process* rather than a static fact.

The Spanish generally avoided the inland area of California, instead establishing their missions along the coast; everything inland was "terra incognita." The first Europeans to enter the Valley were deserters from the Spanish army, and Buena Vista Lake was named in 1772, when the Spaniard Pedro Fages came into the Valley searching for these deserters and made the first recorded description of the San Joaquin Valley. He saw a *buena vista* of a "labyrinth of tulares" and shimmering water spread across the valley floor. Meanwhile, the Spaniards called the general area Los Tulares after the high tule reeds that covered the lakes and wetlands and called the indigenous people they met "Tulareños:" people of the tules (W. Smith 2004). These tules stood ten to fifteen feet high, and in high-water seasons, the swamps, lakes, river, and tules stretched twenty to thirty miles wide.

The lakes and the tules had specific meaning to the Spaniards as an ecosystem that, in its liminal state between water and land, was nearly impossible to traverse. The tules also emerge in mission records as a crucial line of defense for the Yokuts during Spanish colonization and the imposition of missions along the coast. For instance, in the Great Chumash Uprising of 1824—the same year that Mexico took control of the region—the Indigenous people at the Purisima, Santa Inés, Santa

Barbara, and San Fernando missions revolted and many took refuge in the tules.[32] As Fray Sarría, a Spaniard, wrote,

> I previously stated the Indians from Santa Bárbara had fled to the valley of tules and the mission had been abandoned. An expedition of soldiers and armed civilians set out to bring them back, but nothing was achieved. In fact, as I indicated, the neophytes then re-grouped on a small island in a large lagoon which was surrounded by dense tules along its shore. The path to the lagoon was defended by a muddy and marshy area. People on horseback could not pass through without experiencing extreme difficulty and danger. (as quoted in Beebe and Senkewicz 1996, 277)

Under Mexican rule, colonial attention to the tules shifted to specifically military purposes, largely in response to Yokuts and Miwok raids on Mexican settlements (Arkush 1993). Historians describe the Valley Yokuts establishing villages and defenses within the thickets and marshlands of the Valley, in geographies that could confound the open-field battle tactics preferred by mounted Mexican troups. As Brooke Arkush writes, "In order for the natives to inflict casualties upon the invaders with flaked stone-tipped arrows and spears, they constructed trench systems fortified with timber stockades within these dense thickets, and through various means (especially obscene language and gestures) induced the soldiers to enter them" (Arkush 1993, 630). In response, the Mexicans tried to destroy these thickets whenever possible.

These stories help us think about racialized logics of contamination in the disappearance of the Buena Vista area's tules. Not only were the swamps seen as

[32] Fages also entered the Valley looking for runaways and refugees but turned around without finding anyone rather than enter them himself.

useless for settler forms of agriculture, in need of improvement, and potentially a danger to the whiteness of settlers. As a haven for rebels and runaways from both the mission system and Mexican rule, they also presented a threat to the rule of settler law, and speak to what Willie Jamaal Wright (2019) terms "the morphology of marronage." Wright foregrounds the role of "unruly landscapes" in forming the conditions of possibility for maroon communities. He writes specifically about communities of people escaping chattel slavery, but, as he expands the term, those looking to escape gendered and racialized violence or the exploitation of capitalism more broadly. He writes, "Landscapes of marronage are those difficult terrains that marginalized, hunted, and exploited people have made habitable—areas where communities have taken a desire for liberation and merged it with an ignored and undervalued environment to gain liberties in opposition to repressive administrations" (Wright 2019, 1). There is a co-constitutive process in which, as Wright also discusses, sites of marronage often become so because they already presented difficulties to capitalist and colonial imaginaries of productive land, and thus are figured as "waste," dangerous, or evil—yet these categorizations deepen as rebels and "criminals" inhabit those spaces as well. The history of the San Joaquin Valley shows how this process is not only co-constitutive but material-discursive.

Upon US annexation, the area of Buena Vista Lake took on a new and different role within colonial control as the site of one proposed reservation among a range of proposed sites. Here, I rely on documents produced by the Tule River Tribe, the descendants of the southern San Joaquin Valley's Yokuts-speaking peoples, and

published on their website. Today, they live on a reservation in the Sierra foothills just above Porterville, California, and have been advocating for decades to build a small reservoir for water storage on the South Fork of the Tule River, as expanded below.

As settlers—many attracted to California by the Gold Rush—began to settle in the valleys below the Sierras, settler violence against the Yokuts became rampant, often in the form of organized private militias that mounted military-style assaults against the Yokuts. These attacks were often justified by accounts of Indigenous raids on horses and cattle. Yet many of these accounts turned out to be far exaggerated, and the horse stealing that did occur was a way to hold back starvation as settler remaking of the landscape undermined their traditional modes of food gathering and land management (A.L. Hurtado 1990; Frank and Goldberg 2011).

In 1851, the US government sent three agents to negotiate treaties with the California tribes.[33] On June third, 1851, therefore—ten years before Colonel Baker ever arrived at Kern Island—fourteen leaders representing the Chu-nut, Wowol, Koyeti, and Yowlumne Yokuts tribes signed the Treaty of Paint Creek. This Treaty established two reservations: the Tule River Reservation ran east-west from the Tule

[33] As Frank and Goldberg (2011) write in their book about the survival of the Tule River Indian Tribe, California Indians' legal rights to land should have been clear. The 1848 Treaty of Guadalupe Hidalgo required the US to respect property rights under Mexican law, which included the property rights of Indigenous tribes, to whom Mexico had granted citizenship when it took control from Spain. Further, many Mexican land grants explicitly required landowners to maintain Indigenous access to resources. Yet if federal authorities did not intervene, these legal facts had little practical impact.

River to Paint Creek, and the Tulare Lake Reservation ran north-south between Tulare Lake and Buena Vista Lake. However, California settlers were angered that the reservations would withdraw farming and mining land from availability for settlement.[34] Under pressure from the California delegation, the US Senate decided in a closed session on July eighth, 1852, not to ratify the Treaty of Paint Creek or the seventeen other treaties that had been negotiated in California. Instead, the treaties were sealed from public view for fifty years.

Also in 1851, the Federal Land Commission Act had appointed a federal commission to hear evidence presented by those who claimed land from either the Spanish or Mexican government. All lands that were not claimed within two years would become public lands of the US. This long, drawn-out process is widely recognized as one of the ways that Mexican land grant owners were, over time, dispossessed of their land (Almaguer 2008) and also shows the fundamental role of modes of land use in emerging racial hierarchies of the time—and the extension of US sovereignty. The Mexican rancho economy, largely based on cattle ranching, was racialized as non-white and, furthermore, threatening to the whiteness and emergent liberal subject of California because it required large tracts and prevented the parceling out of land into small farms. Small farms, instead, were considered the underpinning of that liberal subject, and of the possibility for liberal democracy. However, for small farms to flourish required reclamation projects on a large scale.

[34] In fact, the California State Legislature had proposed moving California Indians to the Indian Territory of Oklahoma instead.

The long, drawn-out process of validating their land claims bankrupted many Mexican land grant holders, who were forced to sell part or all of their land and cattle to pay their legal fees.

It also put indigenous land claims in further jeopardy: over time, both the California Supreme Court and then the US Supreme Court declared that, if tribes hadn't registered their land claims within two years, then they'd forfeited those claims. As the treaties for land that *had* been negotiated were not ratified, the end of the Federal Land Commission process effectively extinguished, within settler law, all aboriginal title claims for California tribes.

In the southern San Joaquin Valley, in the absence of official treaties, Congress authorized five military reservations in California, including one on Fort Tejon, located in the Tehachapi Mountains on a military reserve (this is where Colonel Baker, for instance, had hired Indigenous laborers for his reclamation projects.) In 1863, the US would validate the Mexican land grant of Rancho El Tejon, on which Fort Tejon was located, to its owners Ignacio del Valle and Jose Antonio Aguirre, but the long and litigious process of proving their land grants had bankrupted del Valle and Aguirre. Superintendent of Indian Affairs Edward Beale bought the property to maintain the reservation, but the Tule River Tribe's own records show that large numbers of Yokuts would not permanently leave their home territories to settle there, likely including many of the Indigenous residents that early Bakersfield settlers mentioned (Frank and Goldberg 2011).

In 1856, an Executive Order established the Tule River Farm, a reservation located in the foothills south of Fresno, as part of the Tejon Reservation. Many Southern Valley and Foothill Yokuts were moved to the Tule River Farm, along with Owens Valley Indians from nearby Owens Valley. As the Tule River Tribe and allied historians describe in detail, this was meant to be the final reservation site for the Yokuts, meant to encourage settler modes of farming. The Yokuts planted crops and began to build a communal life there, but meanwhile, Thomas Madden—who worked as an Indian agent on the Farm—fraudulently claimed patent to 1,280 acres of the Farm using public school patents. Although his claim was illegally based, the federal government allowed his patent to stand. Instead, the government paid rent to Madden to allow the Yokuts to continue living and farming there.

In 1873, an Executive Order by President Grant moved the entire reservation about fifteen miles further into the foothills, on land that was significantly less suited to farming than what had become named the Madden Farm. The Federal Government also did not investigate or set aside water rights for the Reservation, leaving it relying on the seasonally changing South Fork of the Tule River, groundwater, and a few surface springs.

Meanwhile, the Senate's non-ratification of the Treaty of Paint Creek left the Tule River and Tulare Lake Reservations, according to settler law, open to be claimed, and the State of California was intent on turning public lands into private property and a taxable land base. The land between Tulare and Buena Vista Lakes would no longer become the Tulare Lake Reservation, and instead was claimed by

Henry Miller and Charles Lux, two German-born settlers to California, through the legal mechanisms of swampland reclamation. After a drawn-out legal battle with land magnate James Haggin, Miller (Lux had died in 1887) and Haggin and Tevis of the Kern Land Company quietly negotiated an 1888 private settlement colloquially called, at the time, the "irrigation bible." This agreement guaranteed both parties partial access to the river's water and committed to building a new Buena Vista Lake Reservoir System, which would increase the capacity of Buena Vista Lake for irrigation and flood control while draining eighteen square miles of Kern Lake's lakebed (Lynch 2009). In addition to reclaiming further lakebed and water storage, the Reservoir was also used for flood control. In 1953, Lake Isabella—a reservoir at the top of Kern Canyon—was finished, making Buena Vista Lake superfluous. Instead, the lake bottom was more profitable as dry farmland until 1973, when Kern County built the current Buena Vista Aquatic Recreational Area on the old lake bed's north shore and filled it with water from the California Aqueduct.

Scholars like Traci Brynn Voyles and Valerie Kuletz have shown how settler understandings of land or land use as wasted or wasteful served in the racialization of the people who lived there, and vice versa (Voyles 2015; Kuletz 1998). Yet these connections—between the racialization of lands and peoples—weren't only discursive ones, but also fundamentally material processes, which an attention to contamination as a material-discursive *process* makes clear. Both the Kern River and Buena Vista Lake are examples of the impact of racializing a landscape as contaminating, and the performative, material-discursive work of separating the civilized fields of private

property from the unruliness of marshes or deserts. The previous section showed the performative work of logics of disease and contamination within the work of linearizing the Kern River and producing present-day Bakersfield; the history of Buena Vista Lake shows this process working two-fold: both in response to Indigenous and Mexican relationships to land.

As historian Tomás Almaguer recounts, racial formations in the new state of California were by no means obvious, and the question of how both Indigenous peoples and Mexican residents would be racialized was an open and hotly debated discussion: "The Constitutional Convention of 1849 fiercely debated how these racial lines were to be drawn, and consequently, who would and would not be extended the franchise and other important citizenship rights" (Almaguer 2008, 9). On both counts, US settler understandings of proper land use would play a major role.

Mexicans had gained important political rights based on the Treaty of Guadalupe Hidalgo and the US Constitution, including citizenship and suffrage. However, to white settlers, the rancho economy was inferior because it largely didn't involve sedentary agriculture. As Almaguer writes, "The "gente de razon" [wealthy families holding large tracts of land] were reluctantly seen as white; the mestizo were greasers or gente sin razon, and seen as nonwhite, not much different than the "savages" (Almaguer 2008, 55). He concludes that the central conflict between Anglos and Mexicans was a class-specific struggle over the state's best farmlands. In contrast, Indigenous peoples' "traditional hunting and gathering economy and their system of gender and sexual meanings proved to Anglos that they were not only

uncivilized but heathen as well" (Almaguer 2008, 108). Seen as unassimilable and instead occupying land that settlers wanted, they were racialized as subhuman: a necessary precondition for settler rationalizations of anti-Indigenous violence and the expropriation of their lands.

In turn, the legal mechanisms that dispossessed both Yokuts and Mexican landowners often did so by granting property rights to those who either drained or irrigated land: as described above, public land often became white property through mechanisms like the Swamp Lands Act or the Federal Desert Lands Act. In other words, not only were peoples racialized through relationships to land, but land was expropriated through changing its actual "morphology," to use Wright's term. The extension of settler sovereignty and white supremacist racialization was not only a discursive process but one of material transformation of land. Again, an attention to contamination as a material-discursive analytic makes this clear.

The specific ecology of the original Buena Vista Lake and its surrounding wetlands and marshes were central to Indigenous resistance to colonial control; its particularly "difficult terrain," as Wright would put it, both formed a barrier of protection for the Yokuts against the Spanish and Mexican colonial governments, and the marsh just north of Buena Vista Lake would have become part of the Tulare Lake Reservation. In contrast, producing land as private property was deeply entangled with ideas of producing a landscape conducive of liberal democracy; the maintenance and discipline of the white liberal subject; and the production of California as an economically productive space for orchards, vineyards, and crops. In this context,

Buena Vista Lake was racialized as contaminating, not only in the threat of miasmas and marsh vapors to the body, but also the potentially contaminating elements of runaways, bandits, and Indigenous resistance to the body politic.

The later draining of Buena Vista Lake's surrounding wetlands and marshes, and the engineering of Buena Vista Lake into a smaller, deeper, more confined reservoir, was fundamental to extending settler control. But this land wouldn't have been available to become settler property through the Swamp Land Act or the Desert Reclamation Act if it hadn't been for the prior work of the 1851 Land Commission Act and the non-ratification of the eighteen treaties in 1852. And all of this was made possible through the material-discursive work of contamination as a logic and a set of practices.

Today, the Tule River Tribe is working toward building a small reservoir on their reservation to meet their water needs. As articulated in Tribal documents and oral testimony in support of state legislation to fund building the reservoir in 2007 and 2009, their existing water—the small South Fork of the Tule River, groundwater, and a few springs— "barely serve the current needs of the Tribal community on the Reservation" (Garfield 2009, 5). The Tribe reached an amicable settlement with downstream non-Indian users, including the South Tule Independent Ditch Company and the Tule River Association, in 2007 and now await State legislation funding the reservoir.

They argue that this would also settler their claims of fraudulence and wrongdoing as the Tule River Reservation was moved and reduced repeatedly. It will

also assure their federal water rights under the Winters doctrine, a 1908 US Supreme Court decision which asserts Indigenous water rights to as much water as required to make their reserved homelands liveable and sustainable, now and into the future. While Winters water rights often remain rights on *paper* but not in practice, Ryan Garfield, speaking in 2009 as the Chairman of the Tule River Tribe, said, “Once the settlement is fully carried out, the Tribe will join other Indian nations in the United States, by turning its "paper" federal reserved rights to water from the South Fork Tule River into actual "wet" water” (Garfield 2009, 2).

Conclusion

Overall, swampland reclamation affected almost 1200 square miles of sloughs, shallow lakes, and marshes in the Tulare basin and cut about 50,000 acres of riparian forests throughout the southern San Joaquin Valley. The wetlands and marshes along the many channels of the Kern and other rivers, Tulare Lake, and Buena Vista Lake had been a principal wintering habitat for waterfowl and shorebirds, as well as fish, beaver, tule elk, and antelope.

Even before the *Lux v Haggin* decision, water diversions had heavily decreased the wetlands and lakes. Afterward, the wetlands that fed the lakes dried up first, and then the lakes themselves dried in the following decades. Tulare Lake, for instance, once the largest freshwater lake west of the Mississippi, fully evaporated; Kern and Buena Vista lakes dropped precipitously. After Miller and Haggin’s 1888 “irrigation bible” settlement, Kern Lake fully dried as well.

Throughout this process, though, the Kern River still flooded regularly, and repeatedly broke both Miller and Lux' and Haggin's infrastructure. For instance, in 1877, when Miller and Lux lost their 10,000 cattle, one observer had described Miller and Lux' canal headgate "impregnable to the wildest shock" (Igler 2005, 117). But in early 1878, the Kern River flooded and broke the canal headgate and walls. Miller and Lux' head engineer, S.W. Wible, reported that the headgate had functioned properly for only three months.

Again, on May seventeenth, 1884—in fact, while the Supreme Court was hearing Miller and Lux' appeal—Haggin's levees broke: in a few hours a hole forty feet wide had opened and torrents of water were rushing through (Bremer 1999, 213). After they'd repaired it, though, the levee broke again; the whole lakebed returned to a lake and didn't completely dry for over a year. Igler notes, "As late as 1910, the *Bakersfield Californian* complained of the "serious damage" caused by flooding "for the past few years." Echoing its own words of thirty years past, the paper stated that "the future will involve a great deal of expensive work to control the waters of Kern river so as to guard against the great danger of [the county] being overflowed" (Igler 2005, 117).

Similarly, after Baker's original ditches, Bakersfield's hydrologic infrastructure consistently flooded. In 1867-1868, floods returned to the recently dried lands that Baker had sold. A massive flood re-inundated all of Baker's recently reclaimed lands; as Wallace Morgan describes, a settler named Mr. Hudnut saw the floodwaters coming and climbed a tree to keep out of reach. His wife and sister-in-

law, in the house on slightly higher ground, but the stream flooded the house; they perched on the beds, but "the water steadily rose, and what was equally appalling, the roof above their heads was slowly but steadily sinking down. Pretty soon they realized that the adobes at the bottom of the wall were melting in the flood" (Morgan 1914, 60). Eventually the roof was so low that they went outside and scrambled up on top of it, and all three of them sat in their respective places until men with a boat came to their rescue.

The town flooded again in 1893, and other parts of Bakersfield's hydrologic infrastructure were damaged by flooding in 1877, 1884, and repeatedly after that until Lake Isabella—which dams the Kern River at the top of Kern Canyon—was built in 1953 (Igler 2005). Each time, the hydrologic system, and the distinction between inundated lakes and agriculture property, had to be materially remade.[35] These floods are a reminder of the work that is required to maintain the landscape as we know it today; the damming and diversion of the rivers, and draining of wetlands, was never over once and for all. Instead, capitalism takes an immense amount of work to maintain as such and consistently produces its own failures.

[35] In fact, Wallace Morgan goes on to detail an 1878 court case in which the twelfth district declared the patent for reclamation null and void. The court pointed out that the land itself was not actually reclaimed: a fact, Morgan writes, which was "not to be disputed by anyone" (Morgan 1914, 57). An act also approved in 1878, however, provided that anyone who had subsequently bought land on the Montgomery patent could keep their ownership if they had spent more than one dollar an acre in improvements since they purchased it. This is one example in which reclamation served more as a way to transfer public lands into private property as much as it did actually remaking the land.

Even the ostensible *success* of reclamation projects, too, produced ongoing failures. Overirrigation could in fact raise the water table and bring additional salinity to the surface. By the end of the 1880s, the state engineer William Hammond Hall (1889) wrote, "water stands on the surface [of the land in Fresno County], rushes grow, mosquitos breed, malarial fevers abound, and the people are crying for drainage…if irrigation keeps on, the time will come when the whole country will require draining" (as quoted in Igler 2005, 113). Concerns over overirrigation then propelled a further level of monitoring of water levels throughout the state (Worster 1985).

Just as feminist theorizations of performativity highlight the fact that performative intra-actions come to seem effortless precisely through their repetition—the repetition of which obscures the conditions of those intra-actions themselves—each failure of a dam or canal re-entrenches the necessity and centrality of hydrology and hydrologic engineering. Even as water engineering projects continually produce their own failures, these failures instead propel the need for increased state interventions and infrastructure projects. Further, while property itself is performative and requires consistent re-articulation, so do the San Joaquin Valley's fields today: their continued productivity requires continuous technological and material interventions, including fertilizers, pesticides, groundwater extraction techniques, and a statewide hydraulic system.

These constantly shifting water levels, and the performative production of this landscape, remind us that none of this was inevitable, and points to the multiple

cracks, seepages, and other possibilities that surround us. If the work of performativity is to rearticulate dominant norms, even the hydrology of the Kern River—or of Buena Vista Lake—produces points of exit or contestation, from which we can see that none of this was inevitable. A material-discursive analysis of contamination as a shifting and performative process enables an attention to the co-constitutive relationships of water, land, and their settler colonial and racial capitalist transformation.

Chapter 2:

Embodied Empiricisms: Sensing Contamination and the Racialized Work of (Non)Attunement

Figure 3: Standing downwind of a flare outside Arvin, CA. Image by author and Kyle Ferrar.

Kyle and I barreled down the dirt road in his truck. Dust poured into the windows, open to the 100-degree heat because he doesn't have air conditioning. We parked next to a flare. Other than its guttering flame sound, the late afternoon was silent. "Well, I don't see any trespassing signs," Kyle shrugged, and walked into a field to get the flare in the camera's sights.

Next to us was a still pumpjack; I moved around it, taking photos (see figure 3). Suddenly it started to move, and the hydrocarbon smell was so strong that my throat burned and my eyes watered. I hurried around to the upwind side, trying not to breathe. I had a headache –from heat and dehydration, or from the fumes, I didn't know. As we drove away Kyle's eyes were also watery and red-rimmed, and we both had slightly runny noses.

Kyle works for FracTracker and has been trained in how to use a Forward Looking Infrared (FLIR) camera, which uses infrared technology to make hydrocarbon emissions visible. I was helping Kyle map the aquifers most at risk of contamination from oil extraction. All day we had filmed oil drilling sites in the small town of Arvin, south of Bakersfield in the San Joaquin Valley, guided by Cesar Aguirre and his brother, Gustavo Aguirre Jr, both organizers with CCEJN. The FLIR footage was part of CCEJN and the Committee for a Better Arvin (CBA)'s support of a 2018 Arvin City Council ordinance that would ban fracking and oil drilling within 300 feet of homes and schools. This ban is relatively conservative compared to the medically recommended 2500-foot setback between oil and homes or schools (Shonkoff et al. 2017). But in the oil-dominated Bakersfield area, even 300 feet would be a major accomplishment.

Like many towns around Bakersfield, Arvin is surrounded by agribusiness, oil fields, and dairies. The overlapping environmental health impacts of these industries in Arvin and other communities such as Shafter and Lost Hills disproportionately impact Latinx, low-income residents (Harrison 2011). In Arvin particularly, oil wells

and storage tanks sit directly next to apartment buildings, schools, and homes. In 2014, eight houses—including the Arvin mayor's house—were evacuated because they contained dangerous levels of gas from a leaking underground line carrying waste gas from oil wells nearby. For months, residents had complained of nosebleeds, dizziness, and headaches, but were disregarded by regulatory agencies until an organizer from CCEJN, Gustavo Aguirre, took a grab sample from their basements and found gas levels that were thirteen times higher than the US Environmental Protection Agency (EPA)'s standard. In response, CCEJN and Arvin residents, including the local group (CBA), began monitoring hydrocarbon emissions anywhere people reported the smell.

Hydrocarbon fumes are invisible, but with the FLIR, they become bubbling white clouds that look strikingly similar to the marsh vapors that historically hung over the Central Valley, which California settlers called miasmas. In the nineteenth century these vapors were thought to cause malaria (literally "bad air" in Italian) and other diseases. Though hydrocarbons and marsh vapors have very different effects on the body, their respective histories as public health concerns signal the historical continuities between ideas of contamination, race, and health or disease. This chapter expands from the embodied experience of that one day of fieldwork, the evidence that it produced, and how that evidence circulated in one community's political action.

Environmental justice scholarship, broadly defined, has done important work articulating the ways in which contamination is not an unfortunate aberration but instead is fundamentally necessary within US settler colonial and racial capitalist

formations: as much as capitalism requires the extraction of new resources, it also requires "sinks" for its waste, and both produce locally specific environmental health impacts (Shapiro 2015; Barba 2020; Fiske 2020; Checker 2005; Sze et al. 2009). Some have called this "anthropocentric exposure," in which "preventing permeation by the continual, residual, overwhelming onslaught of industrial toxicants is neither possible nor expected" (Roberts 2017). Yet this exposure is also stratified, with low-income communities and communities of color disproportionately exposed to toxicants and contamination (Bullard and Chavis 1999).

These scholars have also argued that standard scientific methods are insufficient to fully address contamination, and instead argue for a turn to "vernacular experience" (Fiske 2020), "bodily reasoning" (Shapiro 2015), "atmospheric attunement" (Stewart 2011), "olfactory epistemologies" (Reno 2011), or "somatic modes of attention" (Csordas 1993).[36] Modes of describing toxicity that begin from embodied experience are indeed necessary to describe subtle but chronic environmental contamination. Yet centering the body and embodied experience in the work of producing evidence about contamination or toxicity also requires rethinking what we mean by the body. It also invites a way of thinking about objectivity, and knowledge production more broadly, as not only discursive but also fundamentally a material-discursive *practice*.

[36] I use the phrase "embodied empiricisms," the same phrase used by historians of science C. Wolfe and Gal (2010), in order to highlight the centrality of bodily attunement within the canon of scientific empiricisms.

As feminist theory has shown, the idea of a stable and distinct body is a historically specific idea, one which has shifted over the last few centuries. How we understand bodies, and the forms of relationship they have with their surroundings, is intimately tied to discourses of race, gender, and contamination (Butler 2011; D. Nelson 1999). Further, one of the troubling and unique things about chemical contamination is the way it destabilizes any clear idea of bodily boundaries. As San Joaquin Valley environmental justice activists use their bodies to measure the contaminated environment around them, they center the complex vulnerability of the body.

Therefore, this chapter contributes to this conversation by centering feminist and science studies descriptions of the historical complexity of bodily definition. Attending to the historicity of logics of contamination—as well as the impacts of contaminants themselves—is a way to understand the ways in which ideas of the stable human body were produced in and through racialized ideas of contamination, its potential pathways, and its potential effects. In other words, beginning from embodiment does more than just offer a different understanding of contamination. It also opens discussion of how understandings of bodies are produced in and through understandings of their (im)permeability and emphasizes the nature of knowledge production as a material-discursive practice.

In the nineteenth century, the idea of differential sensitivity was central to developing understandings of race and evolutionary change (Schuller 2017; Nash 2007). This differential capacity included physiological sensitivity and susceptibility

to disease as well as sensory and emotional sensitivity. Those belonging to more "civilized" races were understood to be more sensitive; physicians of the time believed that a person's susceptibility to malaria was directly related to their race, and racialized peoples, for instance, were considered insensitive to pain (Herzig 2005; Ferreira da Silva 2017).[37] Today, scholars have shown the ways in which exposure to toxicity and contamination can be a *sensitizing* process with major epistemological and affective ramifications (Shapiro 2015). As we see in this chapter, organizers and residents in the San Joaquin Valley, like Gustavo, had also become sensitized to toxicity—and made it an integral part of their community monitoring and organizing networks. Thinking about the historicity of not only contamination but also *sensitivity* as part of racial frameworks, then, shows a different way to think about the constitution of the body and a different way to think about the production of evidence.

This is important because it places environmental justice advocates' embodied empirical evidence squarely *inside* scientific inquiry, rather than outside it. As it emerged in the late 1980s and early 1990s, the environmental justice movement emphasized community involvement in monitoring and environmental decision-making (Bullard and Chavis 1999; Collin and Collin 1998). Yet today, many approaches to community participation in decision-making continue to operate on a deficit framework, assuming that communities need to be educated by institutional

[37] In many ways these assumptions continue today, with studies that show that doctors routinely underestimate black women's pain in particular.

modes rather than having valuable evidence of their own to *contribute* (Cole and Foster 2001). Further, what could broadly be considered community science is often still dismissed as less rigorous than regulatory science. Scholars have well documented how scientists and other "experts" alienate community members with patronizing responses or confusing scientific language (Kaminstein 2008). In response, community-engaged researchers have attended to frames of "popular epidemiology" (Brown 1992), "street science" (Corburn 2005), or "citizen science" (Irwin 2002), among others.

Yet tracing the role of contamination and sensitivity in understandings of the raced body shows that empirical evidence has always been at the center of scientific modes, though definitions of "empirical" have shifted over time—and that empiricisms required a feeling body. In fact, embodied empiricisms were central to the development of scientific inquiry throughout the Enlightenment era and into the nineteenth century: as I show, the body was considered *integral* to the production of empirical knowledge rather than potentially detracting from it. This destabilizes any binary of community versus regulatory science and asks us to reconsider the relationship between professional and community evidence production. I believe that these nineteenth century arguments into account helps us complicate the racialized valences of dismissing frontline communities' experiential evidence.

In this chapter, therefore, I begin by reviewing feminist approaches to historical understandings of bodily sensitivity, race, and experiential evidence. I first elaborate on Kyla Schuller's description of nineteenth-century conceptions of bodily

malleability as intrinsically related to race. I put this in conversation with historians such as Linda Nash to show the connections between bodily malleability and emerging understandings of disease and health in California. These understandings persisted in complicated ways in twentieth-century attitudes toward farmworkers as disposable and were particularly visible in the context of the UFW's struggles over farmworker pesticide poisonings (Barba 2020; Nash 2007; Pulido 1996). I trace this history with a specific focus on embodiment and evidence production.

I then discuss the bodily attunement and, alternately, non-attunement of residents and activists in Bakersfield. Finally, I describe the political impact of embodied evidence and the affective registers it calls upon. In the face of regulatory systems and permission-to-pollute regimes (Shadaan and Murphy 2020) that are structurally set up to fail communities, the evidence-gathering of communities such as Arvin, and the circuits in which that evidence travels, show the centrality of embodiment to the production of evidence more broadly. I return to Arvin's City Council setback ordinance and show the ways that the FLIR footage worked in concert with longstanding community organizing to achieve that success.

Contaminable Bodies

In the evening after finishing FLIR work with Kyle, I drove with Cesar to Lost Hills, a small community just east of one of California's largest oil fields. His air conditioning was out too, so we drove with the windows down. 100-degree air buffeted around our faces, creating a more literal version of Murphy's "white noise," so we had the music turned up and were yelling to hear each other. This car ride,

flying down Highway 99 in the heat, in some ways formed a nexus of the different forms of attunement and evidentiary claims used in environmental justice organizing. Cesar's sense of both smell and sight have been attuned not only by living here but by the work he does. Because Valley-wide air monitors often don't register the hyper-local effects of individual oil wells placed next to schools or homes, organizers and residents have trained their own senses of smell or vision to measure this contamination at much higher resolution.

The whole way out, Cesar kept sniffing the air and saying, "Do you smell that? Do you smell it?"

"No," I kept saying – "nothing."

He rolled down the window a little further and coached me: "don't take long breaths, take short shallow ones." But I still couldn't smell anything.

Cesar said it takes time to get attuned. "Like spices," he said; "you don't necessarily know each one, but if you're attuned, then you're like, oh, that's nutmeg." His phone also rang repeatedly: the FLIR footage from the day before was circulating on Twitter, and CCEJN's nonprofit partners—local, state, and national organizations—were calling to plan a conference call that evening. He went on to explain how residents become attuned to different smells over time. He told me there's an instrument called a nasometer; you hold it in your nose, and it measures the air quality as you breathe in. "But just like it's best to use your hands to knead out knots because your hands feel them, it's best to use your nose because it's the best sensor," he said.

Cesar and other residents have become closely attuned to the smell or sight of contamination, but today, embodied or experiential evidence is often dismissed as "anecdotal" precisely because of its origin in a feeling, thinking body. This dismissal is premised on ideas of the isolated body that emerged with germ theory in the mid-twentieth century in which embodiment itself could become a contaminating influence on the production of evidence (Murphy 2006). However, the isolated body is a historically specific concept. Until the mid-twentieth century, bodies were understood as fundamentally permeable, and the sensitivity of the body was also central to scientific empiricisms from Aristotle through the Enlightenment sciences and their later professionalization (Schuller 2017). Further, the relative sensitivity of the body to its environment (both emotionally and physically) was an important aspect of racial and gendered difference. Therefore, we can see what is in effect a logic of contamination at work in contemporary scientific dismissals of embodied or experiential evidence. In this section I draw on feminist theorizations of the body, and specifically the work of Kyla Schuller and Linda Nash, toward a shifted understanding of the relationships between race, contamination, and sensitivity and how they affect understandings of empirical evidence.

Empiricisms

The definition of empiricism itself has a contested meaning, but its usage as we understand it today emerged in the 17th century as "a new attention to the senses and their function from a physiological, practical and epistemological point of view" (C. Wolfe and Gal 2010, 3). The most common definitions of empiricism emerge

from the emphasis on experiment in, for instance, the ideas of Francis Bacon and Robert Boyle (MacIntosh and Anstey 2018) and the meetings of the Royal Society of London. According to historians of science Charles Wolfe and Ofer Gal, this was a framework that emphasized experimentation, specially designed instruments, gentlemanly conduct, and accuracy and replicability (C. Wolfe and Gal 2010). Several other words associated with this discourse of the senses also took on their modern definitions within this same time. The word "observation," for instance, came to mean extended scrutiny, careful attention, rather than the practice of a rite or ritual as it had in past centuries. Experience, similarly, came to mean a personal affective feeling rather than an event, trial, or circumscribed thing that had happened (Salter 2010).[38]

Yet of course there were multiple threads of empiricism at the time, and historians and philosophers of science have highlighted this multiplicity in the last few decades, shifting understandings of empiricism away from only this experimental, mechanistic view. While Robert Boyle's many experiments were united by a commitment to a mechanistic view of the universe—a belief which many

[38] As Salter expands, "Authors took the physiology of the senses as a foundation on which to construct imaginative treatments of epistemology which in turn shaped the new philosophy of empiricism" (Salter 2010, 60). This philosophical development was part of the beginning of the Enlightenment, in mid-17th century England as the center of a growing empire. Much of what we recognize as modern science emerged in this period, in part out of meetings such as the Royal Society of London. Attendant changes in terms like "observation" and "experience" were part of this shift away from religious thinking toward the individualism and liberalism of thinkers like Locke, who were also at the time theorizing modes of embodied empiricisms.

of his contemporaries also professed—there were also more medical, embodied empiricisms, in which the stress was on observation rather than on experiment, on bodily states rather than on de-personalized, quantitative measures (C. Wolfe and Gal 2010). This empiricism was always focused on the body, and as historians of science have shown, many of the original empiricists were physicians or were interested in the body and life sciences. Thus, "As reflections on experience and the acquisition of knowledge by embodied, affective agents, meditations on 'first philosophy' and essays on 'human understanding' are closer to treatises on the passions, hysteria, the curing of fevers or vertigo…than they are to critiques of pure reason or proofs of the external world" (C. Wolfe and Gal 2010, 2–3).

The body became both an *object* and an *instrument* of research, and the role of the body was hotly debated. For instance, the advent of the telescope and modern optics was positioned as superior to the function of the human eye (Gal and Chen-Morris 2010) even while discourses of bodily "sensibility" were core to emergent empiricist thought across the sciences, art, and literature.

The Permeable Body

Understandings of the body have shifted widely within the last century. In *The Biopolitics of Feeling,* Kyla Schuller argues that in the nineteenth century, the body—and the nervous system more specifically—was understood to be in continuous interaction with its environment; its differential sensitivity (both emotionally and physically) to these interactions was a marker of both race and sex. Impressibility, a concept which "indexed the agential responsiveness of the nervous system to external

stimuli" (Schuller 2017, 7), emerged alongside related frameworks of contagion, probability, and risk, all of which have travelled into the contemporary moment of public health. Race and sex were not immutable and static attributes; instead, differential impressibility created differences in racial or sexual definitions at the scale of both the individual body and the generational descent of evolution. The "more civilized" races, through habitual actions over evolutionary time, had developed more "refined" and sensitive nervous systems, while "less civilized" races were understood to be much less sensitive, caught at an early stage of human evolutionary development.

Differential sensitivity to impressions was also the bedrock of emerging empiricist thought. Discourses of *sensibility,* or the capacity to receive impressions, had begun in the 17th century but become more elaborated in eighteenth-century imperial scientific and literary cultures, and became part of the bedrock of scientific empiricism throughout physics, mathematics, and chemistry (Riskin 2002). Schuller traces a history of empiricist philosophy back to Aristotle's use of impressions as a metaphor. For him, sensation itself happened through impression: it was "being physically open to and impacted by the shape and spirit of an object without incorporating the object itself into the body" (Schuller 2017, 42).

Impressions became a central metaphor in Enlightenment epistemologies as well. For John Locke, for instance, often considered the founder of empiricisms in Western discourse, impressions accumulated over time as the grounds of the self. He then relied on colonial hierarchies of the time to determine which minds could receive

and respond to stimulation, and which (uncivilized) minds let sensations pass right through, without creating an impression. Locke was very much in conversation with the empiricists such as Boyle, discussed above.

Later scientists, such as the French naturalist and evolutionary theorist Jean-Baptiste Lamarck, believed that repeated sensations not only created memory and the self, as John Locke described, but also the *shape* of organisms themselves. Further, he hypothesized that these physical adaptations were transmitted to progeny: in Lamarckian evolutionary theory, any changes accrued during an individual's life would also be passed down generationally. Lamarckism expanded Locke's understanding—of impressions creating the development of the individual—into a process that linked bodies together over generational time. If culture impressed itself on the body, then these impressions also produced inheritable traits through time.

Within modern notions of biological race as determining a body's relative value, Lamarckian evolutionary thinking and impressibility discourses then, in Schuller's words, "translated the era's empiricist epistemology, or the idea that knowledge derives from sensory experience, into a theory of species, race, and sex formation" (Schuller 2017, 37). Race was understood as the accumulation of impressions from a body's climate, environment, and culture, and racism, therefore, functioned by governing the interactions between humans as well as between humans and their environments.

Gender was also a constitutive part of this framework. If "civilized" nervous systems and bodies were more sensitive and permeable than uncivilized bodies, then

they stood the risk of being "contaminated" over time by less refined impulses; they could also, potentially devolve into over-sensitized "hysteria." Therefore, binary gender was understood as an important stabilizing force: while women might be more sensitive, men were more rational, and the heterosexual couple and nuclear family became the foundational unit for the propagation of civilized society (Schuller 2017).

Bodies and Environments

In Linda Nash's history of ideas of health and disease in California's Central Valley, for instance, she focuses on the ways in which nineteenth-century white settlers to California understood the impacts of the landscape on their bodies. She points out that white settlers believed a person's race was liable to shift in a new location, especially over generational time. Therefore, "careful scrutiny of the land and its bodily effects provided an important arena for the ongoing construction of race and racial ideology" (Nash 2007, 13).

Upon white settlers' arrival, the field of environmental medicine considered warm climates such as the Central Valley to "overstimulate the temperate European constitution" (Nash 2007, 28), leading to a predisposition for disease. Further, given environmentalist understandings of race, the question emerged: "if European bodies could in fact physically change to survive in a new climate, would they still be European? More to the point, would they still be white?" (Nash 2007, 30). Therefore, white migration to frontier locations like California was also considered a deep threat to the maintenance of the white race—in particular, with fears about California's

impact on white women's bodies.[39] In her deep historical work, we see that this idea of the body as porous and permeable didn't only affect understandings of the body, disease, and race; it also shaped colonial responses to California as an ecosystem.[40]

This brief history shows that, for nineteenth-century naturalists and scientists, the emotional and physical sensitivity of a body to impressions upon it was at once the basis for scientific empiricisms, and the basis for evolutionary race thinking. These co-constitutions also impacted the emergent field of public health, as well as conceptions of disease and the boundaries of the body. The push for rural sanitation was motivated in part by long-standing concerns about race—and, in particular, the contamination of the white race through disease. As Nash writes, physicians "equated certain rural diseases—especially hookworm and malaria—with the racial deterioration of whites. They increasingly blamed these diseases for creating an inferior breed of whites that were plagued by poverty, low intelligence, and lack of vigor" (Nash 2007, 97). These racial concerns had a particular valence in California, whose large-scale agriculture already relied on nonwhite and migratory labor.[41]

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[39] This articulated with the fears of white race suicide articulated by progressive politicians such as Teddy Roosevelt and others (Haraway 1984).

[40] One example of this is the story of malaria that I began with in Chapter 1. White settlers, considering themselves more impressible and more vulnerable to "tropical" illness, also considered themselves more susceptible to malaria and other diseases even though it had been white trappers that originally brought malaria to California. In turn, this fear of malaria was a major propeller of reclaiming lakes and swamps into dry lands.

[41] The push for irrigation, as well, largely rested on the desire—in the words of Elwood Mead— "to keep rural civilization in California white" (Nash 2007, 97) in part by producing small family farms and by reducing the chance of disease.

Diseases among nonwhites were frequently dismissed as due to personal behaviors rather than the environment—or written off under notions of extraordinary physical fitness (Shah 2001; Molina 2006). Chinese workers were considered racialized public health threats and Chinese neighborhoods were repeatedly blamed as the source of "miasmatic effluvia" that wafted into unsuspecting white bodies. Disease therefore became an oft-repeated rationalization for Chinese exclusion (Shah 2001; Taylor 2014). Meanwhile, Mexicans were racialized as physically fit and particularly well suited for hard agricultural labor; disease was often undercounted and, until public sentiments began to change after the 1924 Immigration Act, it was often assumed that they contracted diseases like tuberculosis after they had entered the United States because of "cultural" factors like poor hygiene and overcrowding (Molina 2006).[42]

It was in this milieu that Rudolph Virchow, in the mid-nineteenth century, documented the causes of a German typhus epidemic by attending to not only biological but also social and economic impacts on health. Nineteenth-century reformers, such as Jane Addams and Florence Kelley, similarly focused on the living conditions of the poor and working class and advanced modern epidemiological methods. They not only *studied* what would come to be called the social determinants

[42] After 1924, however, angry that Mexican immigration hadn't been affected as much as white immigration from southern and eastern Europe, anti-immigrationists began promoting ideas of Mexican immigrants as disease-prone in what Molina calls "medicalized nativism." Alexandra Stern (2005) also describes the use of DDT on Mexican immigrants as a toxic tool of cleaning their bodies before entering the US.

of health, but also began to emphasize the lived experiences of those most exposed, encouraging community residents to record, map, and share their experiences of pollution (Corburn 2005).

Tracing this history is useful because it highlights the relationship between race and contamination—and, more profoundly, the relationship between race and a body's permeability *to* contamination. Further, modern interpretations of scientific empiricism center an ahistorical, disembodied mind working with increasingly mechanized instrumentation, such that any location of that mind within a body is seen as a contaminating factor, which I discuss below. Returning to the links between race, bodily permeability, and empirical knowledge, this history places the embodied empiricisms of contemporary environmental justice organizers as always already within the foundations of scientific evidence-production, destabilizing binaries between community and official science, which I expand further in the next section.

The Permeable Body and Pesticide Use in California

One of the starkest examples of contestations over the permeability of the body is the use of pesticides in California agriculture, its impact on farmworkers, and the strategies used by the UFW to combat pesticide poisoning. As with the history traced above, the questions of bodily permeability in the context of pesticides also have much to do with shifting ideas around empiricisms and the production of evidence, as well as the racialized body. The difficulty of tracing pesticide exposure from the 1960s to the present shows the necessity—but complications—of using bodies as instruments.

As germ theory came to dominate public health work, socially based public health work was largely replaced by laboratory-based research (Nash 2007; Corburn 2005). “By the 1930s lay participation in community-health issues was almost nonexistent because most epidemiological investigations ignored social factors or treated them as nuisance variables in statistical models that focused on isolating germs” (Corburn 2005, 31). The emergence of germ theory added credence to the logic of contamination that had already been at work in separating scientific inquiry from other forms of work: social or economic factors, as nuisance variables, were seen to contaminate the work of focusing specifically on isolating germs. It is worth highlighting the *logic* of contamination here that aims to protect a pure internal thing (in this case, the disembodied observer) from the potential incursions of that observer’s material body and conditions.

However, in the late 1950s and 1960s, a series of highly publicized environmental disasters, the (1962) publication of Rachel Carson’s *Silent Spring,* and a range of growing social movements prompted a return to considering factors beyond germ theory as legitimate fields of academic inquiry. As one example, the Young Lords, a group of New York City Puerto Rican activists, organized street cleanups to collect neighborhood garbage, and convinced local professionals to train them to do door-to-door lead-poisoning screening and tuberculosis testing (Melendez 2005) as part of a broader project of organizing for Latinx power.

Some of the most well-known examples of community science today were in the towns of Love Canal, New York and Woburn, Massachusetts, in the 1970s.

Environmental health activism and community science by residents of Love Canal showed elevated rates of disease related to landfill contamination. Similarly, residents of Woburn, Massachusetts did their own popular epidemiology, investigating the links between local pollution and sickness (Brown 1992). However, the UFW was already using community-based embodied evidence in the early 1960s in its work at the intersections between racial, economic and environmental justice.

By the 1960s, pesticides were an accepted and deeply entrenched aspect of agriculture. The California Department of Food and Agriculture (who was at that time responsible for regulation) did very little to protect workers from exposure to pesticides, only opening a subcommittee in 1969 to explore the relationship between workers and pesticides (Pulido 1996). Farmworkers and early UFW members recall "clouds of pesticides rolling across the landscape" and the impacts to their skin of applying pesticides without gloves (Pulido 1996). For the UFW, pesticides became both an issue and a tool to bargain for contracts.

Yet when the UFW brought up concerns over pesticides, regulatory agencies disregarded their concerns and sought to discredit any public health workers who shared farmworkers' concerns (Nash 2007; Pulido 1996).[43] Regulatory strategies not only relied on a modern concept of the body isolated from the surrounding environment, but scientific studies also usually used single-path causality models or

[43] Other scholars of the San Joaquin Valley also describe industry representatives, medical experts, and regulators dismissing complaints of pesticide exposure: Jill Harrison details victims of pesticide drift, or their advocates, being dismissed as "emotional" or "irrational," or "faking" their symptoms to get off work (Harrison 2006, 517–18).

lab studies which "controlled" for environmental factors. Incomplete records kept by county officials and lax reporting requirements meant that an absence of data continued to pervade these discussions (see Chapter 3 for a longer discussion of the absences of data).

Facing sparse information about the impacts of pesticides, the UFW formed the Health and Safety Committee, made of three health professionals, who did research and education about pesticides in the 1960s. One of the main issues they faced was the status of pesticide spraying reports as trade secrets.[44] California did have a reporting system for both pesticide injuries and for spraying, but injuries were systematically undercounted or written off, and the agricultural commissioner, Thomas Morley, refused to share pesticide spraying records with the public. This meant that, though the UFW's clinic saw numerous poisoning cases, "they did not know which pesticides were responsible for which injuries, and neither fieldworkers nor the general public had access to those records" (Pulido 1996, 91).

When the UFW sued for access to the pesticide spray reports, courts repeatedly sided with the growers until a case in 1969 in which a young woman had symptoms that couldn't be diagnosed because there weren't adequate records of her potential exposure. The judge hearing the case, originally in Riverside County, still sided with the growers based on the reports' status as trade secrets. The attorney

[44] Today, the chemicals used in fracking and oil drilling are also classified as trade secrets, and the dynamics of uncertainty that surfaced around pesticide exposure are very similar to the uncertainties today around contamination from fracking and oil drilling.

general's office appealed the case, and the Appellate Court reversed the decision. Yet even in this case, the judge based his argument on the usefulness of those reports to growers and to scientific study—not the protection of public health or working conditions for farmworkers. He emphasized its importance to entomologists' development pesticide programs and the resultant increased profits for growers.

Beyond widespread underreporting, lax regulation, blatant non-enforcement of laws, and many regulators' close ties with the agricultural industry, scholars have also shown the impact modern concepts of the impermeable body on the difficulties of addressing pesticide exposure. For instance, the holdover of the association between disease and racialized immigrants meant that, upon the advent of widespread pesticide use on crops, many people—public health officials and others—interpreted reactions to pesticide exposure as "symptomatic of the weak and disease-prone bodies of the workers themselves" (Nash 2007, 129). In a regime of knowledge where the body was isolated from its environment, and where disease remained racialized, complaints of pesticide exposure symptoms were (and still are) often dismissed as heat stroke, hysteria, or infectious diseases like the flu (e.g., Barba 2020; Molina 2006). As Nayamin Martinez, the Executive Director of CCEJN, described to me, "they would say to the foreman, hey, I have nausea, I have headaches, I have blurriness—Oh, you have a hangover. Very likely you went yesterday and got drunk, and that's why."

This framework (based on single-path models, chemicals as discrete and isolated entities, and an emphasis on lab studies) is part of what renders dominant

modes such as regulatory science or legal frameworks insufficient. It proceeds from a logic of contamination in which the mind must be separated from the body for rigorous knowledge production, and which assumes clear material boundaries between chemicals, air, parcels of land, and bodies. In reality, the combinations of chemicals, lack of data about what they are, the unpredictable dispersion of chemicals through air and water, and their uneven geographies and temporalities of impact make tracking their impacts next to impossible (Fiske 2020; Boudia and Jas 2016; Goldstein and Hall 2015; Langston 2011; Murphy 2006). Ultimately, because of all of this, one study found that serious illness related to pesticide exposure was actually 300 times more prevalent than had previous been counted (Nash 2007, 163).

But, of course, sometimes the body can be the *only* way to register a particular confluence of chemicals. Even in the face of regulatory neglect, workers read their own bodies as "a kind of instrument whose limits and illnesses measured the health of the land" (Nash 2007, 138) —just as early white settlers had, a century earlier. They described their own symptoms to interviewers and the links they saw between those symptoms and pesticides. In the words of one white farmworker:

> "You see the labels on the sacks; one thing and another. Just from experience, we know what the sprays do. If you stay home for a couple of weeks, because it's raining or something, and you start to feel better—well, you don't have to be a genius to figure out what's going on" (Nash 2007, 163).

Bodies could also gauge change over time: workers reported that their experience indicated that pesticide use was heavier in California than in other locations, or that it had increased over time (Pulido 1996).

One of the UFW's strategies, then, became reminding the public of the permeability of the body. While pesticides most prevalently affected farmworkers, they described the potential pesticide exposure for tourists driving down the road, or consumers eating fruits and vegetables. This became a way of building solidarity across groups, but it also had the added benefit of re-emphasizing the possibility that farmworkers' bodies were, indeed, an important and useful register of contamination.

While experiences such as this have emphasized the role of local or embodied knowledge, and in fact these forms of knowledge are a necessary part of holistic frameworks, it's often only taken seriously once it has been re-produced through scientific channels or produced in collaboration with scientific entities. Examples include AIDS activists' organizing their own clinical trials in the face of state science's inaction (Epstein 1996), or community collaborations with researchers on the effects of diesel on childhood asthma (Northridge et al. 1999). In these examples, community members can *contribute* to scientific knowledge, but their knowledge is still seen as only "complementing the work of experts," due to a "deficit of technical understanding" (Corburn 2003, 422). Community-based, embodied evidence was (and largely remains) undervalued in relation to laboratory-based or institutional research and monitoring. Jasanoff (1998), for instance, describes the boundary work enacted by procedures like peer review, which, while ostensibly about making scientific work more transparent to the public, instead often enhance the distance between trained "expert" scientists and community researchers. As she describes,

questions are labelled either “science” or “policy” to protect institutional autonomy within the uncertainty of scientific research.

This is one reason why theorizing the valences of embodied evidence is so important: at one level, epidemiological models that restrict evidence to that developed in laboratory or institutional studies are a holdover from public health’s historically specific basis in germ theory and the isolated body. This narrowed version of epidemiological evidence is not sufficient for contemporary investigations into the complex and pathways and permeabilities of chemical toxicity. Further, however, as this discussion of empiricisms within the canon of Enlightenment science shows, evidence is always embodied, always produced and interpreted from within a particular sensing apparatus. Attention to the physically produced nature of *all* evidence breaks down any produced dichotomies between embodied evidence and scientific evidence, community knowledge versus expert knowledge. Therefore, in the following section, I discuss the production of embodied evidence in Kern County.

Embodied Empiricisms

The morning after we collected the FLIR footage, my head suddenly felt like it was free-falling through space. The rest of the morning I felt dizzy and nauseous; any time I moved my head off-center, the vertigo returned. Kyle and I pored over the FLIR footage; we had gotten clear footage of hydrocarbon plumes coming off storage tanks and bubbling up from the ground where a different underground pipe was later confirmed to have broken. And, in one video, I saw myself standing downwind of a

flare; then Kyle switched into the infrared spectrum, and you could see immediately the plume of emissions rolling off.

For me, this experience of bodily vulnerability was an aberration from my lived norm, while my collaborators' attunement comes precisely from their everyday navigation of contamination. For them, symptoms such as vertigo or nausea combine to become what anthropologist Nick Shapiro (2015) calls "bodily reasoning," or the sensory and affective processes of attunement in response to long and everyday exposure.

Even for me, though, the vertigo, nausea, and FLIR footage formed, in Shapiro's words, an "embodied apprehension," in Shapiro's words, of chemical exposure. After this experience, I felt my own embodied vulnerability much more viscerally, as well as the harm of oil pumpjacks in Lost Hills operating within 500 feet of a school and the particular fear that comes with the uncertainty of symptoms like nosebleeds, headaches, dizziness, and nausea.

Today, bodies remain important environmental instruments for residents of Bakersfield and the surrounding area. As I show below, residents and activists use a variety of forms of evidence to address the Valley's multiple and chronic chemical exposures, merging the affective power of visuals such as the FLIR footage, the "bodily knowledge" of everyday attunement, and lab-based air sampling and monitoring. In doing so, they build on the UFW's strategies of community-based organizing and show the ways in which—in the very moment of being harmed by contamination—the body can also become a highly attuned instrument itself.

Attunement

In Lost Hills, Cesar and a resident, Santiago, took a bucket sample just outside the oil field. On the way back, we passed orchards, empty fields, and piles of uprooted almond trees, ready to be mulched or burned. We were mostly talking about the Arvin City Council ordinance but kept interrupting our conversation to smell or to look at the horizon for slight gradations in color. I still couldn't pick anything out.

In the distance, he pointed out little clouds of pesticide drift: "do you see it?" Cesar and others at CCEJN took a training that officially certifies them to visually mark gradations in air color at long distances, a more formal process of visual attunement that articulates with their sense of smell. I still didn't see anything, though the air was thick already, full of diesel exhaust, dust, smoke from burning agricultural waste, pesticides; and that year, smoke from the wildfires burning both north and south of us.

Then he suddenly interrupted himself: "Do you see it? It's a pesticide cloud." He rolled up both our windows immediately. Instantly it felt hotter inside. "It's still here, with us," he said, frowning.

"What does it smell like?"

"Like the bottom of a shoe."

We were passing an open field with a tractor tilling the soil, a big cloud of dust around it. "It's probably that tractor," he says. "They spray so many fumigants on plants that when you turn up the soil, all the chemicals go in the air."

I stared, but only saw almond trees and power lines. “I think I missed it,” I said.

“That’s another thing you kind of have to be attuned to,” he said. “You’ll probably start to see them after a while.”

Cesar’s or Santiago’s sense of smell—or that of their colleagues—is the best measure of whether they should take a bucket sample there. It is also the sign that breathing there is particularly contaminating to their bodies.[45] In other words, while breathing this air is indeed contaminating to the body, long-term exposure is also often a prerequisite for producing embodied evidence about it. But, as Cesar shrugged once, while he was coaching me on how to smell pesticides, “we still have to breathe in either way.”

This kind of embodied attunement is a twist on Enlightenment philosophers’ original theorizations of empiricisms. In Cesar’s case, producing knowledge does indeed require the impression of a sensation—but that impression is the trace of contaminated air in his lungs and blood stream. Not everyone is equally sensitized to these impressions, but rather than the question being the refinement of a nervous system, it is the ongoing exposure to these impressions that sensitizes over time.

Yet today, regulatory and legal mechanisms rarely take embodied observations of contamination seriously. Therefore, CCEJN has since built a variety

[45] This, also, articulates with Shapiro’s sublime, in which he also articulates the ways in which bodily knowledge accrues through the very exposure to chemicals and the chronic wounding they produce.

of programs that expand from this process of attunement to produce legible evidence. For instance, CCEJN is the local coordinator of a new reporting network, Identifying Violations Affecting Neighborhoods (IVAN) Kern, one of seven such networks. It brings together representatives from environmental enforcement agencies, local nonprofits, and concerned residents in monthly meetings. Because environmental agencies have so many competing jurisdictions for air and pollution, with so many different missions, environmental issues can often fall through the cracks. Therefore, CCEJN, as the coordinator, facilitates returning check-ins about who is responsible for each step and how the complaints have been resolved.

CCEJN staff also take bucket air samples, and train residents to do the same, for laboratory testing wherever residents complain of fumes. They also have several stationary air monitors located across the region that report real-time levels of ozone, particulate matter (PM) 2.5, volatile organic compounds (VOCs), and other air contaminants and then report in a public interface so that residents can see the levels updated in real time. CCEJN's work is simultaneously to produce the data to back up residents' claims, and to make that data useful to the community: as they explained to me, community members can check the air monitors and then decide whether they'll open their windows or let their kids play outside today.

Figure 4: Filming a storage tank in Arvin, CA, above. Below, a close-up of the same tank on the FLIR camera's screen, shown in the infrared spectrum. Photo by author.

The FLIR footage that Kyle and I took was also based on these different modes of knowledge production (see figure 4 above). Cesar and his brother, Gustavo, guided us to where to film based on prior community complaints of oil and gas

fumes, including a storage and drilling site just next to the office of CBA and adjacent to an apartment building. The footage would both be useful as a piece of evidence that validates previous embodied empirical knowledge, and as a piece of community awareness-building.

Non-attunements

"Smell that?" Joe asked me, sniffing the air. Joe spent most of his life working in the oil industry, and now runs a museum on the West side of the Valley dedicated to the history of oil. "That's the smell of money."

Hydrocarbons were indeed palpable in the hazy summer air, filling our noses as we discussed the museum's collection of historic drill rigs.[46] Yet, while some residents, organizers, and activists have become deeply attuned to the smells, sights, or feelings of contamination, others have not. Further, if it takes work and consistent attention to become attuned, it also takes effort to *avoid* becoming attuned - or to become differently attuned.

I came to consider the work of non-attunement from Shapiro's work, in which he ascribes the differences in attunement and denial to differences in normative gender roles. He describes many cis men's indifference to slight aberrations in bodily feeling or function as an active *process*, noting that they often rejected the possibility of chemical vulnerability, instead emphasizing aging as a natural process of slow debility over time.

[46] I discuss the oil museum and Joe's experience further in Chapter 4.

The work of gender in ideas of bodily permeability is prevalent across historical literatures as well. As described above, Schuller describes the constitutive role of binary gender within nineteenth-century impressibility discourses. In 1960s discussions of pesticides, gendered ideas of bodily permeability were still prevalent, but to a lesser extent. Growers and some farmworkers also dismissed the potential permeability of the body, often through a discourse of masculine non-vulnerability (Pulido 1996).[47] Yet pesticide exposure was (and is) prevalent enough that sensitivity to its exposure didn't entirely fall out along gendered lines.

In Bakersfield, too, the gendering of chemical sensitivity worked alongside other markers of social location such that differences in attunement were often a function of the social and economic stratifications of the Valley—gender, yes, but always as co-constituted with race, class, and occupation. For instance, one geologist I interviewed who grew up in Oildale, surrounded by the Kern River Oil Field, said her parents would likely not believe their water was contaminated unless someone official literally came to their door to tell them—and maybe not even then. She is white and grew up middle-class, and while some of her high school peers went to college, everyone else went straight into oil or related industries.[48] She described her parents' and neighbors' being set on *not* attuning to the air and water around them,

[47] The fact that many pesticides were passed to children through the work of breastfeeding further gendered pesticide exposure risk as feminized.

[48] In my discussion of whiteness throughout this chapter, I use it to signal a particular positioning of privilege within a social stratification, not a skin color itself.

hypothesizing that perhaps people didn't realize the extent of damage that had been done or were simply resigned to it. When she told them about her research on groundwater, they often said, "Oh yeah that makes sense, I mean the air is already so bad why not the water too?" In other words, they might acknowledge problems with air or water quality when necessary, but could deflect its importance by assuming it was naturally occurring or minimizing its severity.

Each of the organizers I spent time with also had stories about people's ability to ignore or deflect experiential knowledge of contamination. For instance, Rosanna Esparza, an environmental justice activist, showed me Racetrack Hill, where it was discovered in 2015 that oil companies had been spraying produced water, a type of wastewater, from Edison Oil Field at a rate of 168,000 to 189,000 gallons a day for decades (see figure 5 below). This wastewater contains a range of harmful chemicals, including transition metal compounds, high salt levels, radioactive elements like radium and uranium, arsenic, and a range of hydrocarbon compounds like ethylenes and others (Borchardt 1989). The groundwater beneath Racetrack Hill was tested in 2015 and was found to contain chloride concentrations nineteen times the maximum allowable level; boron at sixteen times the disposal limit, and TDS—a primary measure of water quality—at as much as seven times the disposal limit (Cox 2021).

Figure 5: Racetrack hill (left) and a nearby oil lease. Photos by author.

> Rosanna recalls visiting a house just above the sprinklers.
>
> They told me they never smelled anything. "I don't see what harm it does," she [the woman who answered the door] said, "and it makes it so green. And it's very beneficial for the cattle—it means we don't have to use our water." I said, "are your cattle grazing on that land?" She said, "no, that's not our property, but for any animals that do get on that land it's nice to know they're being cared for." And I said, "no, that's *toxic*. That's toxic waste." She said, "Oh no, if it were really dangerous, the industry would tell us." I said, "You really believe that?" She said, "oh, yes."

Then, Rosanna added with a smile, after that they put up a gate across their driveway. She hypothesized that, like many people in Bakersfield, the attitude went something like: "I don't want to know about it. Because then I might have to do something about it. And it might disrupt my lifestyle, or my income."

In response, organizers consider part of their job to be destabilizing the normality of contamination to exposure. Toward this end, we can perhaps see the

FLIR as an attuning instrument. For the most part, the FLIR doesn't produce rigorous chemical *data*—it doesn't register which contaminants are in the air, and it's not sufficiently calibrated to a baseline or standard. This is part of why FLIR technologies require an extensive training process so that the operator can do the work of interpreting those differences. Instead, it works to attune others to their environment. In this way the FLIR training is reminiscent of the visual training that Cesar, Nayamin, and other CCEJN staff took: it gives people the tools and capacity to attune more closely to what is visible (or smell-able), either with the mediating technology of our own eyes or with the additional technology of the camera, and then they work to attune others to the same.

With the FLIR, a simple glance—with or without one's own kinds of embodied attunement—registers the plumes of hydrocarbons rolling off storage tanks or wells like smoke. This footage holds power as a visual object: when I showed the footage to my family and friends back home, for example, they each had a visceral shudder. And it travels easily, from one phone to the next through Twitter and other social media, from Kyle to Cesar and Gustavo, to state and national partners in Bakersfield, Oakland, and San Francisco, and then back to Cesar's phone driving down the highway. The image itself was particularly powerful, as opposed to numbers of statistics. The role of the FLIR also presents a different way of thinking about the power of empiricisms altogether, which I describe in the following section.

Toxicities as Intimacies

While Schuller cautions against the risk of re-creating the eugenicist trends of nineteenth-century sentimentalist thought in contemporary models of bodily permeability, thinking in complex ways about the co-constitution of body and environment is necessary to attend to pesticide and oil contamination in the present. The everyday nature of exposure to contamination is what makes it an exposure to premature death—yet this very mundanity, in its repetition, is also what can make it invisible and normalized. As Murphy (2006) points out, chemical entanglements can be so common that they form a regime of imperception—the white noise behind people's lives, and theorists such as Mel Chen (2011) have described the queer bodily intimacies that chemical exposure itself can become.

Further, while contamination can occur from multiple different sources and works on multiple timelines that exceed direct causality, so does the power of relationships, intimacy, and political organizing. Though the FLIR footage and scientific data were part of the success of the city council ordinance, they built on decades of organizing work that built on the UFW's strategies, decades ago. In this section I discuss the affective and emotional valences of encountering contamination and the forms of relationship it can produce.

I spent most of my time with people who, upon encountering pollution, purposefully smelled it further to get a better sense of it. While this increased their individual exposure, they saw it as a way of decreasing collective exposure to those contaminants. In conversations, organizers continuously shifted back to the

intimacies, forms of relationship, and the future visions that propelled them. This is not to dismiss the heart attacks, cancers, strokes, and other health conditions that come alongside contamination. But it is to address the many other potential responses to contamination beyond a desire to maintain an uncontaminated purity (Chen 2011). In this case, this entails understanding that you *will* be contaminated regardless; the question simply becomes one of how to make it useful to those around you. Cesar registered this orientation when he shrugged and said, "we still have to breathe in either way," situating his use of smell as evidence within the inevitability of breath itself.

A year after my drive with Cesar, I stood with Rosanna above the Cawelo Water District, where produced water from the Kern River Oil Field is cleaned and sent downstream to meet the canals that irrigate crops, including Cuties tangerines—"or *feitos*, little uglies, as we call them," she laughs. Both of us already had headaches and could smell the hydrocarbon fumes from where we stood. I asked her if she was ever nervous about her own health. She answered,

> Oh yeah, absolutely. Uh-huh. And I say not everybody can do this, and those of us who have a commitment to environmental justice, just know that you're giving up something. You're giving up a lot. Like part of your life, and your health. Because we definitely take risks. What's important to recall or remember, though, is that I won't put myself in the path of danger if I see it. If I'm taking you to see Cawelo, we're not going to be there very long. The point is, this is a reality that I live with in my community that is part of the problem that we have in Kern County.

Rather than attempting to maintain an uncontaminated purity, Esparza and others address it as an ongoing fact of life. There is no such thing as an uncontaminated body. Instead, addressing contamination in this way propels

organizing and relationships. In the rest of our conversation, for instance, she offered her guest room to me any time I was in the area and described the ways that just gathering together, sharing food, and sharing space are crucially necessary to environmental justice work.

The importance of attunement is also clear in the continuity between CBA, CRPE, and the labor and environmental organizing of the UFW. CBA was formed in 2007 as a small group of residents, largely through the support of Gustavo Aguirre Sr., who spent decades organizing with the UFW. CBA's bylaws and written documents are the same as those of the UFW Worker's Committees. "I don't have any idea why that would be!" Aguirre joked, shrugging his shoulders. But, jokes aside, CBA's overarching frameworks of leadership development, deep community engagement, and collaborative decision-making are also direct results of the UFW through Aguirre and another organizer, Lupe Martinez.

Their approach also brings the UFW's commitment to building power within farmworkers *through* issues such as environmental concerns or pesticide exposure. Organizers such as Gustavo Aguirre and others are indeed deeply concerned about the environmental impacts of agriculture and oil—yet their goals exceed those concerns. Instead, they are ultimately focused on building power and leadership among marginalized communities. As Aguirre told me,

> Convincing people to take action is giving them hope. Sometimes because they are dealing with some issues, they believe that it's normal for them to just deal with that. But part of the job of an organizer is,

> what you are coming to deal with is not fair. Depending on the issue, it's not fair, it's not appropriate, but there are opportunities.

In other words, it is necessary to gather around an issue of importance to everyone—and to trouble what people may have come to assume is normal. As he expanded,

> You are not happy drinking polluted water, are you willing to do something? Or do you want to continue drinking the polluted water—and your kids, how are your kids? *Ahhh!* Okay. Do you want to protect your kids' health or what?…Just guiding them, helping them connect with the situation and how it is affecting them and how it can be changed. Giving them hope.

As Estella Escoto, the president of CBA, and other members later described to me, they began focusing on a Superfund site east of Arvin, but soon focused more broadly on pesticides and oil fumes. They also continuously focus on relationships and leadership development. For the City Council ordinance, CBA knocked on doors and collected thousands of signatures. But they had also been active in the community long enough that they had supported the election bids of younger Latinx City Council members.

The story of CBA shows the interplay between different empiricisms and the affects they produce. While smelling is a deeply embodied empiricism—it requires holding contamination in our lungs—the intimacy of that embodiment can either produce the close attunement and relationships that propel political organizing, or lead people to close off or tune out. The FLIR footage, as a visual tool, allows the viewer slightly more distance. The FLIR validated felt experiences like smell, vertigo, headaches, produced affective responses of fear and concern in a more visceral way

than data alone, and could travel in ways that other forms didn't. In many ways, therefore, the co-existence of the FLIR and the embodied empiricisms of smell, sight, nausea, or pain registers the interplay between different "regimes of perception" (Murphy 2006). They also highlight the fact that perception is never only an epistemological question—but rather entails and produces material practices and formations at the same time. Perception, then, and attunement, are material-discursive apparatuses in themselves.

As Aguirre's description of organizing articulates, developing this attunement is part of resisting the work of racial capitalism. If part of the work of racial capitalism is to make contamination imperceptible and to deny the sensitivity of racialized peoples, then to take these interconnected embodied empiricisms seriously is deeply political work. In this context, part of the work of CBA and CCEJN is to undermine that produced normalcy by reminding individual people that drinking polluted water, for instance, is not what they should have to do. This is not to romanticize their work, but it is to look again at the potential of destabilizing what has been produced as normal. Today, overall health is differentiated through people's ability to shield themselves from the air around them—who has air conditioning, who has a car, and who can work inside. Taking this fact seriously points to how racial capitalism has structured us into different relationships with the air around us, and each of our embodied experiences of those relationships. It highlights not only the immediacy of individual bodies, but the material-discursive formations in which bodies and their senses emerge.

Ultimately, the City Council ordinance passed in a packed house, three-zero with two members absent. While 300 feet is a relatively small setback, it does set an important precedent for the area. Industry opposed it vehemently, seeing it as potentially emboldening environmental justice activists elsewhere in Kern County. For instance, Willie Rivera, a Bakersfield City Councilman and a spokesman for the trade group California Independent Petroleum Association said: “Every notch in [activists’] belt, I think, empowers them to keep biting off more, and that concerns me” (Thompson 2019). Environmental justice activists also see it as an important first step upon which to build. "It might seem like it's small, only 300 feet, but for us, it was a really big accomplishment," Escoto told a reporter for *Inside Climate News* in 2018 (Kane 2020).

Conclusion

As I have shown, in the work of reporting and monitoring pollution, people’s bodies themselves become deeply attuned sensing instruments. Because of the deeply unequal exposure to toxicity that racial capitalism produces, this sensitizing also becomes a racialized phenomenon. If historically sensitivity to impressions was reserved for white bodies, today, whiteness is often signaled by non-attunement to chemical exposure—either because of geographical distance or because of the work of non-attunement. While people of color have always been differentially exposed to chemical toxicity, racialized narratives of insensitivity to pain or physical sensation have attempted to minimize that toxicity’s physiological effects. We can see these shifting experiences and understandings of chemical sensitivity as part of the

racialized differentiation that racial capitalism both produces and requires. Just as racial capitalism is always in motion and shifting forms, we can see these racialized understandings of bodily sensitivity as shifting in kind.

Further, while embodied experience has always been necessary to scientific evidence, there is a logic of contamination at work in dominant conceptions of evidence today that overlooks the power of attunement to chemical contamination. Yet, as I discussed above, the production of *any* evidence, empirical or otherwise, is always an embodied process, requiring specific sets of material-discursive apparatuses. Understanding the production of evidence in this way reworks not only how we understand the production of race and gender through logics of contamination, but also how we understand the production of the body through logics of differential permeability *to* contamination. Further, shifting understandings of contamination and the material body have fundamentally affected the development of empiricisms, from early Enlightenment science to contemporary work in public health and environmental justice. Therefore, questions of contamination in both historical perspective and within community-based science work helps to rethink evidence, science, and what they can do.

In particular, we can see that the body itself, and empiricisms as a form, are entangled material-discursive phenomena that co-produce each other. Attunement or non-attunement both signal the material-discursive production of bodies in relation to chemical signals through, in part, the differential exposure that racial capitalism produces. What a body can sense is fundamentally produced by its history and lived

experience, and the material-discursive specificities of regimes of imperceptibility are linked with, for instance, *not* spending time in proximity to oil and gas sites, such that my body was incapable of sensing chemical effects until residents trained me over time. Or, as another example, some residents' work of non-attunement, in line with what Nick Shapiro describes, is similarly part of a material-discursive apparatus that includes links between whiteness, masculinity, and a commitment to impermeability.

Even as logics of contamination shift over time, racial capitalism's chemical effects have accumulated in groundwater basins, tissues, and sediments across California. White settlers understood the Valley's wetlands and deserts as wasted spaces, places of miasmas and unhealthy vapors that potentially contaminated the white body. Their understandings of contamination propelled the Valley's draining and irrigation—which, today, has produced it as, in fact, contaminating to bodies as over time, these devalued areas became sinks for the chemical contamination of intensive agriculture and oil drilling.

Now, living in Bakersfield is, in fact, detrimental to long-term health via asthma, heart disease, lung disease, and cancer clusters (e.g., Richter 2018). Modes of understanding the body as porous are once more required to face this world of chemical entanglements—yet ones that avoid the eugenicist underpinnings of nineteenth-century environmental health understandings. Therefore, this chapter has shown the utility of thinking about contamination—and, more specifically, how people or things are *made* contaminable or contaminating—as an analytic to trace these links more closely.

Chapter 3:

Unknowing California's Ancestral Lakes: Data Abundance and Regimes of Imperceptibility

The California Environmental Protection Agency (Cal EPA) is in a tall glass office building in downtown Sacramento, landscaped with pine trees and rocks that look like the Sierra forests. The building is directly across the street from Cesar Chavez square and right in the middle of all the civic functions of a capitol: courthouse, state library, capitol building. In 2018, Cal EPA hosted a meeting on hydrologic data and data-sharing in a frigid, air-conditioned auditorium. At the beginning, one of the hosts described the meeting as trying to improve water data for the public and for regulators: as one of them posed the question, "could you Google 'water' and get something *useful*, not PDFs and reports?"

Of course, the definition of "useful" is not stable; a few months later, in a follow-up interview, one of the meeting's presenters, who worked for a state-government scientific agency, asked what my work was about. After I described it, she said, "Huh. Sounds like weaving a basket underwater to me." Apart from being rude, her off-hand remark shows the pervasive ways in which environmental policy discourses produce scientific knowledge as "useful" in contrast to most other forms of knowledge production. In this way, science becomes stabilized as the hegemonic way of knowing the world through claims to the reasonable. This hegemony is reproduced every day in numerous small ways, all of which add up to science being seen as the apolitical arbiter of knowledge.

What do we mean by useful, though? Or, more accurately, useful to what purposes? The conference, hosted by a state scientific agency for state regulators, aimed to be useful by translating scientific understandings into public policy and vice versa. In that sense, it was one part of a larger arena of performative acts premised on the idea that hydrologic intervention is necessary, and the best interventions require the best knowledge. The conference functions as a particularly clear condensation of those acts and is an example of the co-constitution of hydrology as a field with the state governance of water.

In the Cal EPA meeting, as each presenter described the kinds of data they collected and their modes of storage, the emphasis on data collection and storage began to feel oppressive. Even though this conference aimed for more data accessibility, it became clear that data collection could itself become a fetish, a new mode of extraction that guides us further from finding right relation to the lands we live on. In my own work as a hydrologist, I used to feel what I jokingly called a "panic of infinite spreadsheets." It's the feeling of numbers piling on top of numbers, piling up too fast for meaningful quality assurance and quality control, meaningful storage, meaningful analysis. I remember it from every science job I've ever had: almost a fear of the numbers themselves, how to catch them, and how to store them. Further, data isn't stored for free—servers, computers, and the material infrastructure of data storage require raw materials extracted from around the globe. Sitting in the conference, I imagined a world where all the ecological flows are monitored to the

nth degree, but the ecosystems have unraveled anyway, and the servers are sitting in disrepair, slowly reclaimed by salamanders and weeds.[49]

In this chapter I pay a close attention to scientific practices and discourses to focus specifically on the uncertainties that emerge around one question: does oil and gas extraction contaminate groundwater? I argue that California's context of relative data abundance complicates existing frameworks in environmental justice research and activism that call for more and better data. Instead, uncertainties can be propagated *through* datasets, measurements, and monitoring apparatuses. Further, I argue that much of this abundance is not, in fact, data, but instead *numbers,* and that the conflation of numbers and data works to obscure the fact that data must be produced to produce further uncertainty over the impacts of oil and gas production.

Much of the data discussed at this conference exists because California mandated it, which is a success for environmentalists and environmental justice activists. Nationwide, discourses on fracking tend to reflect lax regulation and reporting requirements, producing major gaps in data (Willow and S. Wylie 2014; S. Wylie 2018). For instance, corporations are not required to divulge the chemical constituents of fracking fluid, nor monitor nearby groundwater impacts. Each of these factors contributes to the epistemic impasses surfaced in phrases such as "limited data

[49] Other scholars have similarly noted the vast quantity of data that characterizes this moment of Big Data. Helen Kennedy, for instance, begins her (2016) book on social media data mining with a professor's observation that if all the world's data was printed out, it would make a pile so high it would extend to Jupiter and back seven times. This was in 2014, and the amount of data has simply grown since then.

precludes adequate assessment" (Long et al. 2015, 14), included in the California Council on Science and Technology's comprehensive report of hydraulic fracking impacts. Without a critical analysis of how an absence of knowledge can itself be produced, an absence of *evidence* can easily be conflated with an absence of *impacts*.

In response, the impulse has understandably been to call for more and better data. California passed three major state laws mandating closer hydrologic monitoring in the last decade, two of which address oil impacts specifically. Like the EPA conference, each of these state laws are premised on the proliferation of data. In 2013, the California State legislature passed SB 4, which mandates more comprehensive oil and gas monitoring, including the strongest disclosure requirements for fracking fluid in the nation (Hedemark 2015). SB 4 avoids what's called the "Halliburton language," passed in the Energy Policy Act of 2005, which exempts all fracking fluids that don't use diesel fuel from the federal Clean Air Act and Safe Drinking Water Acts.[50] As part of SB 4, the USGS began an in-depth study of the potential impacts of oil and gas activity on groundwater in California (e.g., McMahon et al., 2018).

In 2015, the California legislature passed SB 83, which addresses underground injection. Injection is used either to dispose of oil wastewater into aquifers or for a practice known as steam injection, which uses heated water to

[50] For more detail on the historical exemption of fracking activity from nationwide legislation, and the way these exemptions both rely on and further propagate absences of knowledge about the impacts of fracking, see Sara Wylie (2018).

lubricate the extraction of California's dense, heavy oils. After significant public attention to discrepancies and breakdowns in DOGGR's monitoring and reporting, SB 83 appointed an independent review panel to re-evaluate the state's Underground Injection Program permitting. Finally, the Sustainable Groundwater Management Act (SGMA), passed in 2014, mandates that all groundwater basins must come into sustainable use by 2050, and must have plans to do so by 2020 (Leahy 2015). This has also prompted a significant drive to collect more data.

Like the EPA conference, each of these state laws is premised on the proliferation of data itself. Still, While the absence of data clearly inhibits comprehensive study of fracking's impacts of groundwater (Long et al. 2015; US EPA National Center for Environmental Assessment, Immediate Office 2015), neither does the *abundance* of data necessarily lead to more equitable or effective response. In particular, California's case shows that more data does not necessarily disrupt scientific "regimes of imperceptibility" (Murphy 2006). Drawing on feminist, critical race, and critical Indigenous scholarship on colonial unknowings, I use the case of state-mandated environmental monitoring to argue that what is made unknown is not only an absence. Instead, these absences are both produced and crucially *productive* of ways of seeing the world, histories, and narratives.

I further show that tracing how scientific data moves can surface what I call a paranoid orientation to the public. As I further expand in Chapter 4, this paranoid orientation invites identification with the oil industry as a benevolent and environmentally responsible industry while, at the same time, keeping observers at a

distance. In the case of data abundance, this paranoid orientation becomes a performance of bureaucratic responsibility in anticipation of potential lawsuits and legality, which propagates further uncertainty through the "white noise" (Murphy 2006) of an overabundance of data. Tracing the question "how does oil and gas impact groundwater?" through state scientific knowledge production illuminates this dynamic: with so much data, the argument goes, then if there are impacts, they must be shown by this data. Therefore, while an abundance of data can produce further uncertainties, it also furthers this expectation of knowledge.

I also draw from critical data studies' emphasis on the production of data to trace instances in which what is produced as data is, instead, simply an overwhelm of numbers. While, as Helen Kennedy has shown, approaches to data and knowledge can be characterized by a "desire for numbers," it's important to attend to the difference between data and numbers. Data is never "raw," but instead is itself produced through apparatuses of knowledge production (Gitelman 2013). Yet ongoing assumptions of knowledge as pre-existing and self-evident and data as transparent obscure this fact. Helen Kennedy (2016) describes this "desire for numbers" as emerging from Porter's (1996) ideas about trust in numbers, and more recent work on a "desire for more" social media metrics (Grosser 2014). As Kennedy writes, "Merging these ideas helps us account for the hunger for data and statistics

that I identified *despite* knowledge about their inaccuracy and unreliability, *despite* distrust" (Kennedy 2016, 224).[51]

Thus, the distinction between data and numbers is an important one; just because something is numbers doesn't make it data; there is a *making* within the production of data itself. In some cases, what is described as data, in an air of transparency, is instead simply numbers. Data itself is a production. Two things we see here: first, we see a conflation between data and numbers. Part of the obfuscation produced by this profusion of numbers relies on the *conflation* of data and numbers themselves.

Finally, as I show, this question and its attendant assumptions is not only discursive. If, as I showed in the previous chapter, sensing and perceiving are material-discursive practices, regimes of imperceptibility are also material-discursive formations. In this case, the forms of unknowing that are produced through an emphasis on data abundance also register the ways in which hydrology as a colonial science also affected the hydrology of the San Joaquin Valley in profound ways. As I articulate, the field of hydrology developed in tandem with hydraulic engineering, which gained its global footing in the nineteenth and twentieth centuries through experimentation and knowledge circulation across colonial contexts, but often based

[51] The emergent field of data justice responds to these concerns by documenting the harm and violence associated with data - and "big data" specifically - as well as putting forth principles of data justice (e.g., Dencik, Hintz, and Cable 2016). I became familiar with this work through the research and advocacy of the Environmental Data and Governance Initiative toward environmental data justice (Vera et al. 2019; D. Walker et al. 2018; Dillon et al. 2017).

in California itself. As I articulate, approaches based on hydrologic data and its presence or absence work to normalize California's present hydrologic conditions, and simultaneously normalize settler temporalities and governmentality.

Data and Feminist Science Studies

At the EPA conference, there were two times when its apolitical glaze was pierced. In the first, after a panel, a black woman sitting in the middle of the auditorium asked a question: "how does all of this" —she gestured broadly— "help frontline communities?" Her tone was impatient and frustrated.

One of the presenters, a blonde woman, responded, "I would offer R [a programming language], and you can get all our Github packages, and learn how to do that."

"Is that a training you can offer *to* the community so we can learn to do that?"

"There's a lot of online resources…that's a good idea. The National Parks Service has something, that's the only one I know that is free."

The exchange was so absurd I almost burst out laughing. The question pointed to the fact that all this hydrologic data—and the funding to do it—circulated on the level of national flows of funding, expertise, and training that re-establish the power dynamics involved in scientific expertise in the first place. The presenter's answer showed the impact of separating scientific knowledges from the larger movements of the world: by responding only to the minutia of the question, she in fact doesn't answer the larger question itself. Her response, in fact, shows how specificity can

work to obfuscate—and how an exclusive focus on data can re-entrench existing power dynamics.

Feminist and critical race science studies offer particularly useful inroads to these questions. As feminist science studies scholars have long described, scientific knowledges' self-understanding as objective—Haraway's God's-eye view from above—is itself a deeply political act. Forms of objectivity premised on the complete separability of the knower from their object of knowledge arise from the same logic systems in which biological understandings of racial difference rationalized extreme human difference even in an era of universal humanism.[52] In response, feminist studies has a long tradition of theorizing the politics of knowledge across a range of contexts, drawing on feminist studies' robust theorizations of power in the constitution of gendered, racialized, and sexed categories.

Early feminist engagements with science took up the question of women in science, and what is now called "the leaky pipeline" of women and other marginalized groups into the sciences (Rossiter 1982). This line of questioning

[52] For instance, through a genealogical reading of Cartesian thought, Denise Ferreira da Silva (2017) argues that the knowing subject—the Cartesian cogito—already assumes Europeanness/whiteness as its universal measure. At the same time, both anthropological and sociological versions of racial knowledge (as they were produced in tandem with imperial projects) understand race the effects of efficient causes (the laws of nature) as they operate through human form—rather than a consequence of hundreds of years of colonial expropriation. Blackness, therefore, as a category produced through colonial knowledge forms, comes to function as a signifier of racial difference that justifies the violence necessary for that colonial expropriation. "The category of blackness serves the ordered universe of determinacy and the violence and violations it authorizes" (Ferreira da Silva 2017, 10). Similar lines of thought are taken up by Sylvia Wynter (2003) and Alexander Weheliye (2014).

continues, with important stakes, into the present (e.g., A. Wylie, Jakobsen, and Fosado 2007). An overlapping site of research, feminist critiques of science, argued that feminist and other marginalized perspectives could expose biases, unearth background assumptions, and provide new insights within the sciences (Fausto-Sterling 1989; Harding 1986; Keller 1982; E. Martin 1991). Theorists were interested in science as usual, not in "bad science" per se; they argued that exceptionalizing "bad" science (such as eugenics and scientific racism), and aiming to correct it through more vigilant objectivity, in fact elided the inherently social nature of scientific knowledge production itself (Gould 1996; Stepan 1986; Harding 1986). A diverse range of theorizations of standpoint theory emerged to account for the role of positionality and life experience in knowledge production (Collins 2008; D. Smith 1989; Harding 1986).

Some emphasized the gendered binaries within the concepts of mind/body that dominate notions of rationality that functioned in dominant scientific method and discourse. This work pointed out that categories such as science, male, and truth are not self-evident, but rather deeply unstable, and rely on the relational definitions of their opposites. For instance, Haraway (1988) and Butler (1990), in different ways, pointed out that the sex/gender distinction in fact relied on prior binaries of passive/active, and nature/culture, in which the passivity of the material body as a "blank slate" to be inscribed by gender marked it as always already gendered.

The field of feminist science studies moved away from feminist critiques *of* science toward theorizing the nature of scientific knowledge, often from within

scientific fields themselves. This approach addresses scientific knowledge production as both entangled within structures of power, and simultaneously as a potential tool for deconstructing systems of power and oppression (Haraway 1988; Traweek 1993; Barad 1996; Schrader 2010). This field took up an often intersectional approach to tracing the co-constitutions of scientific and cultural understandings of sex, gender, and race. For instance, some traced how binary conceptions of the body arise within biology and the life sciences, with a deep engagement with the science itself (Fujimura 2006; Fausto-Sterling 1989, 2000; Richardson 2013). Another focus was on illuminating the entanglements of scientific methodology (specifically, forms of evolutionary biology and genetics) with racial formations historically and in the present (Gould 1996; Anderson 1996, 2006; Stepan 1986; Harding 1993; Haraway 1988). These texts are often in conversation with work within feminist science studies on how racial formations circulate within contemporary genetic discourse (Subramaniam 2001; A. Nelson 2008; TallBear 2013). In conjunction, postcolonial and women of color feminisms have long attended to material sexed and gendered bodies as also emerging within racial and gendered power (Mohanty 1988; Spivak 1988; Crenshaw 1991). Because scientific knowledge is and has been central in formulating and maintaining these categories of racial, colonial, or gendered difference, feminist science studies has an important role to play in this project (Collins 1999; Stepan 1986; Subramaniam 2001, 2009; Harding 1993).

Theorists within women of color feminisms have contributed significantly to theorizations of epistemology by refusing frames of objectivity and instead arguing

for theory grounded in lived experience through frameworks of minor empiricisms (Combahee River Collective 1983; Andrews 2015) and theory in the flesh (Moraga and Anzaldúa 1981; A. Hurtado 2003), responding to the ways that their experiences were written into law, medicine, and education in ways that were divorced from their lived experience. This work emerged from a commitment to epistemological accountability to those whose lives were most affected by the implications of scholarship, arguing that knowledge is always dependent on the social situation of its knowers, and characterized by the power relations of that situation.

Donna Haraway's influential frame of "situated knowledges" argues that a more responsible and accountable form of objectivity requires taking into account the situatedness of our knowledge (Haraway 1988). The absence of attention to this situatedness is not only an absence, but a productive one that becomes materially meaningful in how scientific projects approach their work and what results they can produce. Haraway, and other feminist science studies scholars, are interested in "enforceable, reliable accounts of things," beyond social constructivist or feminist empiricist models, with which to engage or oppose "hierarchical and positivist orderings of what can count as knowledge" (Haraway 1988, 580).

Karen Barad's work has also had major implications for feminist theorizing of objectivity (Barad 1996, 2007). Within agential realism, scientific practices do not reveal pre-existing reality; rather, they, like all practices, are intra-actions which participate in the world's differential becoming. In that sense, they are part of an ontological inseparability between the observer and the observed, or the subject and

the object of knowledge. This is a formulation that fundamentally destabilizes traditional notions of objectivity (as within classical physics) as a complete separation between observer and observed.

For Barad, objectivity is based instead on agential separability, which emphasizes that differentiating is never complete separation but instead differentiating-entangling, always contingent, and in flux. In consonance with Haraway, objectivity for Barad becomes about accountability: it "requires an accounting of the constitutive practices in the fullness of their materialities, including the enactment of boundaries and exclusions, the production of phenomena in their sedimenting historiality, and the ongoing reconfiguring of the space of possibilities for future enactments" (Barad 2007, 391).

Taking knowledge as "made, but not made up" (Haraway 2016, 128)—as specific sets of intra-acting apparatuses (Barad 2007)—enables analysis of the colonial, racialized, and gendered contexts in which knowledge is produced: within particular contexts, which research questions are asked, which are unimaginable, and why? For example, in the case of fracking, this approach provides tools to think about the social processes through which geological maps and groundwater hydrology models are produced as constitutive to the knowledge itself. This opens questions about not only how datasets are produced but the underlying assumptions underneath them: the structures of thought, material constraints, and the "economy of affirmation and forgetting," in Lowe's (2015) formulation, that structure what is knowable and what is unimaginable.

Feminist and critical race science studies offer important ways to theorize the unknown, the uncertain, and the absence of knowledge. This work on the colonial and racial dimensions of unknowing and imperceptibility particularly helpful in considering the ways in which data abundance can also work to produce uncertainties and unknowabilities, which I expand in the following section.

Unknowing and Ancestral Lakes

The second moment of disruption in the EPA conference was on the conference's second day—though most probably didn't notice it as such. A scientist wearing a cowboy hat, plaid shirt tucked into jeans, and brown braided belt came loping down the aisles, late for his own presentation, explaining that he'd been caught in traffic from University of California Davis. His research focuses on salmon conservation, but he began his talk by describing what he called the "ancestral lakes" that once characterized the region.

His main point was that salmon and most other parts of a riverine ecosystem do much better when water, and thus the nutrients it carries, spends longer moving through a landscape. Yet afterward, most of the audience's questions were in relation to the ancient lakes and wetlands. One person said they'd heard about them once before and were glad to be reminded. No one else—at least no one who spoke—had ever heard about them, and they registered surprise and interest. His was the only mention of the ancestral lakes in the two-day conference, and I have not heard them mentioned at a conference since. While many people may know of their existence, they are effectively written out of groundwater hydrology's dominant modes in

California. The presence (yet absence) of the lakes was one of many reminders of the productive material-discursive inertia of *unknowing* in California's hydrologic knowledge.

Unknowing is crucial to both groundwater and oil: they are both underground and invisible, and knowing about them requires significant technological expertise and capital. For instance, in the mid-nineteenth century, an Ohio court ruled groundwater to be "so secret, occult and concealed, that an attempt to administer any set of legal rules would be involved in hopeless uncertainty, and would be, therefore, practically impossible" (Alley and Alley 2017, 87). Similarly, the study of energy extraction, and fracking in particular, requires grappling with the insensible: "the unknown, the invisible, the just beyond the senses" (Cartwright 2013, 201).

Feminist and critical race science studies offer important ways to theorize the unknown, the uncertain, and the absence of knowledge. Taking knowledge as "made, but not made up" (Haraway 2016, 128) enables analysis of the colonial, racialized, and gendered contexts in which knowledge is produced: within particular contexts, which research questions are asked, which are unimaginable, and why? This opens questions about not only how datasets are produced, but the underlying assumptions underneath them: the structures of thought, material constraints, and "the economy of affirmation and forgetting," in Lowe's (2015) formulation, that structure what is knowable and what is unimaginable. Work on the colonial and racial dimensions of unknowing and imperceptibility particularly helpful in considering the ways in which data abundance can also work to produce uncertainties and unknowabilities.

The precise workings of the unknown in the case of California groundwater are perhaps best described by Murphy's regimes of imperceptibility. In their in-depth ethnography and history of workers at the EPA, they describe the predominant version of objectivity as what Haraway calls "the view from nowhere:" scientists are subjects without characteristics, whose observations can be understood to proceed without any personal or political biases. Yet, as Murphy describes, this particular understanding of objectivity, as well as the way white privilege functions, both "rely on and hold an unmarked and neutral location" (Murphy 2006, 120).

Murphy's work is useful because they also address forms of unknowing from the orientation of the state, though she focuses on the federal EPA rather than the state EPA. As they describe, the work of uncertainty is politically important: the causality of chemical exposures is often uncertain in a world where many of us are exposed to multiple forms of chemical contamination. These multiple sources often lead to situations where a particular cancer cluster or health issue can't be directly linked to one particular industry. Instead, uncertainty calls for more studies while business continues as usual.

Robert Proctor first coined the term agnotology to study the production of uncertainty, ignorance, and doubt, but ideas of what is produced as unknown had already been in circulation, largely among women of color feminist scholars such as

Lourdes Arguelles (Barad, personal communication, October 2021).[53] Since then, it has often been used to explain intentional corporate obfuscation, the most famous example of which is the revelation that ExxonMobil produced their own climatological research to delay mainstream acceptance of climate change since the 1970s (Oreskes and Conway 2011). This is one reason that legislation like SGMA, SB 83, and SB 4 is so focused on producing data and data-driven solutions.

Yet work on the colonial production of ignorance and doubt (Byrd 2015; Stoler 2011; Vimalassery, Pegues, and Goldstein 2016) takes the forms of ignorance and active unknowing produced by colonialism and imperialism as not only absences but also productive of the colonial/imperial state, providing "a way to talk about how knowledge, memory, archive, and scientific data sets can be and often are sites of neoliberal biopolitical management that depend upon the cultural production of ignorance" (Byrd 2015, 10). This field describes the structured sublimation and active

[53]Women of color feminisms have since continued to theorize the valences of unknowing, often in addressing the epistemological impossibilities and archival absences of the Middle Passage (Hartman 2008; M.J. Alexander 2006).

forgetting of settler colonialism and slavery as the conditions of possibility through which freedom and equality emerge within enlightenment liberalism.[54]

As Anne Stoler (2011) discusses what she calls "colonial aphasia," rather than amnesia, she argues that the facts and histories *are* there—they have not been forgotten per se. Instead, she focuses on the profound dissociation between colonial histories and state-produced histories, such that colonial histories become unspeakable. While Stoler insists that aphasia is not a question of ignorance or absence, it *is* a form of producing histories as unknown, if not unknowable: "Aphasia in its many forms describes a difficulty retrieving both conceptual and lexical vocabularies and, most important, a difficulty comprehending what is spoken" (Stoler 2011, 125).

Jodi Byrd takes up a similar thread with the term "colonial agnosia" to describe the forms of incomprehension that, in a colonial context, are both normal and normative. As the editors of a special issue on colonial unknowing expand,

> "Agnosia, as a particular manifestation of colonial aporia, indexes how the disjuncture between colonialism as simultaneously everywhere and nowhere shapes the hegemonic terms of the contemporary United States and those

[54]A turn to the speculative is also a way of registering the impossibilities of knowing. A powerful example of this is Saidiya Hartman's turn to the speculative in her (2008) article, "Venus in Two Acts." Throughout her earlier work in *Scenes of Subjection* (1997) and *Lose Your Mother* (2006), Hartman has engaged closely with the fundamental impossibilities of knowing within the archive of transatlantic slavery. In "Venus," Hartman both enacts what Spivak points out as the intellectual's desire for a speaking subject, and the impossibility of recovering anything of Venus other than the violent fragments already registered within the colonial archive. To reconcile those tensions, Hartman attempts a speculative approach to both register her desire and its impossibility—what she calls "critical fabulation." In using this different methodological approach, she writes, "I have attempted to jeopardize the status of the event, to displace the received or authorized account, and to imagine what might have happened or might have been said or might have been done" (Hartman 2008, 11).

> places similarly shaped by the foundational and persistent violence of colonial displacement. At stake in colonial agnosia is the profound investment in maintaining the failure to comprehend the realities of colonialism by those people who might most benefit from these conditions" (Vimalassery, Pegues, and Goldstein 2016, 1).

In other words, agnosia doesn't signal a simple absence of knowledge, but the active work involved in maintaining its incomprehension.

For instance, for a moment, the ancestral lakes might have opened a deeper set of questions about *why* the Valley is arid today, and why there is such a push to imagine further water infrastructure projects at all. But the scientist didn't talk about why the lakes have since disappeared, or the dispossession and destruction that disappearance was a part of; while his description of the ancestral lakes may have produced a temporary disorientation—an imagination of a series of interconnected lakes shimmering above the dry San Joaquin Valley we know today—it also left much else unexplored.

It also helps us understand why the lakes are so often written out of hydrology's history: the field of hydrology in the US west arose in tandem with political and economic interests in irrigating arid land and draining swamps (Molle, Mollinga, and Wester 2009; Teisch 2011). For a field premised on the need to "improve" the land through reclamation, the imagination that it once was radically otherwise is destabilizing.

As the conversation returned to data management and models of sharing knowledge, the lakes remained—at that conference, at least—disconnected from the present and relegated to an inaccessible yet nostalgic past, the constitutive outside to

an equally inaccessible and romanticized possible future of sustainability and environmentalism. This disconnection is entangled with the way that settler logics simultaneously produce Indigeneity as the ontological grounds for the settler state and render contemporary Indigenous survivance and resistance as unimaginable (Byrd 2011, Deloria 2004, Morgensen 2011). The scientist's description, ultimately, worked within the settler logics of colonial unknowing—all while wearing a cowboy hat, big belt buckle, and plaid shirt, no less.

Taking the colonial dimensions of unknowing seriously shows that attention to incomplete datasets, lax monitoring, or research questions that anticipate their own conclusions is necessary but not sufficient. Rather than presuming that with enough data or knowledge, justice can be served through the state apparatus, scholars of colonial unknowing argue that the liberal state and its potential remedies are part of the hegemonic colonial system rather than potentially liberatory from it. Further, the forms of knowledge that *are* produced can also serve to disavow the colonial underpinnings of the current moment: forgetting becomes a *productive* part of memory rather than its absence. In this way, we can think about the liberal state, the coloniality of the present moment, and the production of both knowledge and forgetting as a set of intra-acting apparatuses that co-produce each other. Taking account of these entanglements is one thing that a feminist science studies analysis both requires and makes possible.

Expanding Robert Proctor's work with these theorizations of colonial unknowing shows the potential pitfalls of an environmental justice movement that

only works toward the increased production of data. If narratives of modern reason and reasonableness require subsuming the colonial violences inherent in their production, then simply producing more data on these same terms will also reproduce the structures of liberal governance.

Part of why this analysis matters is that a project of knowledge production is not only that, but is also always a material-discursive project of producing (or subverting) imaginaries, histories, and present worlds. Work that bridges feminist and critical race theory with science and technology provides a foundation for a reworking of the practice of science that can ask after the lack of scientific detail, incomplete datasets, or research questions that obfuscate conclusions—but does not stop there. Rather than assuming that with enough data or knowledge, justice can be served through the state apparatus, we can also ask after what happens when colonial and racial histories of worldmaking are resolved into singular statements of truth.

Tracing the production of unknowing has the potential to engage the constitutive absences within archival and scientific knowledge, the ways in which affirmations can simultaneously be disavowals, and the potentials for deconstructive, speculative, and fictional methods to open different kinds of questions that destabilize dominant regimes of truth. As feminist theory has long pointed out, accounts of what is, or was, are also caught up in asking what could have been or what still could be.

SB 83 and the Overabundance of Numbers

Every year, the oil and gas industry in California generates billions of gallons of wastewater, also known as produced water (itself an evocative phrasing).

According to the California Council on Science and Technology's (2017) study, in 2013, more than three billion barrels of water were extracted along with some 0.2 billion barrels of oil across the state. This water usually contains a mixture of heavy metals, hydrocarbons, naturally occurring radioactive materials, and high levels of salts (McMahon et al. 2018; US EPA National Center for Environmental Assessment, Immediate Office 2015). Yet wastewater from oil-field operations is exempt from the hazardous waste regulations enforced by the Resource Conservation and Recovery Act (RCRA). Operators are therefore not required to measure or report the chemistry of this produced water. Even with very little information about what this produced water contains, it is disposed of through (historically unlined) surface ponds or re-injected back into groundwater aquifers.

When Congress passed the Safe Drinking Water Act in 1974, they mandated that the US EPA develop a plan to protect underground sources of drinking water (or USDWs). However, the bill also contains language that prohibits the EPA from interfering with oil and gas activity (Cupas 2008; Thorp and Noel 2015). Therefore, as the US EPA was developing its Underground Injection Control (UIC) Program to protect underground drinking water, they also included the possibility of aquifer exemptions. In 1980, EPA published their finalized UIC regulations, which included the definition of underground source of drinking water, the option of aquifer exemptions, and requirements to permit underground injection wells. Oil and gas companies could therefore apply for an aquifer exemption, which allows them to

inject produced water into aquifers that do potentially hold high-quality drinking water (Thorp and Noel 2015).[55]

In California, the Department of Oil, Gas, and Geothermal Resources (DOGGR) had been granted primacy to regulate these aquifer exemptions. In 2011, the federal EPA audited California's underground injection program and identified substantial deficiencies in its program, including a failure to protect some potential underground sources of drinking water, a one-size-fits-all geologic review, and inadequate and under-qualified staffing for carrying out inspections (J. Walker 2011). In 2014, the California Governor's office requested that the California EPA perform an independent review of the program. In 2015, DOGGR reported that at least 2,553 wells had been permitted to inject oil and gas waste into non-exempt aquifers, and staff at DOGGR discovered and eventually revealed to the federal EPA that discrepancies in aquifer exemptions had existed since the 1980s (Thorp and Noel 2015). While 176 wells were initially shut down, most of the rest of the 2,377 permits were allowed to continue injecting into disputed wells through the following two years of the regulatory process. EPA subsequently made a specific remediation plan and timeline for DOGGR, and in March of 2015 the State finalized a Corrective Action Plan, to be completed by February 2017.

[55] The American Petroleum Institute sued US EPA over these regulations; EPA settled the lawsuit and published revised regulations in 1982.

A Panic of Infinite Spreadsheets

As part of my fieldwork, I worked for about six months as a research intern with FracTracker, a nonprofit that supports antifracking activists across the country with data, analysis, and GIS mapping. With them, I researched aquifer exemptions, which were a key issue in discussions around oil and groundwater contamination. This ethnographic work shows the ways that scientific data sets, including the abundance of data and numbers, can function as sites of obfuscation and further imperceptibility.

In my internship, as DOGGR was moving through EPA's Corrective Action Plan, I began with four apparently simple questions, each of which is a subset of the question I ask at the beginning of the chapter: how does oil and gas extraction impact groundwater? Knowing that SB 83 had just passed, and that there was an independent review panel pending, part of our goal was to develop a working knowledge of the current state of exemptions. Yet my experience of working with these records and reports showed the ways in which Murphy's regimes of imperceptibility and colonial unknowing play out in this realm. The questions were:

- What are the criteria used for granting aquifer exemptions?
- Are they exempting aquifers under 3,000 ppm Total Dissolved Solids (TDS)?
- How many pending permits still exist, and how many have been re-granted since the EPA review?
- Finally, how many and which aquifers were affected by the EPA's closure of the Class II wells?

The first question was simple: the criteria are determined from state and federal law (40 CFR 146.4). This law has three parts: first, the aquifer must not be currently used as a drinking water source. Second, it must meet one of the two following criteria, as described on the EPA's website: either the aquifer cannot now, and will not in the future, be a source of drinking water; *or* the TDS content of the groundwater is between 3,000 and 10,000 mg/l and is not reasonably expected to supply a public water supply system (US EPA, OW 2015).

Yet there are several reasons why the aquifer might not in the future be used for drinking water. One is if the aquifer was mineral, hydrocarbon, or geothermal producing, *or* if it is part of a permit application for minerals or hydrocarbons. In other words, federal law prioritizes hydrocarbon extraction: if the aquifer is even *part* of a permit application for hydrocarbons, it can be exempted from the Safe Drinking Water Act. This means that even for aquifers that are under 3,000 mg/l TDS, which is the federal definition of fresh water, oil companies could get exemptions if it could reasonably also be a hydrocarbon-producing zone.

But trying to answer the last three questions began what I can only describe as a process of being drowned in numbers—the panic of infinite spreadsheets. Scrolling through long spreadsheets with thousands of entries downloaded from obscure pages within government websites, with unclear tab names and no units produced a feeling of vertigo: we often had to guess what category we were looking at based on how many entries there were and the kind of data it was. Buried in the paper trail were phrases like this:

> "After the requested aquifer exemption was approved, however, the Division became aware that certain maps, tables, and cross-sections appearing in the application document did not accurately depict the exemption areas otherwise supported by data presented in the proposal materials" (Geologic Energy Management Division 2019).

Though they later filed an addendum to correct that particular error, the point remains that the abundance of these numbers, and the way the fact of their abundance obfuscated what they were ostensibly reporting, is an example of how the conflation of numbers and data can produce uncertainty and unknowing. Not only were some of these numbers wrong or incomplete, but some of them were also right, and this made it impossible to make meaning of them. In some ways, we were trying to interpret these reports as if they had already undergone quality assurance and quality control (QA/QC) and all the other processes of interpretation and correction that produce a dataset. But what we faced instead was the incomprehension of a downpour of numbers.

We can interpret this dynamic, I believe, as one of obfuscation: drawing on the public "trust in numbers" (Porter 1996), this downpour relies on the conflation of the two, such that the incomprehension produced by variably accurate numbers was seen to reflect the state of available *data* instead. It also responds to Grosser's (2014) "desire for more" that Kennedy draws on; by satisfying a desire for quantity, the absence of the constitutive work that's required to make numbers into data goes unnoticed.

Yet these numbers interfaced with complete datasets, such as those produced by the USGS or other research entities. In other words, the very abundance of data

and numbers produced the kind of dissociation that scholars of colonial unknowing describe. It wasn't a question of data being not there (or, more accurately, not *only* a question of its not being complete or incorrect), but rather a question of incomprehension; "a difficulty comprehending what is spoken" (Stoler 2011, 125). In this way this abundance of data also helped create the regimes of imperceptibility that Murphy describes.

Others confirmed this sense. One person I interviewed, a geologist who in fact was hoping to one day work for DOGGR, described the difficulty of getting data for a statistical analysis research project in which she attempted to determine whether produced water disposal ponds have any impact on surrounding groundwater quality. She also described the frustration of "scrolling through 800-page PDF documents looking to pull out just three numbers." As she described,

> Prior to [SGMA and SB 83] nobody wanted to share anything, nothing was public, there was no easy access to data. Whereas now you get this attempt to be transparent with data and state and federal agencies are trying to be as public as possible so that researchers can have access to this information. But because it does come from such a profitable industry you're getting that kind of head-butting to where the industry has all this data but they don't want to share it. So you have to go through these public agencies that really didn't care about this data before the regulation.

Her description shows the ways that industry "transparency," forced by state regulation, instead remains deeply opaque. Yet the site of contestation has changed. No longer is the issue one of the complete *absence* of data, but instead, an overwhelm of numbers. She further described that one of the biggest hurdles in her research was getting the data itself—specifically *because* there is so much of it.

> The data is just hard to get to because there wasn't enough political enforcement of it before. But now the policy is involved, the operators themselves are scared and trying to do like whatever they can to not be in trouble, but to also keep on doing what they have been doing. So it's just this weird little loop of nobody really knowing what's going on and nobody wanting to share the whole story is what I feel like is happening.

This "trying to do like whatever they can to not be in trouble, but to also keep on doing what they have been doing" is a clear example of a paranoid orientation to the public: performing bureaucratic responsibility to avoid trouble but using the incomprehension of abundance to continue to obscure.

Ultimately, a profusion of data can further obscure the impacts of oil on groundwater because the work of the data is not actually to clarify those conditions, but rather to adhere to the legality of regulations. This profusion of data also registers a kind of paranoid orientation to the public that I continually ran up against, one which begins and ends with the anticipation of potential legal suits yet advertises transparency and public participation. I repeatedly emailed DOGGR and EPA officials to clarify what specific parts of the data meant, and I received emails that were written with future lawsuits in mind. They would either quote from regulatory documents directly, or one email would direct me to someone else, who in turn would direct me elsewhere or not respond. For instance, after going back and forth with one official at DOGGR about whether I could get an interview, he ultimately wrote: "As I am sure you concluded from your research into these documents, the Aquifer Exemption process is about protecting water." And therefore, he cc'd an official from the State Water Board, who never responded even after I followed up. The paranoid orientation embodied in these regulatory frameworks produced—largely through its

orientation to potential lawsuits and legality—both a profusion of numbers and data, and a profusion of incomprehension and uncertainty.

My collaborator, Rosanna, has stories from that time about Lost Hills residents' jokingly asking her, *"quieres limonada*?" ("want some lemonade?") and offering yellow tap water. And residents, frustrated with agency inaction on the water pollution they experience, brought their corroded water filters to public meetings. Still, the question of whether, and how, oil extraction affects groundwater quality remained unknown and often unknowable among this larger regime of data production. Meanwhile, business carried—and carries—on as usual: even though 177 wells were closed, for instance, the other thousands weren't closed during the duration of the EPA's investigation, and we don't know how many have started back up since. In this way I believe we can see both produced obfuscation—the obscuring of knowledge through a flood of numbers and the conflation of numbers and data—and regimes of imperceptibility produced by overabundance writ large.

Amongst the discourse of transparency and sustainability of the UIC program, the independent panel appointed by SB 83, as of 2021, still had yet to meet more than once. And, as I was revising this chapter, new headlines arose saying that "discrepancies" in the UIC program had yet again been found. According to the *Desert Sun,* Governor Gavin Newsom had fired Ken Harris, the previous supervisor of the Department of Conservation, in July 2019 after they reported that fracking permits issued had doubled since Newsom took office compared to the rate under

Jerry Brown—even though Newsom ran as an environmentalist and an antifracking stance was part of his platform. Jason Marshall was appointed instead (Wilson 2020).

In October 2019, the *Desert Sun* reported on a practice of "dummy files" in DOGGR's permitting practices (Wilson 2019). These "dummy" files never went through the chain of review, and instead were blank inside, yet had been approved, nonetheless. *Desert Sun* reporter Janet Wilson tracked one dummy file, UIC Project 46400400, and described it being empty except one engineer's comment regarding the lack of files inside. As she writes, "In the case of UIC project 46400400, created in 2013, records show a list of 174 permits and notices of intent to drill stretching from 1990 through this year associated with the empty folder number." Yet asked later by the *Desert Sun* about UIC project 46400400, DOGGR reportedly wrote back: "We are not sure which project you are referring to" (Wilson 2019).

In November 2019, Newsom announced a moratorium on new fracking permits pending review by state auditors, and Jason Marshall resigned in February 2020. He also directed an audit of DOGGR (recently renamed CalGEM) in 2020. Under the direction of Cheryl McCormick, CPA, a team from the Office of State Audits and Evaluations performed an audit (Office of State Audits and Evaluations 2020).

While the office concluded that CalGEM "generally complied" with permitting guidelines, vague phrasing—such as "opportunities exist for CalGEM to ensure review determinations are documented consistently and to improve its UIC project transparency" —preceded a long list of concerns (Office of State Audits and

Evaluations 2020, 2). They found, for instance, as I had, issues with "inconsistencies in the identification of a project's approved injection wells:" "not all data fields in the review table were completed for wells listed; some tabs were left blank, or there were multiple versions of the well review files with different information reviewed" (Office of State Audits and Evaluations 2020, 17). They found unclear maps, inconsistent language, a lack of labeling, missing well types, missing project numbers, insufficient or nonexistent well permits, and incorrect permit well locations. This is a clear example that what CalGEM had handed over was not, in fact, a complete or coherent data set.

They also found the "dummy" (or, as CalGEM calls them, placeholder) projects. During their audit process from April first to October thirty first, 2019, a total of 201 well permits were issued under fourteen placeholder projects. None of the placeholder projects had project review files. Further, even after they discovered this and made recommendations, the six projects they kept tabs on were still listed as active as of April 2020, demonstrating that injection has not ceased. Further, "Because CalGEM does not have a mechanism to track or easily identify placeholder projects, additional placeholder projects may exist but not be readily known to CalGEM" (Office of State Audits and Evaluations 2020, 26).

This information is useful, because it shows how, beyond the overwhelm of numbers described in the previous section, the dummy files are one aspect of a more multidimensional project of non-cooperation. This knowledge comes on the heels of several similar reports, mentioned above, each of which have increased public

attention to practices such as this. but have not radically shifted oil drilling practices nor regulatory practices. Meanwhile, among this series of audits, reports, and the hundreds if not thousands of official letters between regulatory agencies, the only aspect of Governor Newsom's response that hasn't been followed through on is his request for a setback ordinance mandating a certain distance between oil and gas activities and communities. And, by now, CalGEM has re-approved twenty one aquifer exemptions, eighteen of which are in Kern County, the site of Bakersfield, and continues to consider others (Geologic Energy Management Division, 2019). Ultimately, however, it's not only that there are major problems with how monitoring is conducted. As I stated in the beginning, this process—not only DOGGR's permit process but the subsequent audits and investigations—proceeds from the premise that everything *can* be known.

Regimes of Imperceptibility and Colonial Unknowing

The language and processes of SGMA, SB 83, and EPA's investigation of DOGGR show the linkages between Murphy's theorization of regimes of imperceptibility and colonial unknowing. In her comprehensive ethnography and science and technology studies (STS) analysis of fracking, Sara Wylie (2018) points to the many-layered regimes of imperceptibility that are produced through the absences and fragmentations of data at every stage of the fracking process. In this case, similarly, the masquerading of numbers as data contributes to these absences and fragmentation, even if DOGGR and the oil industry perform discourses of transparency. However, the overabundance of data on underground injection can also

function as what Murphy would call white noise that, while producing some aspects as perceptible, produces other things as imperceptible. This frame shows the ways in which regulatory scientific language can obscure questions of accountability by prioritizing quantity and strict adherence to legal standards over ecological or environmental impacts.

In turn, theorizations of colonial unknowing show the ways that settler narratives historicize both environmental problems and solutions *within* colonial histories. We can trace the intersections between the production of unknowing within colonial formations with the example of baseline data. Many scientists described, either in interviews or in public settings, the need to establish a baseline of groundwater quality data. One of the clearest examples of this is in SGMA, which explicitly calls for increased data and monitoring. This is one reason that CalEPA's hydrology conference was so focused on data sharing and storage. In this last section, I expand on the ways in which unknowing and imperceptibility extend beyond the realm of the discursive, and instead become material-discursive parts of hydrology's intra-acting apparatuses.

Yet, regardless of California's context of relative data abundance, baseline data is one kind of data that is, in fact, limited: there is very little groundwater data from more than fifty years ago, let alone 150 years ago, when oil and gas drilling began, or before US settlers began to radically remake the landscape (Long et al. 2015). Recall, for instance, that US law in the 1800s still considered groundwater "too secret, too occult" to be regulated or managed. Instead, the field of hydrology

developed in the nineteenth and into the twentieth century, as a discipline and institution, dominated by the need for river engineering, irrigation supply, and flood control (Rosbjerg and Rodda 2019): precisely the kinds of infrastructure projects that I describe in Chapter 1.[56]

The field of hydrology and hydraulic engineering then developed rapidly, and at a global scale. California served as an early launching pad for the export of expertise to a range of other colonial contexts, including India, Palestine, South Africa, and Hawaii (Teisch 2011). The refinement of the field took place in concert with the development of colonial projects around the world. William Hammond Hall, the first State Engineer of California, was among the first to embark for Hawaii to implement colonial hydraulic infrastructures there; Elwood Mead, another central name in California hydrology, first developed his expertise in Wyoming but later traveled around the world advising on colonial water projects (Teisch 2011; Worster 1985; Rook 2000). Therefore, the methods and approaches of California hydrology have always already been circuits of colonial expertise, values, and land-shaping. This historical development is a constitutive part of the intra-acting apparatuses in which hydrologic data is produced. Further, because hydrologic data was gathered in

[56] Even early understandings of hydrology emerged in relation to water engineering: Greek and Roman interpretations, for instance, we based in their impressive systems of aqueducts. Scientific understandings of hydrology developed slowly from the 1500s through the 1700s, but it wasn't until the 1800s that complete and comprehensive understandings began to develop. For instance, John Dalton provided the first complete and empirically based framework of the hydrologic cycle in 1802, and Henry Darcy published the fundamental equation for groundwater flow in 1856 (Rosbjerg and Rodda 2019).

tandem with, and for the purposes of, developing water infrastructure, existing hydrologic data reflects a hydrology that has already been fundamentally impacted by colonization.

While using hydrologic data to construct an original baseline locates that origin in post-settlement conditions, the idea that it was once otherwise—that at one time the Central Valley was seasonally covered with shallow lakes and wetlands—becomes profoundly disorienting. Not only does it present a set of facts, and an entire geography, that is different from what people were trained into imagining—and that hydrology worked so hard to disappear. But it also unsettles the material and affective investments of the field, and of a way of thinking about California altogether. In other words, if California has always been an arid state, then those who work to engineer it differently are simply doing the best with what has been given them. Yet, if this situation has in fact been *created* by hydrologic engineering efforts, then it unsettles the self-obviousness of the field itself. These logics also discursively stake a particular understanding of the world, and a particular place for industry in the terms of reason and reasonableness.

The underlying logics that ultimately produced the vast network of dams and canals across the state, and propelled the development of hydrologic data, also render California's previous hydrology imperceptible in relation to a vision of agriculture and development through infrastructure. In other words, a focus on the abundance of data not only obscures specific accountability by making the material work of colonization imperceptible. It is also a constitutive part of the material-discursive

work of maintaining California as a settler colonial space. SGMA's emphasis on hydrologic data, in fact, means that any move toward a historic baseline is a move toward colonial California.

This is one reason that the salmon scientist's passing comment about the ancestral lakes was so interesting: it was a brief moment when a different temporality could have been at play. His story of the ancestral lakes, in fact, could have led to a discussion about the contexts in which hydrologic data can be produced, or the reasons why the lakes are no longer there. Instead, they surfaced for a moment, and then vanished again.

Ultimately, questions of hydrology from the orientation of the state rely on the production of data. This does two things: first, in this case, it reproduces a settler temporality and renders pre-US ecological conditions imperceptible. Second, this focus on data, reports, legislation, recommendations, and audits produced by government entities continues to locate the power to potentially "fix" groundwater contamination issues within the state and within the fields of hydrology and hydraulic engineering more specifically, even though these institutions and material-discursive practices were central to producing groundwater contamination issues in the first place.

In other words, as I've already shown, scientific practices and data production embedded in regulatory or legal mechanisms produce further uncertainty about the environmental problems they're addressing. The specific groundwater contamination issues in question become imperceptible in scientific regimes that prioritize a

particular version of transparency/obscuring. But further, these practices also function to deepen an orientation to both time and space that functions within settler narratives of presence, progress, and technological advancement.

Conclusion

In the case of water infrastructure, Vimalassery, Pegues, and Goldstein's (2016) description of colonialism as "everywhere and nowhere" surfaces not only in the forms of knowledge that colonial states produce about their water infrastructure, but also in the material-discursive practices through which California's landscape has been produced over time. Tracing colonial hydrologies materially-discursively is a way of attending to the *productive* power of unknowing. If the absence of knowledge is never only an absence but is simultaneously produced and productive, one of the things it produces is the idea of current agricultural California as common-sense. The surprise about the ancestral lakes, for example, reflects not only the ways in which hydrology as a field has been structured to assume arid conditions in California, but also the ways in which the underlying logics of hydraulic engineering produced the landscape as such through investments in water infrastructure at multiple scales: from early canals such as Baker's town canal, to statewide infrastructure projects like the Central Valley Project and the State Water Project.

In this chapter, I have traced the production of uncertainty about oil and gas impacts on groundwater through the production of hydrological and hydraulic data, showing the ways that a focus on data abundance can in fact obscure more fundamental questions of ecological impacts or accountability. Drawing on

frameworks of colonial unknowing and regimes of imperceptibility, I have shown that these uncertainties not only pertain to contemporary environmental or public-health conditions, but more fundamentally also produce colonial histories as imperceptible, normalizing settler notions of time and governance.

Therefore, though this chapter has focused on the circulation of data, the import of regimes of imperceptibility and colonial unknowing is never limited to the discursive realm. The production of imperceptibility is also always a material-discursive practice that has productive effects. Driving through the Central Valley today, the flat landscape looks nothing like the lakes that were once here. Even the Sacramento area where the conference was held, where now the Cal EPA building sits in a landscaped forest of Sierra pines, was also part of these lakes and wetlands. This is the point of hydraulic performativity: through hydraulic effort, the *effort* of producing this version of California becomes invisible, and an arid arable landscape comes to seem common-sense.

Chapter 4:

"That American English:" Truth, Lies, and Belonging in California's Oil Country

In May 1899, the Elwood brothers first began digging for oil by hand next to the Kern River, trying to tap into its historic riverbed. Only forty three feet down, they found oil sand; now, a plaque marks the spot: "The Discovery Well." The story of finding oil here is one of the foundational stories of Bakersfield, yet when I was looking for the monument, it was remarkably hard to find. I drove past it three times before I finally saw it: far behind a fence, almost unnoticeable among oil derricks, with font too small to read from the road (see figure 6 below).

Figure 6: The Discovery Well monument, from behind a fence. Photo by author.

I imagine that at one time people could stand by the sign, yet as more oil wells were drilled, they surrounded the sign; today, its unavailability marks the increasing density and extent of the wells within the Kern Oil Field, concurrent with a trend across California. Yet it's important that the Discovery Well is also trying to serve as a monument: while it's ostensibly addressing a public, the only people who can get close enough to read it are oil workers themselves, people who can cross the fence. At one level, this fence denotes the same logics of private property that undergird the Valley's canals and the historic draining of the lakes discussed in previous chapters; if I crossed the fence to read the words inscribed, I would be trespassing.[57]

The fence and the monument enact two seemingly contradictory but intertwined moves: they simultaneously produce a sense of common history while keeping observers physically far away. They reflect a kind of paranoid orientation to the public, which I also described in Chapter 3, that continuously anticipates attack while putting out its own counternarratives inviting identification with the oil industry. I begin with this monument because it is a particularly obvious example of

[57] Upon finishing this dissertation, I found that in September, 2020, the Kern Historical Society and Chevron installed a new, metal sign where it would be visible from the road (Warner 2020). Yet the same logic applies: the sign invites a sense of identification with the oil fields, while abiding by the physical exclusion of the security fence.

the material-discursive work of narration that the oil industry does more broadly.[58] As such, I use it as a spatial metaphor for the internal contradictions within the material-discursive work of oil extraction and the particular raced, gendered formation that Cara New Daggett (2018) calls petromasculinity.

Daggett's work describes the intersections of whiteness, toxic masculinity, and entitlement that undergird authoritarian desires and continued commitment to fossil fuels, and therefore clarifies the climate denialism that is central to ongoing investments in oil drilling infrastructure. The paranoid orientation to the public of the monument and the fence very much mirrors the sense of vanguardism within petromasculinity: an attempt to preserve or return to a nostalgic America, one that was definitionally reliant on fossil fuels, then any threats to the fossil fuel system become threats to the nation, on the level of feminist and queer threats to the nuclear family and patriarchal power, or the threat of immigration or racial equity to the racial purity of the nation.

Petromasculinity also helps describe my own experience of gendered risk within oil fields. As I stood by the Discovery Well sign, for instance, trying to get a good picture, a white truck passed, then another—or was it the same as the first? This

[58] I follow Karen Barad's (2007) formulation of agential realism in order to go beyond structuralist analyses that posit the primacy of structures as the grounds on which discursive formations arise. At the same time, I also aim to go beyond theorizations that posit that materiality is simply the *result* of discursive work. Instead, we can see the cement of the monument as the condensation of material and discursive aspects of extraction and white settler emplacement. Further, the monument is one example of how the material and discursively intra-actively co-constitute each other such that they come into being together.12/10/21 12:14:00 PM

is my regular experience in the oil fields, whether I am alone, with Rosanna, or otherwise: the ubiquitous white trucks all slow down as they pass, turning their heads to get a good look at me. The roads are public, yet our presence is clearly not expected or welcomed. Rosanna has had many experiences of being confronted by private security teams, being followed, or threatened at home or around town because of her anti-oil work. Now she talks about her practice of hosting people, especially young women: not only for our safety, but also our emotional well-being.

When I stand there alone, I get almost immediately jumpy and nervous for reasons I can't entirely pinpoint—other than being actively watched by men in white trucks. Now, I stay with Rosanna, but before that, I stayed in the very hotels surrounded by parking lots that now define so much of Bakersfield. I viscerally remember walking with my bags past groups of men sitting around the lobby of the hotel. They were often white, though not exclusively, and I remember not wanting them to know which room was mine, always dead-bolting it behind me, and avoiding eating breakfast in the hotel breakfast spaces. There is a world in which this is a public road and I have the right to be on it, and just because a truck slows down and looks at you doesn't mean you're any less safe and secure than you were before. But there is also the world of my body, skin reddening in the heat, in which the perhaps and the maybe are crucial.

In 2018, two years into the Trump presidency, when the twin discourses of climate denialism and "alternative facts" were particularly pervasive, I conducted a set of interviews with oil proponents at the West Kern Oil Museum. These

conversations, and the shifting choreographies of truth and lies they held, shed light on the material-discursive elements of petromasculinity and of white nationalism more broadly. The Discovery Well also provides a spatial metaphor for the back-and-forth of these interviews. Its paranoid orientation to the public, that simultaneously keeps people out while welcoming a nostalgic cultural identification, also describes the way that my interviewees worked to draw me into a shared identification with the oil industry—all while working within a register of truth, lies, and jokes that simultaneously kept me back on my heels. All of this, ultimately, worked to stabilize a sense of white superiority and white belonging to land through the "authority" of work and family.

Oil extraction has become one flashpoint of a larger discourse, particularly apparent in but not limited to the Trump administration, that use the keywords of scientific work (like transparency or reproducibility) to undermine scientific work more broadly[59] and instead propagate "alternative facts" or "fake news." When I was doing my fieldwork, the Trump administration had installed Scott Pruitt, a climate denier, as head of the EPA in 2016 and withdrawn from the Paris Climate Accords. Currents of climate change denial that had been seeded by ExxonMobil since the 1980s (Proctor 2008) had also grown into a larger narrative of climate change as a

[59] For instance, discourses of "transparency" and "reproducibility" undergirded one law, the HONEST Act, introduced to the House in 2017. This bill was the outgrowth of previous bills, including the Secret Science Reform Acts of 2014 and 2015. Senator Alexander, in a 2017 hearing entitled "Making EPA Great Again," had stated that the agency "relied on questionable science based on nonpublic information that could not be reproduced, a basic requirement of the scientific method" (Harvey 2017; Underhill et al. 2017).

political hoax. In the Central Valley, the administration also moved to open a range of new federal lands to oil drilling. Since then, a larger movement of "alternative facts" has been part of the nation-wide campaign to discredit the results of the 2020 election and further empowered a national movement of far-right white supremacists.

At the afternoon's end, I came away with no clear answers about the *content* of my questions—which had mostly revolved around the history of oil in the area, their personal histories in relation to oil, their views or concerns about groundwater quality, and what they considered the role of scientific knowledge in their work. Instead, in these interviews, oil and water became the grounds for a much different, implicit conversation about truth, lies, and what each of them means. While at first, I understood these conversations to be a place where definitions of the truth were "slippery," I came to see them instead as instances in which constellations of facts and belonging were being specifically choreographed by a series of pre-existing assumptions, roles, and stereotypes.

In some ways, then, we were structured into the impossibility of a real conversation from the start. I aim to take these impossibilities as instructive, in the way that not only belonging but conceptions of facts and truth were tied into

relationships to a particular extractive economy.[60] These impossibilities, therefore, show us not only the discursive infrastructures of settler colonialism, but the material-discursive work of affect and subject formation within settler colonialism more broadly.

Therefore, I bypass any question of *whether* what any of us said was true or not. Instead, I pay attention to the work of truth claims themselves: what does a truth claim do here, and how are truth claims established? I focus on four moments in which different definitions of truth and lies were staked, and I trace those shifts. I argue that in each of these truth/lies formations, what we really see are different articulations of belonging and identity that speak to the histories of race and gender within extractive capitalism. This is one way that we see the material-discursive nature of truth claims: as with this example, they are never only in the realm of epistemology, but always entangled with people's lived histories.

Therefore, I interweave our interviews with further discussion of petromasculinity and the historical formation of Taft, highlighting the intersections of Okie identity and the oil industry. Taft's identity as an oil town is rivaled only by its identity as an Okie town: as one interviewee joked in a strong Southern accent,

[60] Tracing impossibilities, here, has resonances with my approach to tracing unknowings in the previous chapter. Both hinge on the importance of absences, and their constitutive work, within tracing entanglements. As in my discussion of Byrd's formulation of colonial agnosia in Chapter 3, the production of ignorance is never only a discursive happening, but is also fundamental to the propagation of colonial worlds and histories Even as emptiness or nothingness often seem powerfully static, active and ongoing work of erasure and elimination are required to make it so.

"Bakersfield is the third largest town in Oklahoma," and the Oil Museum is as much about the history of Okie migration as it is about oil itself. While Okie writers have described this history in terms of its relation to contemporary white American conservatism, I expand this analysis through the lens of petromasculinity. Finally, I end by expanding on the particular forms of family, belonging, and identity that were being inscribed in these conversations, focusing on the affective attachments to particular forms of security.

Taft and Boomtown

Taft is a small town on the San Joaquin Valley's West Side, nestled among the hills of the San Emidio Mountains that separates the San Joaquin Valley from the coast. Taft's main economic driver is oil: it is surrounded by oil fields and its center is only a few miles away from the Lakeview Gusher. In fact, Taft was incorporated only a few months after the Lakeview Gusher blew in 1910 and oil exploration boomed. Therefore, it's no surprise that Taft is also home to the volunteer-run West Kern Oil Museum, which details the history of the area, the history of the town, and the role of oil in American daily life. Taft is also home to the Oil Academy, a high-school vocational program that trains students to work in the oil industry, and a towering bronze statue of an old-time derrick, a white oil worker, and his wife and child bringing him a lunch pail.

If Cesar used his nose to track and record pollution, people in Taft understand that smell very differently. "Smell that?" several museum docents told me, sniffing the air. "That's the smell of money." This distinction in how people understand

contamination is pivotal. While environmental justice organizers focus on the detrimental effects of oil production and its byproducts on their bodies, my conversations in Taft described a benevolent and nostalgic relationship with oil: people grew up on oil leases, played around with oil machinery, and explored the oil fields as children and young adults. As I describe below, many Taft residents located their relation to oil—and all that that means, including their embodied smells of it—as part of their historically attaining whiteness and middle-class status.

Every year, the museum hosts Boomtown, a yearly fundraising event in which Oil Academy students and museum volunteers host a barbeque, the museum puts up special exhibits, and the community comes together for the afternoon. I had been to the museum several times before, but this time I had arranged a few interviews with the museum coordinator ahead of time, hoping to ask the same questions I'd been asking others about oil, groundwater, and the role of scientific knowledge in understanding their relationships.

Many of the attendees were dressed in period costume from around the turn of the century. A ragtime band played under a gazebo, and one of the old motors was up and running, pressing corn into birdseed. Amid the heat waves and drought of the summer, the haze was worse than usual; smoke from the Northern California wildfires, which at the time had been record-breaking, added to the usual particulate air pollution in the Valley. Still, people were out mingling, listening to the band, and chatting with each other.

The museum coordinator greeted me warmly and steered me almost immediately toward my first interviewee, a man I will call Tom who owned a small- to medium-sized oil company in the Midway-Sunset oil field. I would learn later that he had funded most of the bronze oil statue, the Taft Oil Academy, and much of the museum; others around him described him as the most generous man they knew. I spent most of the rest of the day in a small room next to the kitchen talking with Tom and then his friend Bill as Oil Academy students served the barbeque lunch from the kitchen. Tom and Bill, both retired or semi-retired white men in their seventies, sat with me at a table covered in a linoleum cloth, where Tom's wife served me a plate of barbeque and lemonade. It was clear that both of them were beloved in the community: their family and friends kept coming in and out, chatting with them and with me, and ribbing each other in a joking way: yelling, "May Day, May Day!" at each other and referring to the table as the "Big Dogs' Room."

Both of them, throughout our conversation, found elaborate ways to avoid or evade; I almost immediately realized that we were playing a kind of cat-and-mouse game whose terms I didn't entirely understand. Their actions register a kind of awareness and refusal of the power dynamic between researcher and interviewee by consistently referencing my tape recorder and the possibility that I might mis-translate what they said (in their words, that I might not "get it right.") They often turned questions back on me, and while they consistently accused me of lying or "making things up," they also hinted that they themselves were liars. And all of this

was cloaked in the same humor with which they ribbed each other, their grandchildren, and their buddies.

There were also clear gender dynamics: though I generally read as queer, I had purposefully dressed as conservatively and normatively as possible. Throughout the conversation they referred to me as a "young girl" or "young woman." This infantilization through gendered language was one instance of the misogyny that pervaded the conversation and subtly undermined my autonomy. As I discuss later, the conversation functioned within a nuclear family paradigm in which I was produced as a daughter, and the question became, simply, who was my father?

They also consistently referenced a rural/urban distinction between us, relying on what Iyko Day (2016) might call "romantic anticapitalism" to insist on the concrete reality and importance of manual and physical labor as superior to other forms.[61] The production of me as a young girl and coast-city progressive combined to make any knowledge I produced suspect: incompetent at best, and outright dishonest at worst. So, while I was asking them questions about the science around oil and groundwater, they were asking me about how trustworthy I was as an interviewer and

[61] For instance, Tom repeated numerous times, "Hands do the work of the world" in opposition to brains, "which think they do but they don't." For Day, romantic anticapitalism reflects an investment in the difference between the glorification of concrete, rooted things as outside of capitalism, while the evils of capitalism are ascribed to its more abstract forms: surplus value, money, intangible flows of capital. In this view, as Iyko Day writes, "Expressing the antinomy of concrete and abstract, nature therefore personifies concrete, perfected human relations against the social degeneration caused by the abstract circuits of capitalism" (Day 2016, 15). Yet, as she maintains, the romanticized idea of a pastoral farm (or, in fact, the Jeffersonian ideal of the yeoman farmer) is premised on a world of global flows of capital and commodities.

about the larger body of knowledge that might be produced by our interview and my dissertation. In some ways, looking at the transcript now shows how they were looking to see how much they could get me to write *their* "facts" into my research. Yet we never quite got to what those facts *were,* because we spent most of the time circling each other.

Meanwhile, though our differences were marked from the start, our shared characteristics equally structured the conversation. Even as they continued to point to the differences in class, gender, and geography between us, our conversation was structured by our shared whiteness, nationality, and settler status within a settler state. Yet even this shared status was questioned at one point, as I explain in further detail below.

After our conversation, I first tried to understand where the lies and where the truth had been. Yet ultimately, this is not only an impossible question but also not the most important question. Instead, what is more interesting here is what claims to truth *do,* and how they shift the terms of the exchange. In other words, I am less interested in conversations about truth itself, because truth has never been a neutral category. Instead, what are the conditions of possibility that are opened or foreclosed in a particular condensation of statements into a truth claim? For instance, Tom and Bill both argued that, while the oil industry uses science, those on the left or environmentalist "side" don't need to use facts. By doing so, they place themselves in the position of neutral, fact-based science and make a normative statement about what scientific knowledge *should* be. More broadly, they are staking a claim about

belonging, kinship, and the right way to be in the world. Therefore, while I follow claims of truth and lies through four moments in the conversation, I follow them as a sign for the larger configurations of belonging and identity that surfaced and shifted throughout the conversation.

Ultimately, my intention is not to pigeonhole them or strawman them into making a counterargument to my own. As Avery Gordon (2008) so well articulates, each of us holds a "complex personhood," and I don't pretend to understand them as full people. I also don't intend for any of us, myself included, to emerge from my narrative as superior, morally or intellectually. Part of their complex subjectivity is also the antagonism they felt toward me and who they perceived me to be, and so my intention is not to over-sympathize with nor pigeonhole them but instead extrapolate carefully from one conversation we had together about larger dynamics of knowledge and its relation to belonging, understanding that the technologies and infrastructures of whiteness and settler colonialism move through each of us in different ways. This approach helps us understand the way that petromasculinity impacts understandings of knowledge: while it was particularly apparent in their responses, it also undergirds so much of the US settler state in the present.

First moment: Fencing Me In, or, "Not an Environmental Wacko"

One of the first questions that Bill asked me was, "You're not an environmental wacko, are you?"

Similarly, when I began my interview with Tom, he immediately asked, "Is this going to be favorable to the oil fields when we get done?"

I responded, “I’m a researcher, so I’m trying to be neutral.”

“Ok, because the—the other side, they don’t have to talk those facts.”

I begin with these questions because in many ways they defined the available terms for the ensuing conversation. In this formulation, there are only two sides, neutrality is not an option, and there is an implicit assumption that to be fact-based is to be pro-oil. Bill’s question is less a question than a statement of terms that places environmentalism as inherently “wacko” from the start. Tom expands on these terms: in his first question, he is, in essence, asking if I will be biased (i.e., favorable) toward the oil fields. Yet in his next statement, because the “other side” doesn’t need to use facts, he implicitly places the oil industry on the side of facts. Here, the oil industry is fact-based, and those facts implicitly equate to being favorable to the oil fields.

I also begin here because my claim to neutrality as a researcher needs complication as well. Even as I said it, I remember cringing at how it sounded. Now, listening to the recording, I can hear my claims to neutrality falling flat. My voice gets higher, and I hesitate to use the word. I sound skittish, like I’m avoiding telling the real truth. In a larger discussion, I would not in fact describe my approach to research as neutral. A range of feminist and critical race science studies scholars have shown that neutrality is not possible, and that each of our knowledges comes from lived experience. The idea of neutrality, then, as articulated by dominant scientific frames, reflects Haraway’s “view from nowhere” and white, Western paradigms of knowledge. A more rigorous form of objectivity might come from the practices of

situating our knowledge and deeply accounting for all the aspects of our apparatuses of knowledge (Haraway 1988; Barad 2007).

I remember trying to grasp for how to describe my approach, but in a two-sided system of wackos and non-wackos, neutrality was the closest word I could find at the time. Elsewhere in the conversation, I explained that my approach was not (and is not) to take an exclusively pro- or anti-oil stance. Instead, I wanted to understand the histories that produced the particularly entrenched ways that people talk about and relate to oil in the present. But in the opening lines of the interview, before we'd really begun conversing, neutrality seemed to be the most available shorthand. In one way, then, I began the interview with a small lie as well.

Further, I know—and I knew then—that in Bill's world, my personal beliefs would indeed constitute those of an "environmental wacko." But I wasn't sure how much space he might have for understanding the distinction between my personal beliefs and the approach I took here. In the moment, I said I *wasn't* an environmental wacko because my purpose was not to assume an environmentalist stance but rather to learn as much as I could about their world. (I also remember thinking to myself, rather archly, that I was not indeed a wacko, environmental or otherwise. Even at the opening of our conversation I was falling into the oppositional logic that they proffered.)

Ultimately, my hesitation as I tried to translate my approach to the two-sided terms of this emergent conversation did indeed sound like (and partially constitute) a lie. And while the lie they heard was different than the omissions I was making, there

was indeed a slippage here. I claimed neutrality and they claimed facts, yet none of us was being entirely forthcoming. In some ways, this discomfort shows an uneasy and unarticulated similarity between myself, Tom, and Bill. Each of us holds a complicated orientation to objectivity, and none of us believes in such a thing as unclaimed neutral ground (though for different reasons). Still, in these questions and answers, all three of us make claims toward neutrality and facts as a way of creating a ground from which to speak.

While I continue to wonder what might have happened if I had been able to describe my approach differently, I find it useful to show the foundational work of setting out the terms of a conversation: our statements of ourselves only ever come into coherence when understood and met by another, even if we are stating our opposition and difference from that other. [62] Throughout the rest of the conversation, this fact takes on different meanings. As we continued to talk, each of the interviews began to build its own set of shared terms. The most interesting moments, from here on, happened when someone external walked into the room. Their entrance required some explanation—from me, Tom, or Bill—about who we were and the nature of the conversation, and therefore provided a place where the ways we identified ourselves and each other through truth claims could be rearticulated. Much of that identification was filtered through the history of Okie migration to California and what it meant for

[62] As feminist theorists have long articulated, we always exist "for another, or, indeed, by virtue of another" (Butler 2004, 19).

the emergence of white conservatism today, so in the following section, I provide a deeper history of Taft and the Okie migration.

Taft, Oklahoma, and Whiteness

Taft was originally a small settlement called Moron until the West Side oil boom began, and the town became a major trading center for the Midway-Sunset oil field. As historian Gerald Haslam notes, the town's "development has been closely linked with the social history of California's oil industry, for oil companies owned not only much of the surrounding land but a good chunk of the community as well" (Haslam 1993, 125). It's named after President Taft, who set aside two large sections of oil land in the area in 1912 as Naval Petroleum Reserves. By 1912, Taft was described as "the liveliest town in the state" (Haslam 1993, 125). By the 1920s, the city was surrounded by a sea of oil camps where oil workers and their families lived in small tents or cabins. Amenities such as common halls, tennis courts, and even swimming pools were provided by the oil companies for their workers.

While white migration from what is often called the Western South (Arkansas, Texas, Oklahoma, and Missouri) had been going on since the early 1900s, the Okie migration refers to the time between about 1930 and 1940, when almost 315,000 migrants from the Western South immigrated to California (T. Alexander 2009). Kern County—and the San Joaquin Valley more broadly—became the hub of much of this migration. Upon reaching California, in a journey popularized by Steinbeck's *The Grapes of Wrath* and Dorothea Lange's photography, the Okies largely entered the exploitative industry of large-scale agriculture as migrant farmworkers.

While the story of Okie migration is often told in terms of the Dust Bowl and the ecological devastation of plowing the entire Great Plains for agriculture, not all Okie migrants came from agricultural areas. Instead, many of them had been displaced through the mechanization of agriculture and increasing farm sizes rather than the dust bowl ecological crisis itself. In this way, the history of Okie migration links the transformation of the Western South to the transformation of California at the turn of the century. large-scale water infrastructure and the spread of agriculture, originally imagined as the Jeffersonian ideal of the yeoman farmer, quickly turned the ecosystem into land as a commodity for exchange, producing large farm sizes and vast wealth inequalities. Those processes worked hand in hand with the drought and ecological disintegration of the Plains soil to produce mass displacement. Therefore, while in Chapter 1, I mentioned that some state legislators had proposed moving California's Indigenous nations to reservations in Oklahoma, instead, settler processes of landscape change worked to produce mass migration of (primarily settlers) from Oklahoma to California.

Oklahoma and California also share a history of oil production. As Nancy Quam-Wickham writes in her history of the California oil industry, "California led all other states in oil production throughout much of the first quarter of the twentieth century; among the major oil-producing states of the nation, only Oklahoma could rival California during this period" (Quam-Wickham 1994, 4). The rise of the oil industry in California can't be understated in the rise of California as a state; as historian Quam-Wickham notes, "the oil industry of this state made possible much of

the west's industrial development" (Quam-Wickham 1994, 5). By 1909, California produced about 80% of the nation's fuel oil, and in 1910, the "age of the gushers" began, inciting even more interest in oil prospecting.

At the time, Okies posed a threat to the often unacknowledged but inflexible class structure of rural California: they had largely displaced Asian and Mexican labor from the farm labor force, and were whites in roles traditionally relegated to nonwhites. As self-identified Okie writer Roxane Dunbar-Ortiz writes, Steinbeck heralded this change: he saw them as displaced Jeffersonian yeomen, and wrote, "Farm labor in California will be white labor, it will be American labor, and it will insist on a standard of living much higher than that which was accorded the foreign 'cheap labor'" (Steinbeck 1936, as quoted in Dunbar-Ortiz 1994, 20).

In fact, following Steinbeck's prediction, much of the San Joaquin Valley's hatred of Okies was the fear that they would join unions and help organize agricultural labor. There had been strikes in the Central and Imperial valleys in 1933–1934, primarily by Mexican and Filipino workers under the Communist-organized Cannery and Agricultural Workers Industrial Union. But, contrary to Steinbeck's prediction, Okies often played a larger role as strikebreakers than picketers; conceptions of whiteness often placed them, ideologically, on the side of landowners (T. Alexander 2009). As Gerald Haslam (1990), one of the predominant Okie writers of the Central Valley, writes, "the final effect of the Okies coming was to impede the unionization of farm labor" (as quoted in Dunbar-Ortiz 1994, 20).

Oil workers were similarly difficult to organize, seeing themselves as more beholden to their particular craft than as “oil workers” per se and holding deep pride in their skilled labor. As Quam-Wickham describes, “These "earthy-begrimed" men with "tired muscles, leadened eyes, and deafened ears," however, were more than "brawny," unskilled workingmen. Quite the contrary. "There is no such thing as an unskilled oil worker," reported one labor journal editor” (Quam-Wickham 1994, 25).

World War II provided employment for many Okie men. By 1950, they were rapidly working their way up the occupational and income scale. As historian James Gregory describes, most Okie males were no longer doing farmwork by 1950: the fields provided a living for only twenty five percent of them. The majority had moved into blue-collar trades like construction, the oil industry, and transportation (Gregory 1989).

In many ways, then, an investment in petromasculinity provided a stepping-stone to economic security for many Okie migrants. Oil work has long been considered white men’s work, and therefore, the Okie allowance into the oil industry was a profoundly racializing move, making middle-class lives possible through recognizing and responding to their white skin. As Dunbar-Ortiz writes, “In the end, the only advantage for most has been the color of their skin and the white supremacy, particularly toward African Americans, that pervades the culture; what they are not (black, Asian, “foreign”) is as important as what they are (white, “true” Americans) in their sense of propriety and self-esteem (Dunbar-Ortiz 1994, 6). This is part of the profound materiality entangled in discursive moves such as those I detail in this

chapter. Their truth claims, and ways of discounting my claim to producing knowledge, are produced through these material-discursive histories.

Taft, as an oil town, embodied the white supremacy of the oil industry in clear ways: historian Gerald Haslam, for instance, writes that, "[Taft's] reputation was enough to discourage most nonwhites" (Haslam 1993, 125). It was an unofficial sundown town, as were surrounding oil towns like Coalinga, Avenal, and Oildale. He writes that everyone vaguely remembered—but couldn't quite place—signs proclaiming Taft as a sundown town and describes in detail the rising violence aimed at black Taft College students from white Taft residents through the later 1900s. He goes on to say, "It was asserted…when Negroes were not hired in Kern County's oil fields that they didn't even want jobs there; the work was too much for them—only white men possessed the qualities necessary for such demanding labor. So both Taft and the oil fields grew up all white" (Haslam 1993, 126).

Oil production was also a profoundly gendered activity: both because of the ideals of strength and family-breadwinner ideologies it traded in, but also because its long hours and grueling physical elements required the reproductive labor of women to keep laborers available to work. Therefore, themes of masculinity were intertwined with a clear sense of class exploitation. They often appropriated Paul Bunyan stories as part of their claiming superhuman strength and masculine prowess, a fact which points as much to settler colonial imaginaries of oil work as pioneering as it does to

an investment in individuality and masculine strength (Quam-Wickham 1994).[63] Today, oil work is still associated with masculine identity: my interviewees all associated oil with breadwinner jobs. As the museum coordinator told me, he started to work in oil because his wife's father required him to get a better job before they married: "Real men didn't sell shoes. Real men worked in oil."

Interestingly, some oral histories recall that Taft had its roots in Oklahoma long before the Okie migration. Bill Rintoul, for instance, an esteemed historian of the San Joaquin Valley's industry, told an oral historian that the Okie migration didn't impact Taft as much because of the oil industry's pre-existing interchange between Oklahoma and California: "We had always had people coming from a lot of different areas in Texas and Oklahoma. In the town itself there was a strong sort of southern or southwestern undercurrent or background" (Rintoul 1981, 3).

Yet he went on to recall a "Hoover City" in Taft. "They were just cardboard shacks and people out of work were trying to get by as best they could. It's my impression that most of it was just an extension of Hoover City. Somebody who didn't have anything and was living in a tent or darn near on the ground. They just didn't have anything" (Rintoul 1981, 10).

Both Tom and Bill explicitly entwined this history of the Okie migration with their framing of the oil industry. "We say this is Little Oklahoma," Tom said in a

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[63] This went as far as gendered and sexualized initiation rites in the oil fields. As Quam-Wickham describes a range of initiation rites from the 1960s, "Good form calls for an acknowledgment of inferiority at this point... one important function is to show that the group cannot be easily entered; it says that the profession is special" (Quam-Wickham 1994, 45).

strong Southern accent, though he was also proud to be fifth-generation Californian; and they both identified as Okies. At stake in this insistence on Okie identity is an implicit identification with not only whiteness or masculinity, but also a narrative of perseverance through hardship and, through hard labor, attaining the "American Dream." Those themes pervaded the conversations that followed, as I describe below.

Second moment: White Trucks Slowing Down, or, That American English

As I was interviewing Tom, a middle-aged man came in. "Hey!" he called.

Tom: what!?

Unknown: how come you're not in there cooking?

Me: I'm taking him away from his responsibilities.

Unknown: She picking your brain?

Me: I am, yes -

Tom: And she's having a tough time! She could take a note and she ain't wrote nothing down!

Me: That's what this [the recorder] is for!

Unknown: She's making things up.

Tom: Thanks for all the help on the party.

Unknown: I didn't do anything. That was all Ed.

Later, this theme returned. Someone, whose name I would learn was Jerry, came in and asked Tom, "She still listening to you?"

Me: Yeah—

Tom: Hey Jerry, she's trying to figure out what I'm saying, and she ain't deciphering it very well.

Jerry: She don't understand that American English.

Both framings—that I am either outright making things up, or unable to understand—extend their earlier definitions of terms: their claims constituted facts, and there was no room for other interpretations. In this case, there's an undercurrent of intimidation or control. In addition, rather than asking if I was making things up, as they did at the beginning of the conversations, they pre-emptively assumed that I was *not* following what they were saying. Each of these exchanges first circled around my incompetence: "Having a tough time," "ain't deciphering it very well." Yet that vague incompetence quickly shifts to something sharper, articulated in the register of a joke: either my making things up or being outside the realm of American English altogether. Both erode the space in which I, as a researcher, could faithfully take down what they say and also come to my own conclusions. In this formulation, if I come to conclusions other than what they say, I am either wrong or lying—or both.

In a broader analysis, their point about my lying or being outside their social world does index a longstanding tradition within anthropology and related social sciences in which researchers can and do extrapolate exoticizing, incorrect, or misinformed conclusions from (whether intentionally or not) misunderstood conversations. So they might be pointing out what is indeed a consistent concern about the nature of social science research—or, perhaps, are showing hostility to an increasingly vilified journalistic tradition. What is new here, and particularly

interesting within a discussion of the epistemologies of petromasculinity, is the turn to "American English," and their explanation of my incompetence through a lack of understanding.

So, what does this reference to American English do? It definitely reads, in one way, as a joke about the elite and ivory-tower nature of academia. They could be re-asserting their own epistemological relevance over and against the produced "expertise" of the academy. But it also resonates with the "plain-folks Americanism" of Okie identity and the vanguardism of petromasculinity (Gregory 1989; Daggett 2018). As Daggett describes in her discussion of petromasculinity, "Through the rosy nostalgia afforded by petro-masculine identity, the affront of global warming or environmental regulations appear as insurgents on par with the dangers posed by feminists and queer movements seeking to leach energy and power from the state/traditional family" (Daggett 2018, 33). Thus, even over our shared whiteness or English fluency, this remark reserves *true* American identity and English language for them, while I, perceived as a feminist and perhaps queer progressive and potential environmentalist, am figured as an insurgent: so much outside of their world that I am placed outside the bounds of Americanness altogether.

This comment also points to the way that petromasculinity situates American identity—and oil work—in a refusal of technology and urbanization so that the real "American English" is maintained in rural areas rather than in urban and elite knowledge production. This is also reflected in their orientations toward capitalism more broadly. For instance, as Tom was describing his workers as his family, he

contrasted their company from Corporate America. But then he immediately interrupted himself: "I mean, you know, Corporate America's good, you know, I'm not, you know…"

In many ways their investment in reserving "American English" for themselves, while foreignizing me, also resonates with the cultural legacy of Okie identity today. As historian Gregory notes, observing the dipthongal vowels, cowboy hats, and trucks of the Central Valley, "The culture here is not 'rural,' it is the white South." Many of these white southern cultural remnants remain. As Gregory further describes,

> Coming from a region with historic links to the South, many of the migrants brought with them elements of a political culture that is best labeled "plain-folk Americanism" …the perspective enjoys its most consistent constituency among rural and working class whites in the greater South. It blends several elements: First, an egalitarian ethos, a populist commitment to ordinary folks as the bone and sinew of American society, but a commitment that in practice worries more about elitist styles than actual disparities of wealth and power. Second, an ethnocentric impulse that at times manifests itself through racism, at other times through patriotic or nativist fervor. And third, a celebration of toughness, individualism, a belief in hard-jawed individualistic solutions to most problems. (Gregory 1989, 83)

This "plain-folk Americanism" meshes well with a petro-masculine nostalgia for an imagined past America: "a version of white, patriarchal rule in which the achievement of hegemonic masculinity required intensive fossil fuel consumption and, for the working or middle-class, jobs within or reliant upon fossil fuel systems" (Daggett 2018, 32). This imagined past included cars, suburbs, the nuclear family, and the white male worker as a breadwinner, sacrificer, and hero—all of which were premised on a supply of cheap energy. In Bakersfield, this nostalgic sense of a

patriarchal past can be encapsulated by the common saying, "Remember when the derricks were made of wood, and the men were made of steel?"

If my interviewees' rise from starvation and displacement to middle-class security was made possible through whiteness and the oil industry, then to question the role of oil in future economies is to question that history as well as to question Americanism writ large. Further, because this rise was largely through blue-collar industries and Defense Department jobs that required and reaffirmed whiteness, part of a contemporary investment in the oil industry is an investment in the shared whiteness that made their current existence possible.

At the same time, their Okie identity provides a sense of aggrievance and oppression—having at one point been excluded by the San Joaquin Valley society around them, this sense is still pervasive, especially in a moment when far-right movements have created more space to claim white victimhood. "We're just like the farmworkers," Tom said to me at one point, referring to the fact that oil workers often follow oil booms from Texas to North Dakota to California. But he was also making a larger claim about their oppressed status: later in the conversation, he added, "Everybody hates us." For them, the social exclusion of being oil producers in an aggressively progressive state intertwines with the remembered social exclusion of being poor white migrants in a racially stratified class system.

While the term "Okie" was a derogatory one in the 1930s and 1940s, the 1960s saw a resurgence of Okie pride largely catalyzed by country singer Merle Haggard's song "Okie from Muskogee." As one article describes, "The song became

not only an anthem of pride for the Okies of the San Joaquin Valley, but likewise for the conservative, blue-collar populace nationwide. The generalized Okie story had reentered mainstream consciousness by contributing to the notion of the hardworking American" (T. Alexander 2009, 91).

Now, people often joke about their Okie roots, and engage in self-deprecating humor around it. Statewide, the production of the Okie as the archetypal migrant—moving through hardship toward assimilation—is also used to impart a sense of liberal, progressive California identity. But this narrative ignores two things: first, it ignores the role of whiteness and citizenship in their economic rise. Second, the "plain-folk Americanism" of Okie narratives today largely focuses on guarding white Americanism from the incursions of racialized others, including the migrant workers that today work in the agricultural fields.

It is this combination of a sense of victimhood *and* investment in dominant ideologies that is so interesting to me here. While others have studied the lines of "aggrieved entitlement" (Vito, Admire, and Hughes 2018; Kimmel 2017) and petromasculinity, I am particularly interested in how these affective investments play out in the realm of truth claims. What happens to questions of truth and fact in a social world premised simultaneously on superiority but also a profound sense of victimization?

Third moment: Inviting Me Across the Fence, or, A bunch of high-class hippies

Later in the conversation, Tom asked where I'm originally from. I said Boulder, Colorado, which is a very progressive, relatively wealthy town. In that

moment, his entire demeanor changed. If, before, he was trying to figure me out, this information seemed to decide that entirely. “Boulder’s a bunch of high-class hippies,” he responded. As he went on:

Tom: So, a, you're going to get kicked out of the family if you write this correctly. Or b, I'm going to be no good, one or the other.

Me: Or I’m just going to write—

Tom: What it is.

Me: Neutral stuff.

Tom: And your daddy ain't gonna like you for that.

On the most basic level here, Tom again re-stakes a claim to the truth: “what it is.” He also expands on the idea that, if I come to conclusions other than his, I’m either wrong or lying. But here, the question of my family now comes into play. Here, he defines the truth as opposite to what my family—who he interprets to be progressive environmentalists—might think. He imagines me having to make a choice between the truth and my family, because what is “correct” will be in such opposition to what my family thinks that I will be kicked out.

This binary is so strong that when I again say I’ll write “neutral stuff,” my attempt at creating a third space is flattened immediately. He again resolves neutrality into his “correct,” anti-environmentalist narrative. For him, the truth is the pro-oil narrative, and he projects that I am writing the opposite of that. For me, the truth is something complicated and unattainable, but my aim is to describe the ways that discourses around truth itself circulate.

At another level, this passage has everything to do with family, family values, and morality. The invocation of my "daddy" makes me a child rather than an adult conversing with them, part of the ways in which misogyny works to infantilize women. It also invokes a particular set of assumptions about the nuclear family structure. While he assumed that my family are indeed "environmental wackos," he also assumes that we share a family structure in which my father's patriarchal authority would lead to my being "kicked out" for disagreeing or would extend to what I write about.

Here, to ask what truth claims *do,* rather than what the truth is, shows that they have more to do with belonging and allegiance than with truth itself. Within a morality structure where one always tells the truth but one *also* does what their family wants, the definition of truth must become malleable. So, really, their repeated questions about whether I would tell the truth or not are asking something more like, "are you going to tell the lies that your family thinks are true and wants you to tell, or are you going to tell the truth (but also lies) that I want you to tell?" How I define truth has everything to do with who I belong with. And, vice versa, belonging has everything to do with what it means to be a truth-teller. If being a true American (white, speaking American English, etc.) is necessary to be a truth teller, then in some ways, I was situated as always already wrong. In this frame, blood relations and ideas of proper family structure as a measure of belonging become important; race and emplacement become important in defining the truth. I become a dutiful daughter

rather than a researcher who produces rigorous work. The (insincere) question becomes: who I will be dutiful to? Them, or my own father?

Ultimately, truth claims are less about their substance than they are about marking a field of belonging. In our conversations, our concepts of family, identity, and belonging were clearly conditioning the possibilities of our speaking. In a small way, we even see this in the role of the room—the "big dogs' room" —where we sat. In some ways, the room itself and the prior conversation we'd entered created a sense of belonging between the three of us; as new people entered, the sense of "we," and the lines of belonging that connected or disconnected us, were rearticulated.

Many people I spoke with pointed out that they live in Taft and have families there, too: the museum coordinator, for instance, told me, "You know, oil men, or women, have families. I haven't met one—'Let's go see what we can damage today so our kids won't have a place to live.' We're all concerned about the environment. We all want to breathe good stuff. We want our water good…" In this way there is a direct similarity between their discourses and those of the environmental justice activists I worked with: both wanted to protect the health of their families and children, and none wanted to breathe (or drink) harmful air or water. The difference lies in how they understand hurt and harm or what is acceptable hurt/harm, and where the oil industry fits in their families' respective histories.

For instance, Bill repeated a few times to me, with some of the most affective charge I experience from him throughout the conversation, "I wouldn't do *nothing* to hurt my family." But his understanding of hurting or protecting one's family comes

directly from witnessing his mother's hardships. As the conversation continued, it also began to circle repeatedly into (and then out of) deeper intimacy. At one point, he described that his father, suffering from post-traumatic stress disorder, often disappeared to Oklahoma; he and his mother would travel by train to try to track him down. Others told me similar stories of having no shoes for years, cooking one pot of beans to last the week, and siblings raising siblings in the absence of parents. Another woman I met at the museum who lived as a girl with her father and younger brothers in the oil field remembered that when he was in an oil accident, no one knew to tell them. When their food ran out, she and her brothers hiked barefoot over the sagebrush hillsides to find the doctor's office in town. The historian Bill Rintoul, for instance, recalled families who subsisted on oatmeal mush and that many of the kids who attended school with him arrived barefoot. "Times were genuinely hard," he said (Rintoul 1981, 5).

For Bill and many others, the oil industry was the thing that took his family from deep poverty to a solid middle-class existence. Wrapped up in their identity as Okies is the poverty and hardship that they, their parents or grandparents experienced—often only one generation away, if that. As Bill continued:

> I'll tell you a story—my mother had asthma. She's dead now, smoker, you know...so when I first got in the business, I asked her one day—I said mom—mom, when I grow up, and she's my mom, and she got it hard, hard. Working outside, you only see it in the cartoons, but washing in a big black pot—I witnessed my mother do that. And she'd stir 'em with a broom stick, she'd hang 'em on the clothesline, sometimes they'd dry, didn't have a dryer…so I watched her do that. I watched her not have a washing machine, I watched her not have a stove, a wood stove, and all that stuff. Dishwasher, none of that. So I asked her one day—mom, I'm gonna ask you a question. She said, what, honey? I said now if I told you ... if you could live a year, a year and a half

> longer—that's when they said asthma takes a year, year and a half off your life or whatever—but in return, I want your refrigerator, I want your washer/dryer? She said, oh, no honey, I'm not gonna do that. So people really worked through that.

In this statement, Bill relies on his mother's testimony to place the hardship of poverty and displacement above the hardship of environmental pollution. Working for the oil industry became an issue of family obligation and loyalty. When I asked him what made him want to work in oil, for instance, he bristled and said he never wanted to work in oil. He wanted to be a football coach. But what he most wanted—and *needed*—to do was "put beans on the table."

Tom also grew up on an oil lease. "The junkyard was my playground," he said. "We lived in an active oil field, and old rigs and junk everywhere, anything we could get running we could drive as long as we didn't get on the highway." He loved the oil fields and always had, but when I asked him what he loved so much about oil, he said it was the people. The history of how the oil industry has changed over time is also part of the family stories that have been handed down to him, and today, he says that he considers the people who work for him as family.

This sense of nuclear family is a large part of what knits them together in support of oil. If, as I described in the last section, much of their sense of collective self is marked by a sense of being aggrieved, I think we can connect that aggrievement, and the complicated levels of exclusion and inclusion that inhere in Okie identity to this frame of family. Both Tom and Bill felt that they needed to protect and defend their families however possible, and the oil fields were the way they could do that.

This sense of identification and belonging is fundamentally material-discursive, and tracing the connections between their lived histories and the truth claims they articulate now is one way of highlighting the material-discursive nature of these interviews. Their back-and-forth dances around truth emerge as much from the materiality of hunger, beans steaming on tables, and oil junkyards as playgrounds as much as they do from discourses of extraction. Further, the beans and junkyards, and the extractive discourses, co-constitutive each other; they can't be separated but instead form the apparatuses in which our conversations—and their impossibilities—emerged and were constrained.

Fourth Moment: Rebuilding the Fence, or, Winning the Liar Championship

One of the last exchanges in my conversation with Bill, however, destabilized the entire formulation of truth and lies they had developed thus far. During the conversation, someone named Derek came into the room. "Is that a tape recorder?" he asked. "He [Bill] lies, a lot."

Tom yelled from the kitchen: "We pay him to do that!"

Derek: "He won the liar championship twelve years in a row."

Bill: "Oh, it's called Toastmasters."

Derek: "And then that guy took over [pointing to Fred] and he started winnin'."

[We're all laughing.]

Bill: "Go back to your station, Derek."

Derek: "Call me later and I'll tell you the rest of the story."

If, before, they had claimed truth and neutrality as part of their identity, this exchange—masked in a series of jokes—turns those previous exchanges on their heads. For instance, earlier, someone else I didn't know had entered the room. "Howdy. How are you. This is the spot, here," he said.

Bill: "This is the spot."

Tom: "This's the big dogs' room."

Bill: "You's supposed to come here sit down and shut up."

Unknown: "I'm surprised the door's even open."

Bill: "May Day May Day. Backroom deals being made right here."

In the genre of jokes and humor, these exchanges signal that Tom and Bill also know that part of what they're telling me could be lies as much as truth. They could also be feeling protective of themselves and using jokes as way to guard. This is an interesting shift: while opening the entire conversation to their potential lies, it keeps the conversational power in their hands. Incorrectness isn't an option. Instead, they know the truth, and the question is just how much of it and in what ways they share it. So, while truth hovers within this conversation as the most important thing, their conversation could also be lies.

Their jokes about the liar's championship show that they are fully aware that everything we said to each other was spoken, and received, through several layers of mistrust, potential obfuscation, or outright lies. If one aspect of petromasculinity is the way in which it feels threatened, then maintaining control over the terms of a conversation—and the terms of truth more broadly—becomes part of maintaining that

power. This is especially true as scientific evidence overwhelmingly demonstrates the fact of climate change and the unsustainability of fossil economies.

Finally, there is something useful in the way that they construct their identities through mine, and vice versa. The phrase "It's called Toastmasters" implies that lying is simply a common fact in public speaking, or at least in speaking to those who aren't your own. The question of who I was—articulated through where I belonged—was consistently at play in the conversation, sometimes in unsubtle terms. For instance, the very first exchange I had with Bill, even before he asked if I was an environmental wacko, went like this:

Me: Hi, I'm Vivian.

Bill: Are you a banana slug? Or what? [The banana slug is the mascot of University of California Santa Cruz.]

Me: I am a banana slug!

Bill: Why are you here?

[I paused]

Tom interjects: Did she understood what you said?

Bill: Banana slugs don't do well in the desert.

Me: That—that is true.

As a banana slug, or an environmental wacko, they produced a caricature of me that constrained the speech I could potentially produce—and that helped them more fully describe themselves and their identities. I also think their quickness to caricature me reflected a frustration on their part with having been caricatured as

backward over the years. They were particularly frustrated at the hypocrisy they saw in the fact that everyone wants their products, but—as Tom said—they say "no anything" when it comes to the actual infrastructure needed to make that happen. "I mean, everybody hates us," Tom repeated, shortly before he asked me whether I drove to Taft and if I knew how many gallons of gas it had taken me to arrive there—a consistent "gotcha" line I had heard many times before. In some ways, then, our failure to communicate—or the fact that the question of truth was at stake throughout—variably reinforced and destabilized each of our identities.[64] It also showed how vulnerable these identities are: so much of the rhetorical back-and-forth in the conversation was defending identities that were frail or over-caricaturized.

Conclusion

While, elsewhere, I have discussed ideas of purity and noncontamination as central to the maintenance of whiteness, this provides a useful countercase in which contamination exists alongside whiteness or becomes an acceptable cost of maintaining whiteness and petromasculine futurities. In some ways, it is an exchange between chemical contamination and the relative purity of investment in petromasculine futures. In Taft, people located their relation to oil—and all that that means, including their embodied smells of it—as part of their attaining whiteness and middle-class status. Bill, for instance, feels certain that his mother would prefer the effects of chemical contamination on her body—manifested as asthma—because of

[64] For instance, they threatened or controlled my identity to some extent, potentially as a foil on which to assert their own.

the middle-class life that it afforded to her. He relies on a sense of glorified concrete labor and petromasculine imaginations to validate the role of the oil industry in the town's economy.

This provides a useful contrast to Chapter 2, in which I discussed residents' and activists' embodied evidence of contamination. In some ways, it expands on the ideas of non-attunement I sketched there. People's modes of perceiving or understanding contamination are always entangled with their lived histories (individually and collectively) in relation to these extractive industries, such that my interviewees as the Oil Museum interpreted oil fumes as "the smell of money" —and, by extension, the smell of middle-class security while Cesar, Gustavo, and the other organizers interpreted the smell of the oil fumes as empirical *evidence* in tracing its deleterious effects on bodies. This is important because it shows the ways that the definition of contamination can shift profoundly, not only over time, but also across space and social formations including, in this case, the particular valences of whiteness and colonialism. Further, it shows the performative work of contamination as a *logic.*

Bill and Tom's discourses continue to function within a *logic* of contamination: they still clearly feel the necessity of protecting their "plain-folks Americanism" from a variety of contaminating threats. As articulated above, Tom's strategically placing me—understood as a coastal urban elite—outside American English points to the white vanguardism, described by writers such as Roxane Dunbar-Ortiz, that can be a part of Okie identity: they are the "*true* Americans, the

personification of what America is supposed to be" (Dunbar-Ortiz 1994, 8), trying to protect American culture from the incursions of liberal politics, feminist and queer politics, and non-white immigrants. This shifting logic shows that contamination is never a concept that can be defined in the abstract. Instead, it always emerges as part of a material-discursive entanglements. This analysis highlights the materiality of meaning-making, and the constitutive ways in which ideas, contestations, and productions of contamination always co-produce each other.

While I came away unsettled, confused, and emotionally exhausted, my desire is not to leave the conversation there. Instead, I believe that it provides a deeper look into the divides that are so central to the functioning of petromasculinity in the present. As Daggett writes, "If people cling so tenaciously to fossil fuels, even to the point of embarking upon authoritarianism, it is because fossil fuels also secure cultural meaning and political subjectivities. Since the new imperialism of the nineteenth century, fossil fuels have become the metaphorical, *material*, and sociotechnical basis of Western petrocultures that extend across the planet" (Daggett 2018, 27; italics mine). The affective dimensions of belonging, as well as the material, lived histories that are co-constituted with fossil fuel-based economies are part of why this question of truth and lies is so important. Fossil fuels secure cultural meaning and political subjectivities, in part, through maintaining particular material-discursive *worlds* that have to be actively constructed and reconstructed, as we can see in these conversations.

After the interviews, as the museum coordinator was giving me a tour of the museum itself, we passed Tom and Bill again. Bill yelled out, “Hey. She knows what she’s talking about now, so leave her alone. Don’t educate her.”

Chapter 5: Conclusion

In early 2021, the Kern County Planning Commission held a public meeting on a new ordinance that would nearly double the oil wells in Kern County. Hundreds of residents testified against the ordinance through calls, voicemails, and live testimony. Yet ultimately, the Commission voted in favor of the oil ordinance (Melley 2021). My primary collaborator, Rosanna, wrote me an email a few days after the decision. "I've had some thoughts about why the Commission voted four-zero on Friday (with one abstention from oil executive) in favor of the Oil Ordinance," she wrote.

> In the end the planning commission determined, "*They don't know what they're talking about*."…How is it that "we/they" don't know what we're talking about? We are the experts. Clearly the majority of women caring for children, extended family members, husbands, friends and others recognize the many ways in which we engage in the reality of serving as a buffer to the toxic elements, infection, disease, poverty…Our labor and efforts transform the harsh impacts of the aforementioned then we are marginalized as "know nothings" by five members (four males, one female) of the Planning Commission.

She and I had already been brainstorming ideas for a paper about resilience in climate change organizing (Underhill and Esparza 2021), so the themes of reproductive labor and buffering were already "in the air," so to speak, between us. But they were also in the air because the work of caring for each, and the way it serves as a buffer, is indeed such an important aspect of living and organizing in oil country.

Rosanna's email highlights the material-discursive ways (toxic elements, infection, disease, poverty) in which oil extraction produces its own worlds, each of

which has its own complicated relationship to logics of contamination. Her response also highlights the material-discursive valences of producing evidence about toxicity: as she describes, "we are the experts:" people living near toxicity produce knowledge and hold expertise about its effects on their health precisely *through* the buffering work they perform. Yet frontline communities (including the 200 people who called, emailed, or testified in person) continue to be defined a priori as "know nothings."

In this dissertation, I have argued that understanding the infrastructures through which oil and water are managed and come to have meaning requires understanding the work of settler colonialism and racial capitalism in producing the contemporary San Joaquin Valley. The Planning Commission's decision exemplifies this fact: even as oil production declines across the state and the Newson administration has vowed to transition away from fossil fuels (Cantu 2021; Office of Governor Gavin Newsom 2019), infrastructures of extraction are entrenched in Kern County in part because they are foundationally linked to the settler colonial and racial capitalist underpinnings of the Valley's economy. Yet, though the Planning Commission's decision may have illustrated the entrenched nature of logics of extraction, Rosanna's response is also indicative of the ongoing resistance to that extraction.

Beginning with the relationships between oil and water, the two liquids that undergirded the production of the contemporary San Joaquin Valley's ecology and economy in the nineteenth and twentieth centuries, this dissertation examines the production and maintenance of material-discursive colonial infrastructures of

extraction. I investigate contemporary contestations over oil and gas extraction within the historical context of reclamation projects, in which racialized ideas of contamination propelled a major reworking of California's landscape. Its ancestral lakes and sloughs, which historically covered much of the Valley floor in wet seasons and connected Bakersfield to Sacramento, were drained in order to produce arable land, which was irrigated by both severely overdrafting groundwater and building increasingly massive irrigation projects.[65] At the same time, the work of reclamation—and the industries of large-scale oil and agriculture it made possible—required the exploitation of racialized workers and produced the Valley as a sink for the contamination from nitrates, fertilizers, hydrocarbons, and other toxins. Today, the Valley is a site of major environmental injustice (Harrison 2011; Garoupa White 2016; London, Sze, and Lievanos 2008). In other words, while the Valley was historically understood as contaminating to the body (and white bodies in particular), the work that produced it from ostensibly "wasteland" to productive farmland also created the conditions in which, today, living in the Valley is in fact contaminating to the body, in group-differentiated and disproportionate ways.

I trace these dynamics in two main ways, building on ethnographic engagements, interviews, and archival research. First, I trace the production of knowledge and unknowings across regulatory science, community knowledge

[65] The largest of these, the State Water Project and Central Valley Project, remain crucial underpinnings of California's agricultural economy today and are clear examples of the coloniality of California's hydraulic system. For more on this see Middleton-Manning (2018).

production, and oil industry narratives, drawing on feminist theorizations of objectivity and the production of colonial unknowings. Second, I elaborate an analytic of contamination, tracing not only shifts in how contamination has been defined, but more fundamentally how a *logic* of contamination stabilizes racialized environmental projects in sometimes contradictory ways. To do so, I draw on literature across feminist and critical race science studies, settler colonial and critical Indigenous studies, racial capitalist theorizations, and the growing body of critical water studies.

Drawing these lines of thought together, I show that contamination has never been a static fact, but instead is a material-discursive formation that is central to the racializing work of settler environmental projects, and the environmental aspects of racial formations. I also show that the production of unknowings and imperceptibility is never only a discursive phenomenon, but rather form a central part of colonial infrastructures of extraction by elaborating the material-discursive ways in which perception and imperception are produced.

The first two chapters I traced the material-discursive and performative ways in which definitions of contamination, the body, and water infrastructure have co-constituted each other. In Chapter 1, I focus primarily on the production of landscapes as contaminating or contaminable through the performative logics that propelled hydraulic infrastructure. Drawing on archival research and feminist theorizations of performativity, I showed that early hydraulic infrastructures were not only part of public health projects or the economic work of turning land into property. The

linearizing and line-drawing entailed in reclamation projects also functioned within a larger *logic* of contamination that furthered conceptions of racial categories and settler sovereignty claims.

In Chapter 2, I turn to the material-discursive ways in which ideas of the body—and its potential contamination—have shifted over time and through racial logics. Historically, understandings of bodies' differential sensitivities to their environments were considered a definitional part of someone's race; today, racialized peoples are indeed exposed to disproportionate levels of chemical exposure, as the environmental justice movement has long shown. I trace these shifts through ideas of empiricisms, from the canon of Enlightenment science to the embodied empiricisms of UFW organizers and current environmental justice activists. Though community-based evidence is often dismissed as anecdotal because of its origin in a feeling body, this genealogy of empiricisms places the embodied work of smelling or feeling contaminants precisely within the canon of scientific thought. In

In Chapter 3, I focus more specifically on the scientific and regulatory apparatuses involved in addressing the question of contamination in the present. While, nationwide, contestations over oil extraction—and fracking specifically—are defined by an absence of data, California prides itself on being a state of relative data abundance. However, I show that an overabundance of *numbers* does not necessarily equate to an overabundance of data, and that the conflation of numbers and data in fact does political work. Further, an overabundance of data itself can also produce regimes of imperceptibility, in which the effects of oil and gas become increasingly

uncertain through further production of data. I finish by showing that California's emphasis on hydrologic data produces a regime of imperceptibility that re-entrenches colonial California as common-sense.

In Chapter 4, the idea of these regimes of imperceptibility returns within the nuances of conversations I had over one day with oil proponents at the West Kern Oil Museum. While our conversations were ostensibly about oil and water, they were more of a cat-and-mouse game that claimed different and shifting terms of truth, lies, and jokes. By bypassing any attempt to sense what was true or false within our conversations, and instead tracing the productive work that a truth claim *does,* I emphasized instead the co-constitutions between definitions of contamination and formations of belonging, family, and identity. This fact shows that even ostensibly discursive formations such as truth or lies emerge from the material-discursive apparatuses of the lived histories of race, gender, and migration. I put these truth claims in conversation with the framework of petromasculinity to highlight a logic of contamination at work in petromasculine desires to protect a nostalgic Americana that is reliant on fossil fuels.

Returning to Objectivity

My analysis throughout the dissertation has been informed by feminist theorizations of objectivity, and it is a theme that undergirds the work as a whole. Each chapter, in different ways, engages with questions of how we judge the basis on which we come to know and understand a particular question. None of the chapters takes up the idea of objectivity explicitly, yet it is important that my focus on how

different forms of knowledge are produced and circulate along lines of power doesn't become a gesture to a generalized relativism. Therefore, in what follows, I return to the ideas of objectivity that I sketched in the Introduction, bring together some threads around objectivity that I have not explicitly teased out, and gesture to what feminist theorizations of objectivity can offer here.

Questions of objectivity were deeply pertinent at each stage of this project. Fissures over facts and objectivity have long characterized interactions between regulatory scientific establishments (like the San Joaquin Valley Air Quality Control Board, the State Water Board, or DOGGR [now CalGEM]); concerned residents and community science producers; environmentalists from elsewhere; and oil proponents, all of whom accused each other of not having to "speak in facts." Accusations of intentionally misleading science collided with the fundamental uncertainties *and* indeterminacies, to use Barad's (2007) framing, of oil's impact on groundwater.

In addition, I did my fieldwork during the Trump administration and its heightened discourse of "alternative facts" and "fake news." The Trump administration had installed industry executives in positions of environmental control (for instance, EPA Director Scott Pruitt, who had built a career as Oklahoma's attorney general suing the EPA), had deleted data sets, reworked panels of scientific consensus, and removed the mention of "climate change," for instance, from federal websites (Dillon et al. 2017). Academic discussions circulated around what this meant for a wide array of fields who had long considered critiques of science to be within their wheelhouse, understanding scientific work as colonial, racial capitalist,

and usually entangled with military and development. In the words of one panel on which I spoke, "how do we critique science when Trump is critiquing it too?"[66]

Now, these questions have only become more important: "fake news" and "misinformation" are affecting election policy, vote counting, vaccine distribution, and public health mandates, among a range of other arenas. Yet, while the Trump administration may have marked a particularly intensified moment in which the definition of facts, neutrality, and science were being contested, feminist and critical race science studies have shown that the dynamics of defining facts and neutrality have always been racialized, gendered, and colonial. Further, there is a distinction between critiquing science from the outside and theorizing from within a deep understanding of scientific practice, as one knowledge practice among many.

In this way, placing all "critiques" of science on one side of a divide and mainstream science on the other could in fact create an uneasy alliance between critical scholars and white supremacist claims. But feminist science studies work shows that the axes along with we consider things become agential cuts themselves, and feminist science studies offers a different axis of analysis by offering a more

[66] At University of California Santa Cruz, Karen Barad also organized a research cluster with the Science and Justice Research Center entitled "Telling the Truth: Objectivity and Justice" beginning in January 2017 as Trump was inaugurated. Barad argued against reasserting the authority of hegemonic Science or an uncritical embrace of scientism and its entanglements with colonialism, racism, and militarism. Instead, they argued for a reworking of scientific work in a way that foregrounds questions of justice as an integral part of scientific practice and that reconsiders *every* aspect of scientific practice. This included an emphasis on objectivity as response-ability rather than objectivity as transcendent and separate (personal communication October 31, 2021).

rigorous objectivity rather than giving up on, in Haraway's words, "enforceable, reliable accounts of things" (Haraway 1988, 580). Viewed another way, the dynamics of whiteness, coloniality, and misogyny that undergirded the Trump administration's actions, and continue to undergird the rise of fascism, can be traced in complex ways to the "hierarchical and positivist orderings of what can count as knowledge" (Haraway 1988, 580) that feminist and critical race science studies have not only opposed but theorized beyond (Benjamin 2016b; Andrews 2015; Barad 2017).

One of the important parts of these feminist theorizations of objectivity is to move beyond a modernist idea of objectivity as transcendent, or based on the separability of observer and observed, and toward an idea of objectivity as accountability and response-ability. This includes the fact that all knowledge is produced within a particular apparatus, which could be imagined as the laboratory or experimental apparatus, but also includes all the material-discursive conditions in which knowledge is produced. Importantly, these conditions are not simply the background "context" for a particular formation of knowledge, but rather, are constitutively part of it through a series of intra-actions. As I described in the Introduction, this form of objectivity requires "an accounting of the constitutive practices in the fullness of their materialities, including the enactment of boundaries and exclusions, the production of phenomena in their sedimenting historiality, and the ongoing reconfiguring of the space of possibilities for future enactments" (Barad 2007, 391).

For instance, in Chapter 2, I address the embodied and racialized, gendered actions that produce an attunement to the environment and what I call embodied empiricisms. In tracing how understandings of contamination have historically conditioned ideas of the body and its differential permeability, we also see that these empiricisms are never only epistemological concerns, but are themselves material, and in this case produced through the materiality of a sensing body. While *all* empirical knowledges, in fact, are produced in and through the materiality of a particular sensing apparatus, in this chapter I focus on the human body and all the forms in which it has been trained to think and perceive experimental apparatus.

This dissertation focuses not only on the production of knowledge but the production of its absence, but accounting for unknowing requires the same attention to the fullness of constitutive practices of producing ignorance. For instance, if perception is a material-discursive practice whose situated, embodied nature must be accounted for (as, for instance, in Haraway's discussion of vision as an embodied material practice), imperceptibility and not knowing are material-discursive, situated, and embodied practices as well.

In the case of this dissertation, there are also material, embodied ways in which our bodies come to *not* perceive things. What a body can sense is fundamentally produced by its history and lived experience, and the material-discursive specificities of regimes of imperceptibility are linked with, for instance, *not* spending time in proximity to oil and gas sites, such that a body could be

incapable of sensing their chemical effects. My body, for instance, took time to become attuned as Cesar and others taught me how to smell pesticides and oil fumes.

Imperceptibility could also be produced by so much exposure that a body can no longer tell the difference, or by the active work of *not* forming attunements. For instance, Shapiro (2015) describes men who insist that the impacts others attribute to formaldehyde exposure are instead simply the unavoidable impacts of aging. In addition, interviewees from Bakersfield described their families' hard work to not notice contamination or form attunements. In these examples, the entanglements of investments in whiteness, masculinity, and class status can also become material-discursive regimes of imperceptibility, and feminist objectivity's accounting for *all* the constitutive aspects of a particular phenomenon is also necessary to fully understand the absence of knowledge.

Similarly, in Chapter 3, I discuss regimes of imperceptibility and colonial unknowing in relation to state-produced science over the question of how and whether oil and gas activity impacts groundwater. In this realm, too, the knowledge produced in innumerable reports is inseparable from the material presences or absences that produced it. Though the discussion within regulatory science is almost always within the realm of the epistemological—how do numbers become data; how do agencies monitor and maintain their data; and, as I add, how does an overabundance of data in fact further obscure knowledge—it is also a fully material set of concerns. As I show, part of the apparatus of regulatory hydrology is in fact the

material history of reworking the California landscape, such that the landscape that hydrology can monitor is only ever one constrained within colonial conditions.

Therefore, the hydraulic history I discussed in Chapter 1—in which a logic of contamination reveals the racialized boundary-making between private property and settler-defined wastelands in the settler ecologies of Kern County in the late nineteenth century—becomes a crucial part of both objectivity and unknowing today. This history shows how understandings of particular *ecosystems* as contaminating, and racialized understandings of contamination within the field of public health, worked together to guide hydraulic infrastructures across the San Joaquin Valley. Yet the impact of that history on the availability of data in the present also conditions the possible futures we can imagine. This shows the importance of thinking with the history of a place, not as context but as materially meaningful in producing what we can (or can't) observe.

Contamination and Racialization

As I described in the Introduction, scholars like Laura Pulido, Neel Ahuja, and David Pellow have pointed out that environmental racism literature has historically taken race as a static and pre-existing category upon which disproportionate levels of toxicity then accrue. Throughout this dissertation, I show that tracing contamination as a shifting material-discursive formation provides one way to track the entanglements of racialization as one form of social difference, ecological change, and toxicity. Here, I return briefly to an analysis of contamination within theorizations of race.

As I showed in the Introduction, attending to the historicity and context-specificity of racial capitalism and settler colonialism in US California also helps us locate the power of settler colonial whiteness in logics of property, and help us see the relations of land and labor that constitute the contextual articulation and circulation of categories such as race and indigeneity. The group-differentiated devaluing of human and more-than-human life and relations through discourses of race is not exceptional, but rather fundamental to the San Joaquin Valley, both historically and in the present.

In large part, the production of land into property relied not only on shifting *definitions* of contamination, but on a logic of contamination that understood the necessity of protecting the "goods" of private property from the incursions of the "wild." Therefore, while differential *relationships* to land and property are important in processes of racialization, so are the fundamental shifts to the land that were entailed in the process of making land into property. We see this, for instance, in Chapter 1, and the ways in which racialized understandings of the landscape propelled hydraulic infrastructures in the performative production of property, which in turn shifted understandings of racial formations themselves.

Chapter 2 extends this notion through highlighting the role of the (non)permeable body in this work. Chapter 3 relates the Valley's hydrologic history to contemporary data production over the question of contamination, in response to environmental justice organizing. Chapter 4 takes a slightly different tack by showing the complicated relationship between contamination and the production and maintenance of whiteness within petrocapitalism. In this case, racial capitalism

propels the co-identification of an almost benevolent conception of contamination with whiteness and class status.

Ultimately, approaching contamination as a material-discursive formation allows us to not only empirically describe the ways that groundwater contamination disproportionately affects racialized communities in the Central Valley, but to also ask what this context can tell us about how racial capitalism and settler colonialism function through contamination (including both *logics* of contamination or contaminability, and the actual contamination of certain landscapes). This approach enables attention to the complex ways in which ecosystems and communities are racialized, *and* the ways in which race is rearticulated and reconfigured through this process.

In the Introduction, I discussed the question of how we got here, and the way that question points not only to each of our implications in the oil economy, but also the ways that the present has been performatively produced as reliant on oil. Engaging a material-discursive, performative analysis is necessary in tracing not only the conditions of the present, but also the production (or subversion) of imaginaries, histories, and present worlds. Driving through the Central Valley today, especially at mid-day, in the flat bright light and endless expanses of regimented orchards and oil fields, it can feel like the current late-capitalist extractive economy of the Valley is intransigent and unchangeable. Yet, from another viewpoint, it is fundamentally precarious, requiring consistent and increasing interventions: the infrastructures of water and oil that create the Valley's present are under increasing strain. While it took

an immense amount of work and violence to reshape the Valley into its present state, that work is not over; it *continues* to take material-discursive work to maintain the Valley as it is today, and to propagate the erasures that maintain its sense as self-obvious and natural.

As I have shown, a material-discursive approach to contamination provides the foundation for research that is capable of asking after the lack of scientific detail, incomplete datasets, or research questions that obfuscate conclusions—but does not stop there. Rather than assuming that with enough data or knowledge, justice can be served through the state apparatus, it allows us to ask after what happens when disparate colonial and racial histories of worldmaking are resolved into singular statements of truth. It opens a frame to go beyond asking for a more responsible or reliable account of what is or was, toward purposefully asking what could have been or what could be.

References

Aguirre, Gustavo. 2021. *Beyond Organizing: The Indispensable Principles to Organize and Empower People*. No City: Creative Book Writers.

Ahmed, Sara. 2006. "Orientations: Toward a Queer Phenomenology." *GLQ: A Journal of Lesbian and Gay Studies* 12 (4): 543–74. https://doi.org/10.1215/10642684-2006-002.

Ahuja, Neel. 2016. "Race, Human Security, and the Climate Refugee." *English Language Notes* 54 (2): 25–32. https://doi.org/10.1215/00138282-54.2.25.

Alexander, M. Jacqui. 2006. *Pedagogies of Crossing: Meditations on Feminism, Sexual Politics, Memory, and the Sacred*. Durham: Duke University Press Books.

Alexander, Toni. 2009. "'Welcome to Old Times': Inserting the Okie Past into California's San Joaquin Valley Present." *Journal of Cultural Geography* 26 (1): 71–100. https://doi.org/10.1080/08873630802617168.

Alley, William M., and Rosemarie Alley. 2017. *High and Dry: Meeting the Challenges of the World's Growing Dependence on Groundwater*. Illustrated ed. New Haven: Yale University Press.

Almaguer, Tomas. 2008. *Racial Fault Lines: The Historical Origins of White Supremacy in California*. Berkeley: University of California Press.

American Lung Association. 2021. "State of the Air Report 2021." https://www.lung.org/getmedia/17c6cb6c-8a38-42a7-a3b0-6744011da370/sota-2021.pdf

Anderson, Warwick. 1996. "Disease, Race and Empire." *Bulletin of the History of Medicine* 70 (1): 62–67. https://doi.org/10.1353/bhm.1996.0001.

———. 2006. *The Cultivation of Whiteness: Science, Health, and Racial Destiny in Australia*. Durham: Duke University Press.

Andrews, Lindsey. 2015. "Black Feminism's Minor Empiricism: Hurston, Combahee, and the Experience of Evidence." *Catalyst: Feminism, Theory, Technoscience* 1 (1): 1–38. https://doi.org/10.28968/cftt.v1i1.28808.

Arkush, Brooke. 1993. "Yokuts Trade Networks and Native Culture Change in Central and Eastern California." *Ethnohistory* 40 (4): 619–40. https://doi.org/10.2307/482590.

Arvin, Maile, Eve Tuck, and Angie Morrill. 2013. “Decolonizing Feminism: Challenging Connections between Settler Colonialism and Heteropatriarchy.” *Feminist Formations* 25 (1): 8–34.

Austin, John Langshaw. 1975. *How to Do Things with Words*. Oxford: Clarendon Press.

Barad, Karen. 1996. “Meeting the Universe Halfway: Realism and Social Constructivism without Contradiction.” In *Feminism, Science, and the Philosophy of Science*, edited by Lynn Hankinson Nelson and Jack Nelson, 161–94. Synthese Library. Dordrecht: Springer Netherlands.

———. 2007. *Meeting the Universe Halfway*. Durham: Duke University Press.

———. 2017. “Troubling Time/s and Ecologies of Nothingness: Re-Turning, Re-Membering, and Facing the Incalculable.” *New Formations* 92 (1): 56–86. https://doi.org/10.3898/NEWF:92.05.2017.

Barba, Mayra G. Sánchez. 2020. “‘Keeping Them Down:’ Neurotoxic Pesticides, Race, and Disabling Biopolitics.” *Catalyst: Feminism, Theory, Technoscience* 6 (1): 1–31. https://doi.org/10.28968/cftt.v6i1.32253.

Barker, Joanne. 2019. “Confluence: Water as an Analytic of Indigenous Feminisms.” *American Indian Culture and Research Journal* 43 (3): 1–40. https://doi.org/10.17953/aicrj.43.3.barker.

Beebe, Rose Marie, and Robert M. Senkewicz. 1996. “The End of the 1824 Chumash Revolt in Alta California: Father Vicente Sarría’s Account.” *The Americas* 53 (2): 273–83. https://doi.org/10.2307/1007619.

Benjamin, Ruha. 2016a. “Catching Our Breath: Critical Race STS and the Carceral Imagination.” *Engaging Science, Technology, and Society* 2 (0): 145–56. https://doi.org/10.17351/ests2016.70.

———. 2016b. “Racial Fictions, Biological Facts: Expanding the Sociological Imagination through Speculative Methods.” *Catalyst: Feminism, Theory, Technoscience* 2 (2): 1–28. https://doi.org/10.28968/cftt.v2i2.28798.

Bentham, Jeremy. (1843) 1978. “Security and Equality of Property.” In *Property: Mainstream and Critical Positions*, edited by Crawford Brough MacPherson, 39–58. Toronto: University of Toronto Press.

Bhandar, Brenna. 2018. *Colonial Lives of Property: Law, Land, and Racial Regimes of Ownership*. Durham: Duke University Press Books.

Borchardt, John K. 1989. “Chemicals Used in Oil-Field Operations.” In *Oil-Field Chemistry: Enhanced Recovery and Production Stimulation*, edited by John K. Borchardt andTeh Fu Yen, 3–54. Vol. 396 in *ACS Symposium Series*. Washington DC: American Chemical Society.

Boudia, Soraya, and Nathalie Jas, eds. 2016. *Powerless Science? Science and Politics in a Toxic World*. New York: Berghahn Books.

Bremer, Jeff. 1999. “The Trial of the Century: ‘Lux v. Haggin’ and the Conflict over Water Rights in Late Nineteenth-Century California.” *The Southern California Quarterly* 81 (2): 197–220. https://doi.org/10.2307/41171945.

Britton and Rey. 1877. “Map of a Part of Kern County Compiled from Official Surveys and Records 1877.” San Francisco. Bancroft Library, University of California, Berkeley.

Brown, Phil. 1992. “Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing.” *Journal of Health and Social Behavior* 33 (3): 267–81. https://doi.org/10.2307/2137356.

Browne, Simone. 2015. *Dark Matters: On the Surveillance of Blackness*. Durham: Duke University Press Books.

Bullard, Robert D., and Benjamin Chavis, eds. 1999. *Confronting Environmental Racism: Voices from the Grassroots*. Boston: South End Press.

Burow, Karen R., Bryant C. Jurgens, Kenneth Belitz, and Neil M. Dubrovsky. 2013. “Assessment of Regional Change in Nitrate Concentrations in Groundwater in the Central Valley, California, USA, 1950s–2000s.” *Environmental Earth Sciences* 69 (8): 2609–21. https://doi.org/10.1007/s12665-012-2082-4.

Burow, Karen R., Jennifer L. Shelton, and Neil M. Dubrovsky. 2008. “Regional Nitrate and Pesticide Trends in Ground Water in the Eastern San Joaquin Valley, California.” *Journal of Environmental Quality* 37 (S5): S-249-S-263. https://doi.org/10.2134/jeq2007.0061.

Butler, Judith. 1990. *Gender Trouble: Feminism and the Subversion of Identity*. New York: Routledge.

———. 2004. *Undoing Gender*. East Sussex: Psychology Press.

———. 2006. *Gender Trouble: Feminism and the Subversion of Identity*. New York: Routledge.

———. 2011. *Bodies That Matter: On the Discursive Limits of Sex*. New York: Routledge.

Byrd, Jodi. 2011. *The Transit of Empire: Indigenous Critiques of Colonialism*. Minneapolis: University of Minnesota Press.

———. 2015. "Eyes That Can Never Close: Colonial Agnosia and the Mnemonics of Refusal." Lecture presented at University of California Santa Cruz Cultural Studies. Santa Cruz, CA, February 21, 2018.

Cantu, Aaron. 2021. "The Fossil Fuel Industry's Last Stand in California Oil Country." *Capital and Main,* March 4, 2021. https://capitalandmain.com/the-fossil-fuel-industrys-last-stand-in-california-oil-country-0304.

Carson, Rachel. 1962. *Silent Spring*. Boston: Houghton Mifflin.

Cart, Julie. 2015. "Central Valley's Growing Concern: Crops Raised with Oil Field Water." *Los Angeles Times*, May 2, 2015. https://www.latimes.com/local/california/la-me-drought-oil-water-20150503-story.html.

Cartwright, Elizabeth. 2013. "Eco-Risk and the Case of Fracking." In *Cultures of Energy: Power, Practices, Technologies*, edited by Sarah Strauss, Stephanie Rupp, and Thomas Love, 201-212. Walnut Creek, CA: Taylor & Francis Group.

Checker, Melissa. 2005. *Polluted Promises: Environmental Racism and the Search for Justice in a Southern Town*. New York: NYU Press.

Chen, Mel Y. 2011. "Toxic Animacies, Inanimate Affections." *GLQ: A Journal of Lesbian and Gay Studies* 17 (2–3): 265–86. https://doi.org/10.1215/10642684-1163400.

Cole, Luke W., and Sheila R. Foster. 2001. *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement*. New York: NYU Press.

Collin, Robert W., and Robin Morris Collin. 1998. "The Role of Communities in Environmental Decisions: Communities Speaking for Themselves Symposium: Science and the Law: An Uneasy Partnership." *Journal of Environmental Law and Litigation* 13 (1): 37–90.

Collins, Patricia Hill. 1999. *Fighting Words: Black Women and the Search for Justice*. Minneapolis: University of Minnesota Press.

———. 2008. *Black Feminist Thought: Knowledge, Consciousness, and the Politics of Empowerment*. New York: Routledge.

Combahee River Collective. 1983. "The Combahee River Collective Statement." In *Home Girls: A Black Feminist Anthology*, 264–74. New Brunswick, NJ: Kitchen Table: Women of Color Press.

Corburn, Jason. 2003. "Bringing Local Knowledge into Environmental Decision Making: Improving Urban Planning for Communities at Risk." *Journal of Planning Education and Research* 22 (4): 420–33. https://doi.org/10.1177/0739456X03022004008.

———. 2005. *Street Science: Community Knowledge and Environmental Health Justice*. Cambridge, MA: MIT Press.

Coulthard, Glen. 2014. *Red Skin, White Masks: Rejecting the Colonial Politics of Recognition*. Minneapolis, MN: University of Minnesota Press.

Cox, John. 2021. "Groundwater Contamination: Facility Operator Wins Time, but Appeal Awaits." *The Bakersfield Californian.* June 11th, 2021. https://www.bakersfield.com/news/groundwater-contamination-facility-operator-wins-time-but-appeal-awaits/article_36673931-50fb-5650-9dc3-879a45c26b96.html.

Crenshaw, Kimberle. 1991. "Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color." *Stanford Law Review* 43 (6): 1241–99.

Cronon, William. 1996. "The Trouble with Wilderness: Or, Getting Back to the Wrong Nature." *Environmental History* 1 (1): 7–28. https://doi.org/10.2307/3985059.

Csordas, Thomas J. 1993. "Somatic Modes of Attention." *Cultural Anthropology* 8 (2): 135–56. https://doi.org/10.1525/can.1993.8.2.02a00010.

Cupas, Angela C. 2008. "The Not-So-Safe Drinking Water Act: Why We Must Regulate Hydraulic Fracturing at the Federal Level." *William & Mary Environmental Law and Policy Review* 33 (2): 605–32.

Daggett, Cara. 2018. "Petro-Masculinity: Fossil Fuels and Authoritarian Desire." *Millennium* 47 (1): 25–44. https://doi.org/10.1177/0305829818775817.

Darling, Curtis. 2003. *Kern County Place Names*. 2nd ed. Bakersfield: Kern County Historical Society.

Davis, Clark, and David Igler. 2002. *The Human Tradition in California*. Washington, DC: Rowman & Littlefield Publishers.

Day, Iyko. 2016. *Alien Capital: Asian Racialization and the Logic of Settler Colonial Capitalism*. Durham: Duke University Press Books.

Deloria, Philip J. 2004. *Indians in Unexpected Places*. Lawrence: University Press of Kansas.

Dencik, Lina, Arne Hintz, and Jonathan Cable. 2016. "Towards Data Justice? The Ambiguity of Anti-Surveillance Resistance in Political Activism." *Big Data & Society* 3 (2). https://doi.org/10.1177/2053951716679678.

Derby, George H., and Francis P. Farquhar. 1932. "The Topographical Reports of Lieutenant George H. Derby II. Report on the Tulare Valley of California, April and May, 1850." *California Historical Society Quarterly* 11 (3): 247–65. https://doi.org/10.2307/25178135.

di Palma, Vittoria. 2014. *Wasteland: A History*. New Haven: Yale University Press.

Dillon, Lindsey. 2021. "Civilizing Swamps in San Francisco: Formations of Race, Nature, and Property in the Nineteenth Century US West." *Environment and Planning D: Society and Space* 0(0): 1-18.

Dillon, Lindsey, and Julie Sze. 2016. "Police Power and Particulate Matters: Environmental Justice and the Spatialities of In/Securities in US Cities." *English Language Notes* 54 (2): 13–23. https://doi.org/10.1215/00138282-54.2.13.

Dillon, Lindsey, Dawn Walker, Nicholas Shapiro, Vivian Underhill, Megan Martenyi, Sara Wylie, Rebecca Lave, Michelle Murphy, and Phil Brown. 2017. "Environmental Data Justice and the Trump Administration: Reflections from the Environmental Data and Governance Initiative." *Environmental Justice* 10 (6): 186–92. https://doi-org.oca.ucsc.edu/10.1089/env.2017.0020.

Douglas, Mary. 2003. *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*. East Sussex: Psychology Press.

Dunbar-Ortiz, Roxanne. 1994. "One or Two Things I Know about Us: 'Okies' in American Culture." *Radical History Review* 1994 (59): 4–35. https://doi.org/10.1215/01636545-1994-59-4.

Epstein, Steven. 1996. *Impure Science: AIDS, Activism, and the Politics of Knowledge*. Berkeley: University of California Press.

Estes, Nick. 2017. “Fighting for Our Lives: #NoDAPL in Historical Context.” *Wicazo Sa Review* 32 (2): 115–22. https://doi.org.oca.ucsc.edu/10.5749/wicazosareview.32.2.0115

Fausto-Sterling, Anne. 1989. “Life in the XY Corral.” *Women’s Studies International Forum* 12 (3): 319–31.

———. 2000. “The Five Sexes, Revisited.” *The Sciences* 40 (4): 18–23.

Ferreira da Silva, Denise. 2017. “1 (Life) ÷ 0 (Blackness) = ∞ - ∞ or ∞/∞: On Matter Beyond the Equation of Value.” *E-Flux* 79 (February): 1-11.

Fiske, Amelia. 2020. “Naked in the Face of Contamination: Thinking Models and Metaphors of Toxicity Together.” *Catalyst: Feminism, Theory, Technoscience* 6 (1): 1-30. https://doi.org/10.28968/cftt.v6i1.32093.

Francis, Robert. 2016. *Black Gold in California: The Story of the California Petroleum Industry*. San Antonio: HPN Books.

Frank, Gelya, and Carole Goldberg. 2011. *Defying the Odds: The Tule River Tribe’s Struggle for Sovereignty in Three Centuries*. New Haven: Yale University Press.

Fujimura, Joan. 2006. “Sex Genes: A Critical Sociomaterial Approach to the Politics and Molecular Genetics of Sex Determination.” *Signs: Journal of Women in Culture and Society* 32 (1): 49–82. https://doi.org/10.1086/505612.

Gal, Ofer, and Raz Chen-Morris. 2010. “Empiricism without the Senses: How the Instrument Replaced the Eye.” In *The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern Science*, edited by Charles Wolfe and Ofer Gal, 121-148. Studies in History and Philosophy of Science 25. New York: Springer.

Galloway, Devin, and Frances Riley. 1999. “San Joaquin Valley, California—Largest Human Alteration of the Earth’s Surface.” US Geological Survey Circular 1182. Land Subsidence in the United States. Menlo Park, CA: US Geological Survey. Retrieved from: http://pubs.usgs.gov/circ/circ1182/.

Garfield, Ryan. 2009. “Testimony of Ryan Garfield on Behalf of the Tule River Tribe of California in Support of S. 789, the Tule River Tribe Water Development Act.” Sacramento, CA, July 23. http://www.narf.org/nill/documents/NARF_water_settlements/Tule/20090723Garfield_testimony.pdf.

Garoupa White, Catherine. 2016. “Do You See What I See? Advocates’ and Authorities’ Social Constructions of Air Pollution in California’s San Joaquin Valley.” *ProQuest Dissertations and Theses*. PhD, United States. California: University of California, Davis. https://www.proquest.com/docview/1832312975/abstract/2128BCB6ACEB46C6PQ/1.

Geologic Energy Management Division (CalGEM). 2019. “Aquifer Exemptions Status.” 2019. https://www.conservation.ca.gov/calgem/Pages/Aquifer-Exemptions-Status.aspx#mountposo.

Gillespie, Janice, Tracy Davis, Michael Stephens, Lindsay Ball, and Matthew Landon. 2019. “Groundwater Salinity and the Effects of Produced Water Disposal in the Lost Hills–Belridge Oil Fields, Kern County, California.” *Environmental Geosciences* 26 (3): 73–96. https://doi.org/10.1306/eg.02271918009.

Gilmore, Ruth Wilson. 2002. “Fatal Couplings of Power and Difference: Notes on Racism and Geography.” *The Professional Geographer* 54 (1): 15–24. https://doi.org/10.1111/0033-0124.00310.

———. 2007. *Golden Gulag: Prisons, Surplus, Crisis, and Opposition in Globalizing California*. Berkeley: University of California Press.

Gitelman, Lisa, ed. 2013. *“Raw Data” Is an Oxymoron*. Cambridge, MA: MIT Press.

Goldstein, Donna, and Kira Hall. 2015. “Mass Hysteria in Le Roy, New York: How Brain Experts Materialized Truth and Outscienced Environmental Inquiry.” *American Ethnologist* 42 (4): 640–57. https://doi.org/10.1111/amet.12161.

Gordon, Avery. 2008. *Ghostly Matters: Haunting and the Sociological Imagination*. 2nd ed. Minneapolis: University of Minnesota Press.

Gould, Stephen Jay. 1996. *The Mismeasure of Man*. New York: W. W. Norton & Company.

Gregory, James N. 1989. “Dust Bowl Legacies: The Okie Impact on California, 1939–1989.” *California History* 68 (3): 74–85. https://doi.org/10.2307/25462394.

Gregson, Nicky, and Gillian Rose. 2000. “Taking Butler Elsewhere: Performativities, Spatialities and Subjectivities.” *Environment and Planning D - Society & Space* 18 (4): 433–52. https://doi.org/10.1068/d232.

Grosser, Benjamin. 2014. “What Do Metrics Want? How Quantification Prescribes Social Interaction on Facebook.” *Computational Culture* 4: 1-41. http://computationalculture.net/what-do-metrics-want/.

Haraway, Donna. 1984. “Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908–1936.” *Social Text* 11: 20–64. https://doi.org/10.2307/466593.

———. 1988. “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective.” *Feminist Studies* 14 (3): 575–99. https://doi.org/10.2307/3178066.

———. 1990. *Primate Visions: Gender, Race, and Nature in the World of Modern Science*. East Sussex, UK: Psychology Press.

———. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. Illustrated ed. Durham: Duke University Press Books.

Harding, Sandra. 1986. *The Science Question in Feminism*. Ithaca: Cornell University Press.

———. 1991. *Whose Science? Whose Knowledge? Thinking from Women’s Lives*. Ithaca: Cornell University Press.

———. 1993. *The “Racial” Economy of Science: Toward a Democratic Future*. Bloomington: Indiana University Press.

Harris, Cheryl I. 1993. “Whiteness as Property.” *Harvard Law Review* 106 (8): 1707–91. https://doi.org/10.2307/1341787.

Harrison, Jill Lindsey. 2006. “‘Accidents’ and Invisibilities: Scaled Discourse and the Naturalization of Regulatory Neglect in California’s Pesticide Drift Conflict.” *Political Geography* 25 (5): 506–29. https://doi.org/10.1016/j.polgeo.2006.02.003.

———. 2011. *Pesticide Drift and the Pursuit of Environmental Justice*. Illustrated ed. Cambridge, MA: MIT Press.

Hartman, Saidiya. 1997. *Scenes of Subjection: Terror, Slavery, and Self-Making in Nineteenth-Century America*. New York: Oxford University Press.

———. 2006. *Lose Your Mother: A Journey along the Atlantic Slave Route*. New York: Farrar, Straus and Giroux.

———. 2008. “Venus in Two Acts.” *Small Axe: A Caribbean Journal of Criticism* 12 (2): 1–14. https://doi.org/10.1215/-12-2-1.

Harvey, Chelsea. 2017. “The Hearing Was Titled, ‘Making EPA Great Again.’ Scientists Are Afraid the Opposite Will Happen.” *Washington Post*, February 7th, 2017. https://www.washingtonpost.com/news/energy-environment/wp/2017/02/07/the-hearing-was-titled-making-epa-great-again-scientists-are-afraid-the-opposite-will-happen/.

Haslam, Gerald W. 1993. *The Other California: The Great Central Valley in Life and Letters*. Reno: University of Nevada Press.

Hedemark, Justin. 2015. “Taming the West: Senate Bill 4 and California’s Struggle to Regulate Fracking.” *Golden Gate University Environmental Law Journal* 8 (1): 119–54.

Herzig, Rebecca. 2005. *Suffering for Science: Reason and Sacrifice in Modern America*. New Brunswick: Rutgers University Press.

Huang, Ganlin, and Jonathan K. London. 2012. “Cumulative Environmental Vulnerability and Environmental Justice in California’s San Joaquin Valley.” *International Journal of Environmental Research and Public Health* 9 (5): 1593–1608. https://doi.org/10.3390/ijerph9051593.

Hurtado, Aída. 2003. “Theory in the Flesh: Toward an Endarkened Epistemology.” *International Journal of Qualitative Studies in Education* 16: 215–25. https://doi.org/10.1080/0951839032000060617.

Hurtado, Albert L. 1990. *Indian Survival on the California Frontier*. New Haven: Yale University Press.

Igler, David. 2005. *Industrial Cowboys: Miller & Lux and the Transformation of the Far West, 1850-1920*. Berkeley: University of California Press.

Irwin, Alan. 2002. *Citizen Science: A Study of People, Expertise and Sustainable Development*. London: Routledge.

Jasanoff, Sheila. 1998. *The Fifth Branch: Science Advisers as Policymakers*. Boston: Harvard University Press.

Kaminstein, Dana. 2008. “Persuasion in a Toxic Community: Rhetorical Aspects of Public Meetings.” *Human Organization* 55 (4): 458–64. https://doi.org/10.17730/humo.55.4.f08081n88554tl17.

Kane, Julia. 2020. “Tired of Wells That Threaten Residents’ Health, a Small California Town Takes on the Oil Industry.” *Inside Climate News* (blog). August 3, 2020. https://insideclimatenews.org/news/03082020/california-big-oil-environmental-health/.

Karuka, Manu. 2019. *Empire's Tracks: Indigenous Nations, Chinese Workers, and the Transcontinental Railroad*. Berkeley: University of California Press.

Kauanui, J. Kēhaulani. 2008. *Hawaiian Blood: Colonialism and the Politics of Sovereignty and Indigeneity*. Durham: Duke University Press Books.

———. 2018. *Paradoxes of Hawaiian Sovereignty: Land, Sex, and the Colonial Politics of State Nationalism*. Durham: Duke University Press Books.

Keller, Evelyn Fox. 1982. "Feminism and Science." *Signs: Journal of Women in Culture and Society* 7 (3): 589–602. https://doi.org/10.1086/493901.

———. 1985. *Reflections on Gender and Science*. New Haven: Yale University Press.

Kennedy, Helen. 2016. "New Data Relations and the Desire for Numbers." In *Post, Mine, Repeat: Social Media Data Mining Becomes Ordinary*, edited by Helen Kennedy, 221–36. London: Palgrave Macmillan UK.

Kimmel, Michael. 2017. *Angry White Men: American Masculinity at the End of an Era*. 2nd ed. New York: Bold Type Books.

Kuletz, Valerie L. 1998. *The Tainted Desert: Environmental and Social Ruin in the American West*. New York: Routledge.

Langston, Nancy. 2011. *Toxic Bodies: Hormone Disruptors and the Legacy of DES*. New Haven: Yale University Press.

Leahy, Tina Cannon. 2015. "Desperate Times Call for Sensible Measures: The Making of the California Sustainable Groundwater Management Act." *Golden Gate University Environmental Law Journal* 9 (1): 5–40.

Littlefield, Douglas R. 2020. *Ruling the Waters: California's Kern River, the Environment, and the Making of Western Water Law*. Norman, OK: University of Oklahoma Press.

London, Jonathan K., Julie Sze, and Raoul S. Lievanos. 2008. "Problems, Promise, Progress, and Perils: Critical Reflections on Environmental Justice Policy Implementation in California." *UCLA Journal of Environmental Law and Policy* 26 (2): 255–90.

London, Jonathan K., Tara Mirel Zagofsky, Ganlin Huang, and Jenny Saklar. 2011. "Collaboration, Participation and Technology: The San Joaquin Valley Cumulative Health Impacts Project." *Gateways: International Journal of Community Research and Engagement* 4: 12–30.

Long, Jane C. S., Laura C. Feinstein, Corinne E. Bachmann, Jens T. Birkholzer, and Mary Kay Camarillo. California Council on Science and Technology. "An Independent Scientific Assessment of Well Stimulation in California, Vol. 2 (SB4)," July 9, 2015. https://ccst.us/reports/an-independent-scientific-assessment-of-well-stimulation-in-california-volume-2/.

Longino, Helen E. 1987. "Can There Be A Feminist Science?" *Hypatia* 2 (3): 51–64. https://doi.org/10.1111/j.1527-2001.1987.tb01341.x.

———. 1990. *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry*. New Haven: Princeton University Press.

Lowe, Lisa. 2015. *The Intimacies of Four Continents*. Durham: Duke University Press.

Lugones, Maria. 2016. "The Coloniality of Gender." In *The Palgrave Handbook of Gender and Development: Critical Engagements in Feminist Theory and Practice*, edited by Wendy Harcourt, 13–33. London: Palgrave Macmillan UK.

Lynch, George. 2009. "The Late, Great, Buena Vista Lake." *Historic Kern Quarterly Bulletin* 59(3): 1-8.

MacIntosh, J. J., and Peter Anstey. 2018. "Robert Boyle." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta. Metaphysics Research Lab, Stanford University. https://plato.stanford.edu/archives/win2018/entries/boyle/.

Martin, Emily. 1991. "The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles." *Signs: Journal of Women in Culture and Society* 16 (3): 485–501. https://doi.org.oca.ucsc.edu/10.1086/494680.

Martin, Philip L., and J. Edward Taylor. 1998. "Poverty Amid Prosperity: Farm Employment, Immigration, and Poverty in California." *American Journal of Agricultural Economics* 80 (5): 1008–14. https://doi.org/10.2307/1244195.

McMahon, Peter B., Justin T. Kulongoski, Avner Vengosh, Isabelle M. Cozzarelli, Matthew K. Landon, Yousif K. Kharaka, Janice M. Gillespie, and Tracy A. Davis. 2018. "Regional Patterns in the Geochemistry of Oil-Field Water, Southern San Joaquin Valley, California, USA." *Applied Geochemistry* 98: 127–40. https://doi.org/10.1016/j.apgeochem.2018.09.015.

Melamed, Jodi. 2015. "Racial Capitalism." *Critical Ethnic Studies* 1 (1): 76–85. https://doi.org/10.5749/jcritethnstud.1.1.0076.

Melendez, Miguel. 2005. *We Took the Streets: Fighting for Latino Rights with the Young Lords*. New Brunswick: Rutgers University Press.

Melley, Brian. 2021. "California County OKs Plan for Thousands of New Oil Wells - Los Angeles Times." *Los Angeles Times*, March 9, 2021. https://www.latimes.com/environment/story/2021-03-09/kern-county-approves-new-oil-and-gas-wells-over-environmental-objections.

Middleton-Manning, Beth Rose. 2018. *Upstream: Trust Lands and Power on the Feather River*. Tucson: University of Arizona Press.

Mignolo, Walter D. 2007. "Delinking the Rhetoric of Modernity, the Logic of Coloniality and the Grammar of de-Coloniality." *Cultural Studies* 21 (2–3): 449–514. https://doi.org/10.1080/09502380601162647.

Mohanty, Chandra Talpade. 1988. "Under Western Eyes: Feminist Scholarship and Colonial Discourses." *Feminist Review* 30: 61–88. https://doi-org.oca.ucsc.edu/10.1057/fr.1988.42

Molina, Natalia. 2006. "Medicalizing the Mexican: Immigration, Race, and Disability in the Early-Twentieth-Century United States." *Radical History Review* 2006 (December): 22–37. https://doi.org/10.1215/01636545-2006-94-22.

Molle, Francois, Peter Mollinga, and Philippus Wester. 2009. "Hydraulic Bureaucracies and the Hydraulic Mission: Flows of Water, Flows of Power." *Water Alternatives* 2 (3): 328–49.

Moraga, Cherríe, and Gloria Anzaldúa, eds. 1981. *This Bridge Called My Back: Writings by Radical Women of Color*. Fourth ed. Watertown, MA: Persephone Press.

Morello-Frosch, Rachel, Manuel Pastor, and James Sadd. 2001. "Environmental Justice and Southern California's 'Riskscape': The Distribution of Air Toxics Exposures and Health Risks among Diverse Communities." *Urban Affairs Review* 36 (4): 551–78. https://doi.org/10.1177/10780870122184993.

Moreton-Robinson, Aileen. 2015. *The White Possessive: Property, Power, and Indigenous Sovereignty*. Minneapolis: University of Minnesota Press.

Morgan, Wallace Melvin. 1914. *History of Kern County, California, with Biographical Sketches of the Leading Men and Women of the County Who Have Been Identified with Its Growth and Development from the Early Days to the Present*. Philadelphia: Dalcassian Publishing Company.

Morgensen, Scott Lauria. 2011. *Spaces between Us: Queer Settler Colonialism and Indigenous Decolonization*. Minneapolis: University of Minnesota Press.

Murphy, Michelle. 2006. *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers*. Durham: Duke University Press.

Nash, Linda. 2007. *Inescapable Ecologies: A History of Environment, Disease, and Knowledge*. Berkeley: University of California Press.

Nelson, Alondra. 2008. "Bio Science: Genetic Genealogy Testing and the Pursuit of African Ancestry." *Social Studies of Science* 38 (5): 759–83. https://doi-org.oca.ucsc.edu/10.1177/0306312708091929

Nelson, Diane M. 1999. *A Finger in the Wound: Body Politics in Quincentennial Guatemala*. Berkeley: University of California Press.

Ngo, M., K. Pinkerton, S. Freeland, M. Geller, W. Ham, S. Cliff, L. Hopkins, et al. 2010. "Airborne Particles in the San Joaquin Valley May Affect Human Health." *California Agriculture* 64 (1): 12–16.

Nimmo, Joseph. 1890. "Uncle Sam's Farm: The Reclamation of the Arid Region of the United States by Means of Irrigation." *Frank Leslie's Illustrated Newspaper* Thanksgiving Series of 1889. https://archive.org/details/unclesamsfarmre00conggoog

Northridge, M. E., J. Yankura, P. L. Kinney, R. M. Santella, P. Shepard, Y. Riojas, M. Aggarwal, and P. Strickland. 1999. "Diesel Exhaust Exposure among Adolescents in Harlem: A Community-Driven Study." *American Journal of Public Health* 89 (7): 998–1002. https://doi.org/10.2105/AJPH.89.7.998.

O'Brien, Jean M. 2010. *Firsting and Lasting: Writing Indians out of Existence in New England*. Minneapolis: University of Minnesota Press.

Office of Governor Gavin Newsom. 2019. "Governor Gavin Newsom Signs Six Bills to Move California Away from Fossil Fuels." Office of Governor Gavin Newsom. October 12, 2019. https://www.gov.ca.gov/2019/10/12/governor-gavin-newsom-signs-six-bills-to-move-california-away-from-fossil-fuels/.

Office of State Audits and Evaluations. 2020. “Final Report - California Department of Conservation, Underground Injection Control and Well Stimulation Treatment Programs, Performance Audit.” Audit 20-3480–030. Sacramento, CA: California Department of Finance. https://esd.dof.ca.gov/reports/reportPdf/5631D3F7-882E-EB11-9121-00505685B5D1/California%20Department%20of%20Conservation%20Underground%20Injection%20Control%20and%20Well%20Stimulation%20Treatment%20Programs%20Performance%20Audit%20November%202020.

Onishi, Norimitsu. 2014. “A California Oil Field Yields Another Prized Commodity.” *New York Times*, July 7, 2014. https://www.nytimes.com/2014/07/08/us/california-drought-chevron-oil-field-water-irrigation.html.

Oreskes, Naomi, and Erik M. Conway. 2011. *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Climate Change*. Reprint ed. New York: Bloomsbury Publishing.

Pellow, David. 2016. “Toward a Critical Environmental Studies: Black Lives Matter as an Environmental Justice Challenge.” *Du Bois Review - Social Science Research on Race* 13 (2): 425–425. https://doi.org/10.1017/S1742058X16000175.

Porter, Theodore. 1996. *Trust in Numbers*. Reprint ed. Princeton: Princeton University Press.

Proctor, Robert. 2008. “Agnotology: A Missing Term to Describe the Cultural Production of Ignorance (and Its Study).” In *Agnotology: The Making and Unmaking of Ignorance*, edited by Londa L. Schiebinger and Robert Proctor, 1–37. Stanford, CA: Stanford University Press.

Pulido, Laura. 1996. *Environmentalism and Economic Justice: Two Chicano Struggles in the Southwest*. Tucson: University of Arizona Press.

———. 2017. “Geographies of Race and Ethnicity II: Environmental Racism, Racial Capitalism and State-Sanctioned Violence.” *Progress in Human Geography* 41 (4): 524–33. https://doi-org.oca.ucsc.edu/10.1177/0309132516646495

Quam-Wickham, Nancy Lynn. 1994. “Petroleocrats and Proletarians: Work, Class, and Politics in the California Oil Industry, 1917-1925.” PhD, United States. California: University of California, Berkeley. http://search.proquest.com/docview/304081522/abstract/78BCC7B2199E4F61PQ/1.

Quijano, Aníbal. 2007. “Coloniality and Modernity/Rationality.” *Cultural Studies* 21 (2–3): 168–78. https://doi.org/10.1080/09502380601164353.

Ranganathan, Malini. 2016. “Thinking with Flint: Racial Liberalism and the Roots of an American Water Tragedy.” *Capitalism Nature Socialism* 27 (3): 17–33. https://doi.org/10.1080/10455752.2016.1206583.

Reno, Joshua. 2011. “Beyond Risk: Emplacement and the Production of Environmental Evidence.” *American Ethnologist* 38 (3): 516–30. https://doi.org/10.1111/j.1548-1425.2011.01320.x.

Richardson, Sarah. 2013. *Sex Itself: The Search for Male and Female in the Human Genome*. Chicago: University of Chicago Press.

Richter, Lauren. 2018. “Constructing Insignificance: Critical Race Perspectives on Institutional Failure in Environmental Justice Communities.” *Environmental Sociology* 4 (1): 107–21. https://doi.org/10.1080/23251042.2017.1410988.

Rintoul, Bill. 1981. *California Odyssey: the 1930s Migration to the Southern San Joaquin Valley*. Oral History Interview. Bakersfield, CA. https://www.csub.edu/library/_files/DB_files/Rintoul208.pdf.

Riskin, Jessica. 2002. *Science in the Age of Sensibility: The Sentimental Empiricists of the French Enlightenment*. Chicago: University of Chicago Press.

Roberts, Elizabeth. 2017. “Exposure.” Society for Cultural Anthropology. https://culanth.org/fieldsights/exposure.

Robinson, Cedric. 1983. *Black Marxism: The Making of the Black Radical Tradition*. Chapel Hill: University of North Carolina Press.

Rolle, Andrew. 1996. “Turbulent Waters: Navigation and California’s Southern Central Valley.” *California History* 75 (2): 128–37. https://doi.org/10.2307/25177575.

Rook, Robert E. 2000. “An American in Palestine: Elwood Mead and Zionist Water Resource Planning, 1926-1936.” *Arab Studies Quarterly* 22 (1): 71–89.

Rosbjerg, Dan, and John Rodda. 2019. “IAHS: A Brief History of Hydrology.” *History of Geo- and Space Sciences* 10 (1): 109–18.

Rossiter, Margaret W. 1982. *Women Scientists in America: Struggles and Strategies to 1940*. Baltimore: Johns Hopkins University Press.

Rowe, Aimee Carrillo, and Eve Tuck. 2017. "Settler Colonialism and Cultural Studies: Ongoing Settlement, Cultural Production, and Resistance." *Cultural Studies ↔ Critical Methodologies* 17 (1): 3–13.

Saldaña-Portillo, María Josefina. 2016. *Indian Given: Racial Geographies across Mexico and the United States*. Durham: Duke University Press Books.

Salter, Alan. 2010. "Early Modern Empiricism and the Discourse of the Senses." In *The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern Science*, edited by Charles Wolfe and Ofer Gal, 59-74. Studies in History and Philosophy of Science 25. New York: Springer.

Saxton, Dvera I. 2015. "Strawberry Fields as Extreme Environments: The Ecobiopolitics of Farmworker Health." *Medical Anthropology* 34 (2): 166–83.

Schoups, Gerrit, Jan W. Hopmans, Chuck A. Young, Jasper A. Vrugt, Wesley W. Wallender, Ken K. Tanji, and Sorab Panday. 2005. "Sustainability of Irrigated Agriculture in the San Joaquin Valley, California." *Proceedings of the National Academy of Sciences* 102 (43): 15352–56.

Schrader, Astrid. 2010. "Responding to Pfiesteria Piscicida (the Fish Killer): Phantomatic Ontologies, Indeterminacy, and Responsibility in Toxic Microbiology." *Social Studies of Science* 40 (2): 275–306. https://doi.org/10.1177/0306312709344902.

Schuller, Kyla. 2017. *The Biopolitics of Feeling: Race, Sex, and Science in the Nineteenth Century*. Durham: Duke University Press Books.

Sepulveda, Charles. 2018. "Our Sacred Waters: Theorizing Kuuyam as a Decolonial Possibility." *Decolonization: Indigeneity, Education & Society* 7 (1): 40–58.

Shadaan, Reena, and Michelle Murphy. 2020. "EDC's as Industrial Chemicals and Settler Colonial Structures." *Catalyst: Feminism, Theory, Technoscience* 6 (1): 1-36.

Shah, Nayan. 2001. *Contagious Divides: Epidemics and Race in San Francisco's Chinatown*. Berkeley: University of California Press.

Shapiro, Nicholas. 2015. "Attuning to the Chemosphere: Domestic Formaldehyde, Bodily Reasoning, and the Chemical Sublime." *Cultural Anthropology* 30 (3): 368–93. https://doi.org/10.14506/ca30.3.02.

Sherwood, Yvonne. 2019. "The Political Binds of Oil Versus Tribes." *Open Rivers: Rethinking Water, Place and Community* 13: 48–68.

Shonkoff, Seth, L. L. Hill, E. D. Czolowski, K. Prasad, S. K. Hammond, and T. E. McKone. 2017. “Human Health Hazards, Risks, and Impacts Associated with Underground Natural Gas Storage in California.” Long-Term Viability of Underground Gas Storage in California. Sacramento, CA: California Council on Science and Technology. Retrieved from: https://ccst.us/wp-content/uploads/Chapter-1-v2-Section-1-4.pdf

Smith, Dorothy E. 1989. *The Everyday World as Problematic: A Feminist Sociology*. Boston: Northeastern University Press.

Smith, Wallace. 2004. *Garden of the Sun: A History of the San Joaquin Valley, 1772-1939*. William B. Secrest, ed. 2nd ed. Fresno, CA: Craven Street Books.

Spivak, Gayatri Chakravorty. 1988. “Can the Subaltern Speak?” In *Can the Subaltern Speak? Reflections on the History of an Idea.* New York: Columbia University Press.

State Water Resources Control Board. 2019. “2018 Annual Performance Report: Model Criteria for Groundwater Monitoring in Areas of Oil and Gas Well Stimulation.” https://www.waterboards.ca.gov/water_issues/programs/groundwater/sb4/docs/2018_performance_measures.pdf.

Stepan, Nancy Leys. 1986. “Race and Gender: The Role of Analogy in Science.” *Isis* 77 (2): 261–77.

Stern, Alexandra. 2005. *Eugenic Nation: Faults and Frontiers of Better Breeding in Modern America*. Berkeley: University of California Press.

Stewart, Kathleen. 2011. “Atmospheric Attunements.” *Environment and Planning D: Society and Space* 29 (3): 445–53. https://doi.org/10.1068/d9109.

Stoler, Ann Laura. 2011. “Colonial Aphasia: Race and Disabled Histories in France.” *Public Culture* 23 (1): 121–56. https://doi.org/10.1215/08992363-2010-018.

Subramaniam, Banu. 2001. “The Aliens Have Landed! Reflections on the Rhetoric of Biological Invasions.” *Meridians* 2 (1): 26–40.

———. 2009. “Moored Metamorphoses: A Retrospective Essay on Feminist Science Studies.” *Signs: Journal of Women in Culture and Society* 34 (4): 951–80. https://doi.org/10.1086/597147.

Sze, Julie, Jonathan London, Fraser Shilling, Gerardo Gambirazzio, Trina Filan, and Mary Cadenasso. 2009. “Defining and Contesting Environmental Justice: Socio-Natures and the Politics of Scale in the Delta.” *Antipode* 41 (4): 807–43. https://doi.org/10.1111/j.1467-8330.2009.00698.x.

TallBear, Kim. 2013. *Native American DNA: Tribal Belonging and the False Promise of Genetic Science*. Minneapolis: University of Minnesota Press.

———. 2014. “Standing with and Speaking as Faith: A Feminist-Indigenous Approach to Inquiry.” *Journal of Research Practice* 10 (2): N17–N17.

Taylor, Dorceta. 2014. *Toxic Communities: Environmental Racism, Industrial Pollution, and Residential Mobility*. New York: NYU Press.

Teisch, Jessica B. 2011. *Engineering Nature: Water, Development, and the Global Spread of American Environmental Expertise*. Chapel Hill: University of North Carolina Press.

Thompson, Gabriel. 2019. “Meet the Millennial Mayor Who Took On Big Oil—and Won,” *The Nation.* July 12, 2019. https://www.thenation.com/article/archive/arvin-california-oil-drilling-resistance/.

Thorp, Lynn W., and John Noel. 2015. “Aquifer Exemptions: Program Overview and Emerging Concerns.” *American Water Works Association Journal* 107 (9): 53–59. https://doi.org/10.5942/jawwa.2015.107.0138.

Todd, Zoe. 2017. “Fish, Kin and Hope: Tending to Water Violations in Amiskwaciwâskahikan and Treaty Six Territory.” *Afterall: A Journal of Art, Context and Enquiry* 43 (March): 102–7. https://doi.org/10.1086/692559.

Traweek, Sharon. 1993. “An Introduction to Cultural and Social Studies of Sciences and Technologies.” *Culture, Medicine and Psychiatry* 17 (1): 3–25.

Tuck, Eve. 2009. “Suspending Damage: A Letter to Communities.” *Harvard Educational Review* 79 (3): 409–28. https://doi.org/10.17763/haer.79.3.n0016675661t3n15.

Tuck, Eve, and K. Wayne Yang. 2012. “Decolonization Is Not a Metaphor.” *Decolonization: Indigeneity, Education & Society* 1 (1): 1–40.

Tule River Tribe. 2018. “History: Tule River Indian Tribe of California.” 2018. https://tulerivertribe-nsn.gov/history/.

Underhill, Vivian, and Rosanna Esparza. 2021. “Wildflowers and Water: Desire, Joy, and Creativity in Environmental Justice Organizing.” *Environmental Justice* online, ahead of print. http://doi.org/10.1089/env.2021.0058.

Underhill, Vivian, Megan Martenyi, Sarah Lamdan, and Andrew Bergman. 2017. “Public Protections Under Threat at the EPA: Examining Safeguards and Programs That Would Have Been Blocked by H.R. 1430.” Environmental Data and Governance Initiative. https://envirodatagov.org/wp-content/uploads/2017/03/Public-Protections-under-Threat-at-the-EPA.pdf.

US EPA (Environmental Protection Agency) National Center for Environmental Assessment, Immediate Office. 2015. “Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States (Final Report).” Reports & Assessments. https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990.

US EPA (Environmental Protection Agency), OW. 2015. “Aquifer Exemptions in the Underground Injection Control Program.” Other Policies and Guidance. US EPA. April 30, 2015. https://www.epa.gov/uic/aquifer-exemptions-underground-injection-control-program.

Vera, Lourdes A., Dawn Walker, Michelle Murphy, Becky Mansfield, Ladan Mohamed Siad, and Jessica Ogden. 2019. “When Data Justice and Environmental Justice Meet: Formulating a Response to Extractive Logic through Environmental Data Justice.” *Information, Communication & Society* 22 (7): 1012–28. https://doi.org/10.1080/1369118X.2019.1596293.

Verges, Francoise. 2019. “Capitalocene, Waste, Race, and Gender.” *E-Flux Journal* 100. http://worker01.e-flux.com/pdf/article_269165.pdf.

Vimalassery, Manu, Juliana Hu Pegues, and Alyosha Goldstein. 2016. “Introduction: On Colonial Unknowing.” *Theory & Event* 19 (4): 1-19.

Vito, Christopher, Amanda Admire, and Elizabeth Hughes. 2018. “Masculinity, Aggrieved Entitlement, and Violence: Considering the Isla Vista Mass Shooting.” *NORMA* 13 (2): 86–102. https://doi.org/10.1080/18902138.2017.1390658.

Voyles, Traci Brynne. 2015. *Wastelanding: Legacies of Uranium Mining in Navajo Country*. Minneapolis: University of Minnesota Press.

Wachs, Martin. 1984. “Autos, Transit, and the Sprawl of Los Angeles: The 1920s.” *Journal of the American Planning Association* 50 (3): 297–310. https://doi.org/10.1080/01944368408976597.

Walker, Dawn, Eric Nost, Aaron Lemelin, Rebecca Lave, and Lindsey Dillon. 2018. "Practicing Environmental Data Justice: From DataRescue to Data Together." *Geo: Geography and Environment* 5 (2): e00061. https://doi.org/10.1002/geo2.61.

Walker, James. 2011. "California Class II Underground Injection Control Program Review." Sandwich, MA: Horsley Witten Group, Inc. https://www.conservation.ca.gov/index/Documents/DOGGR%20USEPA%20consultant's%20report%20on%20CA%20underground%20injection%20program.pdf.

Warner, Mike. 2020. "Discovery Well Marker Installed: Kern Historical Society." *κ*September 25, 2020. *Kern Historical Society.* https://kernhistoricalsociety.org/news/discovery-well-marker-installed/.

Weheliye, Alexander G. 2014. *Habeas Viscus: Racializing Assemblages, Biopolitics, and Black Feminist Theories of the Human*. Durham: Duke University Press Books.

Whyte, Kyle. 2017. "Indigenous Climate Change Studies: Indigenizing Futures, Decolonizing the Anthropocene." *English Language Notes* 55 (1): 153–62.

Willow, Anna J., and Sara Wylie. 2014. "Politics, Ecology, and the New Anthropology of Energy: Exploring the Emerging Frontiers of Hydraulic Fracking." *Journal of Political Ecology* 21 (1): 222–36. https://doi.org/10.2458/v21i1.21134.

Wilson, Janet. 2019. "California's Oil Regulators Made 'Dummy' Approval Files for Risky Drill Permits, Records Show." *Desert Sun*, August 12, 2019, sec. Environment. https://www.desertsun.com/story/news/environment/2019/08/12/california-oil-regulators-doggr-permit-steam-records-dummy-files/1926347001/.

———. 2020. "Another Top California Oil Regulator Will Step down amid Continued Probes." *Desert Sun*, January 31, 2020, sec. Environment. https://www.desertsun.com/story/tech/science/energy/2020/01/31/california-oil-regulator-jason-marshall-step-down/4626515002/.

Wolfe, Charles, and Ofer Gal, eds. 2010. *The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern Science*. Studies in History and Philosophy of Science 25. New York: Springer.

Wolfe, Patrick. 2006. "Settler Colonialism and the Elimination of the Native." *Journal of Genocide Research* 8 (4): 387–409. https://doi.org/10.1080/14623520601056240.

Worster, Donald. 1985. *Rivers of Empire: Water, Aridity, and the Growth of the American West*. Oxford: Oxford University Press.

Wright, Willie Jamaal. 2019. "The Morphology of Marronage." *Annals of the American Association of Geographers* 110 (4): 1–16. https://doi.org/10.1080/24694452.2019.1664890.

Wylie, Alison, Janet Jakobsen, and Gisela Fosado. 2007. "Women, Work, and the Academy: Strategies for Responding to 'Post-Civil Rights Era' Gender Discrimination." The Barnard Center for Research on Women. http://bcrw.barnard.edu/wp-content/nfs/reports/NFS2-Women_Work_and_the_Academy.pdf.

Wylie, Sara Ann. 2018. *Fractivism: Corporate Bodies and Chemical Bonds*. Durham: Duke University Press Books.

Wynter, Sylvia. 2003. "Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation--An Argument." *CR: The New Centennial Review* 3 (3): 257–337. https://doi.org/10.1353/ncr.2004.0015.

Yazzie, Melanie K. 2013. "Unlimited Limitations: The Navajos' Winters Rights Deemed Worthless in the 2012 Navajo–Hopi Little Colorado River Settlement." *Wicazo Sa Review* 28 (1): 26–37.

Yazzie, Melanie, and Cutcha Risling Baldy. 2018. "Introduction." *Decolonization: Indigeneity, Education & Society* 7 (1): 1–18.