Placeless

An Ethnography of Biotechnology in the San Francisco Bay Area

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved April 2022 by the
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ARIZONA STATE UNIVERSITY

May 2022

ABSTRACT

This dissertation investigates the relationship between the universal aspirations of technology and the particularity of place, by way of close participant observation with biotechnology companies in the San Francisco Bay Area. Its central claim is that the aspiration to placelessness in the development of science and technology operates as material configurations, modes of subjectivation, and historical conditions particular to places. Following Foucault's late work in ethics, I conduct a series of sustained investigations into the reflective modes of critique biotechnologists make in thinking of and being in the San Francisco Bay Area. I show the ways the aspiration to placelessness exists in place at four different vantage points: the organization, the city, the broader cultural history of the region, and the practices of self-cultivation undertaken by technologists. Within biotechnology organizations, biological work is digitized and automated only through an intensification of bespoke material infrastructures, physical labor, and tacit institutional knowledge. Biotechnology organizations have come into existence through a history of settler colonial erasure, industrial devastation, post-war industrial decay, and urban renewal in Bay Area industrial suburbs and neighborhoods. A nostalgic imagination of the broader San Francisco Bay Area and its history of counterculture become mobilized as an antidote to the felt lifelessness of these forms of urban renewal and technological order and incorporated back into engineering practice. Finally, the technologist themselves must aspire to placelessness, in ways critiqued by local landless people's movements who offer an alternative ethic to place in their imperative to gentrifiers to "move home with your parents." I conclude by reflecting on the ways interlocutors at each of these vantage points are actively exploring the creation of more enduring relationships to place in the face of the unintended but intensified forms of social suffering in zones of technological innovation.

ACKNOWLEDGMENTS

Thank you to my chair Gaymon Bennett and committee members Ben Hurlbut and Emma Frow. I'm forever grateful for the years of intellectual and emotional support that have taught me to think the kind of thoughts I never thought I'd be able to think.

Thank you to the Engineering Life Project, funded by the European Research Council and run by principal investigators Emma Frow and Jane Calvert, for generously supporting me as a graduate student researcher and sponsoring multiple research visits to one of the most expensive places on earth.

Thank you to the Beyond Secularization Project, funded by the Templeton Religion Trust and headed by principal investigators Gaymon Bennett, Ben Hurlbut, and Hava Tirosh-Samuelson, for funding me during the second half of my graduate studies. Area 2 of the project, "The Digital," made a space for collaborative thinking and working that was very influential in the write up of my dissertation – Gaymon Bennett, Jennifer Clifton, Schuyler Marquez, Heather Mellquist-Lehto, Charlie McCrary, Max Gabriele, Taylor Genovese, and Sanghamitra Das.

Thank you to Adam Nocek and Stacey Moran, who direct the Center for Philosophical Technologies, for hosting me as a 2021 graduate student fellow. They also funded the research and facilitated conversations that became the basis for chapter four of my dissertation.

Thank you to Jacque Wernimont for creating the Nexus Feminist Digital Co-op Lab, which was a campus home base in the early days of my graduate program and fostered important friendships with Becca Monteleone and Kaethe Selkirk.

Thank you to the Young Schpengelheimers, a radical anthropology collective and dear friends, who have been a nourishing resource for collective thinking and fun the last several years – Nevada Drollinger-Smith, Amber Layne, and Taylor Genovese.

Thank you to Haku-un-ji and Sonoma Mountain Zen Centers for giving me a root through the many moves and occasional rootlessness of academic life.

And thank you to the many technologists, city officials, activists, scholars, co-workers, and friends who participated in my fieldwork and generously shared their time, space, thoughts, anxieties, and dreams with me.

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CHAPTER 1

INTRODUCTION: PLACELESS IN THE BAY

A woman is bored of our conversation, but her eyes get big when I bring up fire. She said the Bay's not affordable anymore, not a place anyone interesting can live, but everywhere else she wants to move, the Sierra Foothills or Nevada City, is too close to fire. I say we're probably too close to fire right here, the exact same thing would happen as Paradise if it moved too quickly, freeways are always backed up as it is, and they'd get so backed up that people couldn't get out. Her eyes light up when I say this, like she hadn't thought of this before, and the thought thrills her.

Fire is what everyone wants to talk about during my first two weeks of fieldwork in the San Francisco Bay Area in the fall of 2019. I was there, officially, to study the work practices of synthetic biology companies, a style of biotechnology with Silicon Valley aspirations to digitize and automate biological sciences and by extension save the world. But there was an unstated feeling in my conversations these first two weeks with fire weather in full force, dry, windy, warm, activating memories for others that I don't share when last year the wind was just this way right before people had to run out of their homes in the middle of the night, or else had to stay looking at the smoke and orange skies that they always say "looked like the end of the world." An unstated feeling crept in, that your questions don't matter because it's all going to burn down.

This faded as that weather faded after the first two weeks, but the accident of the timing set a tone for the rest of the fieldwork and activated a sense that maybe these organizations weren't really the thing at stake, and that instead relevance and agency lay in the unpredictability of the material world outside.

This dissertation starts with biotechnology labs in a biotechnology corridor of a city called Emeryville, a small industrial suburb of the San Francisco Bay Area. While

largely unknown outside the area, the first biotechnology company was founded in Emeryville. Biotechnology has since spread across the Bay Area, to other cities, and to other countries, while also continuing to thrive in Emeryville.

The thesis of this dissertation about biotechnology in Emeryville in the Bay Area is simple: technology exists in place. What complicates this – what generates the need for something so simple to be asserted in the first place – is the aspiration to universalization and placelessness that is a central aim of science and technology. This dissertation doesn't aim to debunk the myth of placelessness that partly authorizes biotechnology as a universal science. Instead, it works to specify the ways the aspiration to placelessness takes material form in place.

The dissertation begins with synthetic biology for the primary reason that it was the industry I found myself working in after I graduated college. And this is meaningful in that it was the kind of technology industry that was attractive 20-year-old undergraduates in 2010. Since the early 2000s, synthetic biology has encountered significant financial and technical difficulties, enough for social scientists who built their careers around synthetic biology to announce its death and host its funeral (Calvert et al. 2017).

But like the controversy (Bloor 1981), friction also opens up the black box. Technologists in this space between the life sciences and information sciences were questioning and reconstructing their work. The nature of these questions and reconstructions often tied back to the unpredictability of the material environment and of place.

Which is interesting, because the motivation for synthetic biology was to achieve a placelessness in biological work – bioengineering on the internet. In the course of constructing this project, elements of place have re-asserted themselves: the importance

of tacit knowledge specific to organizations, the existence of organizations within strange tidied up post-industrial suburbs, the tech industry's contributions to gentrification, the aspirations to heal the moral ailments of tech through revivals 1960s counterculture – and the orange end of the world sky when you walked outside that seemed to signal, for a two week period, none of this was worth the effort.

Social studies of science have previously worked to characterize the relationship and tensions between the universal aspirations to placelessness in technology and the particularity of the places tech industries emerge. Many of these considerations have functioned at the level of law and governance across countries (Jasanoff 2005; Pfotenhauer and Jasanoff 2017; Jasanoff and Hurlbut 2018) or at the much closer level of a technological culture within a circumscribed organizational space (Knorr-Cetina 1999; Helmreich 2000; Forsythe 2001).

In order to show the ways placelessness, in fact, operates as a part of place, this dissertation takes a meso-level approach that operates both within organizations, and outside them, in the cities and local metropolises they operate in. It works in the mode of ethnography and cultural anthropology and uses its material closeness to lived realities in order to distill different ethics of place asserted among a group of technologists.

Ethics was a conceptual space Michel Foucault began to chart out at the end of his life, after a career of characterizing metastructures of power. He looked to understand ethics as the practical activities a subject engages in order to cultivate a relationship to their world (Foucault 2005). This analytic allowed a focus on the ways a subject and their external environment were mutually constituted – not defenseless docile recipients of power relations and not free agents asserting their will on a passive world.

I draw on this conceptual orientation to use fieldwork with technologists in the San Francisco Bay Area to multiply emergent and changing conceptions of the relationship between technology and place. While I prime the ethnographic method of cultural anthropology, this is an interdisciplinary dissertation that pulls on the conceptual reflections of science and technology studies (STS), cultural anthropology, religious studies and urban studies.

In the next section, I discuss STS inquiries into biotechnology and synthetic biology and the challenges of studying emergent technologies, in the ways the ephemeral is prone to crumble.

With these limitations in mind, I shift to discuss Foucault's late work, and the way he posed modernity as an ethical posture which continually seeks exit immaturity and enter maturity. I use Foucault's work, and its extension into the anthropology of ethics in order to extend reflections of biotechnology, and synthetic biology in particular, in the ways subjects try to work with their difficulties to the physical environment.

In order to name an emergent ethics of place in this set of materials, I discuss the ways place has been a troubled conceptual area in postcolonial accounts of cultural anthropology. I suggest the unsettled motions between place and placelessness are interesting to investigate "on the ground" in a place like the post-tech boom San Francisco Bay Area. This fieldwork provides an emergent set of materials to consider the ways the material agency of place is recognized among the apparently placeless figure of the technological innovator. Last, I'll discuss methods and how writing about agency of place requires styles of writing and analyzing, specifically writing and analyzing in a more immanent, personal, and patchwork mode.

Studying Biotechnology

Postwar cultural anthropology went through a period of self-critique in the 1970s and 80s in its efforts to escape the colonial origins and trappings of its disciplinary history. One proposed escape was the call to "study up," and reorient their analytical tools to analyze "the colonizers rather than the colonized, the culture of power rather than the culture of the powerless, the culture of affluence rather than the culture of poverty" (Nader 1972). This call is what in part spurred early work in still nascent STS around laboratory studies (Latour and Woolgar 1979; Collins 1985; Latour 1987; Traweek 1988). These projects were essentially a deconstruction of science through a demonstration of the practices of social constructivism in the laboratory. This particular project was hugely generative, so generative in fact that its conceptual insights are now largely taken for granted in the field and the public large (Kofman 2018).

The exercise was to deconstruct the ultimate authority of science and show the ways scientists and technologists were subject to the influences of a culture in the same way that had been historically ascribed to the colonial subject. While redirected at new groups, this project subscribes to a notion of culture which anthropologists rarely invoke now, culture as a "complex whole" shaping deep beliefs (Geertz 1973) or habitus shaping practices (Bourdieu 1977). Lab studies in ensuing decades had more specific projects, for example, feminist critiques the masculine gendering of technological design (Forsythe 2001; Wajcman 2010; Suchman 2007). Or, there have been the kinds of accounts of biotechnology that enumerate the strange complex convergences that make up a lab or mode of science, often in a mode of playfulness rather than one of truth to power (Franklin 2007; Helmreich 2009; Roosth 2017). But still the main motivation and driving force for this kind of study is a check on power. Its main risk is isolation and overstatement: overstating the influence of an elite group that is ultimately just one node

on a broader network of cultural forces, and overstating the influence of a static, consistent culture on that group.

There is also the style of anthropology that walks into the biotechnology lab not to deconstruct a source of unchallenged authority, but to specify the new ontologies emergent from biotechnologists as "technicians of ideas," groups of people bringing new objects and material-epistemic configurations into the world. Ethnography is warranted in this kind of exercise these new worlds are often very different than the discursive productions technologists use to describe themselves, or what they might be able to communicate in an interview. Social scientists, however, do have the disciplinary training to name these sorts of things, and potentially stand to help scientists see these things in more sophisticated ways (or not) (Collier, Lakoff, and Rabinow 2004; Rabinow and Bennett 2012).

There has been particular attention, in this sort of style, directed to the ways biotechnology has worked to digitize and scale their processes through attention, once again not to discursive productions, but to material practices in the making. For example the material infrastructures of data at the Broad Institute that changed what counted as valid scientific questions (Stevens 2013); the transformation of "biomedicine" by during the transformation of immunophenotyping from experimental system to platform technology (Keating and Cambrosio 2003); the construction of recursive public space mutually formed in the recursive logics of computer programming and engineering (Kelty 2008); the construction of recursive facility building in formulations of biotechnology seeking to emulate the recursive programming styles of engineering (Bennett 2015).

One of the primary draws of the anthropology of science in the lab today is the possibility of collaborative work it presents. The perceived failures of the largely

"downstream" ELSI (ethical, legal, social implications) supplement to the Human Genome Project (Yesley 2008), forged a space for experimentation with more epistemically sophisticated modes of collaborative engagement between the social sciences and biological sciences (Rabinow and Bennett 2012; Frow and Calvert 2013; A. Balmer, Bulpin, and Molyneux-Hodgson 2016). Nearly all strands of this collaborative work, though, have made mention of their strong power imbalances, in which biological scientists still hold most of the power in naming terms of engagement, and social scientists have to play nice to keep getting invited back. (A. S. Balmer et al. 2015)

In response to some of these limitations inside the lab, there have been many accounts of biotechnology that try to move science outside the lab. There have been other strategies to get out of the lab. There have been modes of intellectual history that try to bend the understanding of the intellectual out of the purview of single great men, but rather, groups of people in particular institutional environments (Rabinow 1996; Abbate 1999; Hayles 1999; Landecker 2007). The impulse to consider science outside the lab has, more than anything, directed focus on broader political economies or modes of governance that biotechnology is shaped by. There are the multi-sited, multi-national characterizations of the co-constituted production of knowledge and capital in the neoliberalized knowledge economy (Sunder Rajan 2006). There are views onto these systems of valuation hiding outside of the lab and in plain published site, like trade journals for corporate pharmaceutical marketing trade journal (Dumit 2012). And there are the studies of the production of (bio)technological value and the ways it minimizes the contribution of novel arrangements of human labor (Hayden 2003; Sunder Rajan 2006; Atanasoski and Vora 2015; Irani 2015; Noble 2016).

Considerations of biotechnology have also plugged in to modes of social science that have followed Foucauldian biopolitics to show the way novel medical technologies

co-create novel regimes of healthcare, and by extension, governance (Parthasarathy 2005; N. Rose 2007; Petryna 2017). The subset of these focused more directly on biotechnologies, often focus on genetic testing technologies and their reinscriptions and reformulations of racial identity, with an eye to the ways reformulation can lead to liberatory possibilities (TallBear 2013; Nelson 2016).

There has also been the push in STS to study the technocrats of democracy, rather than scientists, as a circumscribed group of experts wielding significant power – and open as a point of possible intervention. These have been analyzed through cross country comparisons (Jasanoff 2005; Jasanoff and Kim 2015), or the mobilization of the biotechnological in courts and in law (Jasanoff 1998). Or by characterizing the mechanics of spaces of democratic deliberation in, say, human embryos research and bioethics panels (Hurlbut 2017).

And then there are those that have sensed the limitations of the lab, and even of topics of governance and political economy, and abandoned the study of biotechnology entirely. Many of the social science scholars most famous for studying biotechnology have moved to study analogous technical elements in different fields – some toward financial markets (Birch 2020; Birch and Muniesa 2020), others to environmental sciences (K. Fortun et al. 2014; Latour 2017), and others so tired of the power imbalances and technologist bravado they made a left turn into German Expressionism (Rabinow 2017). These career turns point to a primary analytic difficulty for those studying the emergent and the contemporary.

Biotechnology, on the one hand, is analytically interesting as a site of convergence of many important elements in the world: styles of reasoning, equipment, infrastructures, forms of value, practices. But part of its appeal was its newness and potential to shape futures, however careful social scientists are in qualifying those

claims. Biotechnology promised to change the world with its start in the 1970s, and the potential of that influence warranted a careful critical eye from the social sciences. But the successes of biotechnology, as both a mode of a research and a value proposition, have been more limited than ambitious early claims projected (Pisano 2006; Ayoub 2007; "Failure to Launch" 2013). Part of the work of the social sciences became accounting for this disconnect and characterizing the mechanics of hype that make those styles of promising sensible, possible, and necessary (Sunder Rajan 2006; M. Fortun 2001; 2008; Doezema and Hurlbut 2017). But once it's been pointed out the ways biotechnology has failed to change the fabric of our lives, as have the mechanics of the futurity that allows us to understand the political economic patterns of that failure, are there other aspects worth studying to understand the nature of that failure?

Synthetic Biology as a Site of Friction

Friction has been identified as a conceptual point of orientation, to undermine universal claims, by specifically looking to understand "zones of awkward engagement" (Tsing 2004). Biotechnology is, on the one hand, the product of certain promissory visions which the field never seems to live up to, but this also makes it a site of friction. Some underlying logic to its premise continues to make sense in a way that chafes with the technological and financial possibilities of the present. Synthetic biology is a subfield of biotechnology that has encountered considerable friction.

Synthetic biology is an industry in current financial and technical difficulties (Chatsko 2019a; 2019b), that twenty years earlier, found ease winning space in *Nature* as much as *Wired*, as much as a TedTalk stage (Endy 2005; 2014; Stinson 2015). It was an idea with scientific credibility and popular appeal. It was the sort of idea appealing to me as an undergrad, in the early 2000s, biking by Monsanto protests on my way to an

internship at another bio lab, watching and liking *The Constant Gardner,* and knowing that however much I liked studying biological sciences, big ag and big pharma were the bad versions of that science, and not the kind of place I was looking for a job after graduation. It was also a moment of an urgency of a free internet, the Arab Spring and wave of democracy supposedly heralded in by our smartphones, a time when undergrads still had dorm room conversations about what it would be like when computerized contact lenses and gestural computer screens were here.

It was a moment where it was sensible that big ag and big pharma and biology seemed like they would be better if they would just be a little more like internet tech companies. This was arguably the central conceit of synthetic biology, a field first emerged in the early 2000s that was seen as an alternative to existing biotechnology of the day, which was experiencing especially public critique in these years (Law 2006). This backlash coincided with the dot-com boom and associated excitement around new internet information technologies. The idea of synthetic biology was to refashion biotechnology in the image of its dot-com neighbors, where a biologist might one day program the DNA of a living object the way someone programs computer code (Endy 2005; Frow 2013; Bennett 2018a). New digital infrastructures would allow for the more precise, rapid manipulation of genetic sequences, which would in turn tap the latent, natural generativity of living things.

This would lay the foundation for biology to proceed along the same trajectory information technology seemed to be heading: the cultivation of amateur garage biologists, the free exchange of biological knowledge on the internet, the proliferation of new startups. Harnessing this untapped biological energy and human creativity would democratize biotechnology and wrest the means of production from pharmaceutical and agribusiness monopolies. The knowledge gained in the discipline would be the

knowledge of life itself, the rewards exponential advances in health, food, and the environment. This premise struck enough of a chord in its moment to generate considerable resources in laboratories, government funding, and start-up companies (Si and Zhao 2016). But in the ensuing years, many of the main organizations associated with synthetic biology encountered significant financial and technical failures, especially around the ways the brand became associated with the very public failures of biofuels (Chatsko 2019a; 2019b; Grushkin 2012; Bullis 2012).

Despite these failures, the field's underlying premise is still often returned to in the tech world. Synthetic biology crystallized a sensibility, that life has an informational quality that can be manipulated by information technologies, that now needs less pitching – that living things are like computer programs and can be treated with analogous logic for the next great breakthroughs in perennial crises of food, health, and the environment is now largely taken for granted (Bennett 2018a). The infrastructures and principles of synthetic biology are being mobilized toward new products with the same techno utopic valence: rather than biofuels and antimalarials imagined in 2005, industry conferences and magazine coverage center on vegan meat, species resurrection, and DNA as data storage (Garret 2020; Neuman 2021; Farley 2021).

But rather than presenting an alternative to the reigning evil of pharmaceutical monopolies, this ebb-water between life and information sciences has arguably only come to represent a stronger possibility of redemption for internet tech giants who, especially after the 2016 US presidential election, have themselves become reigning techno-villains of a shared imagination. From the Chan Zuckerberg Biohub to Tesla's neuroscience spin-off, big tech deploys its ventures into the life sciences in quasi-philanthropic language which belie the resonances of the life and information science overlap has as unalloyed good in the realm of technological futures (Regalado 2021;

Markoff 2019; Castillo 2016). It's the type of thing that is very appealing to idealistic people in STEM who think they are willing to take a pay cut (but not too much of a pay cut) to do something meaningful. As a computer programmer trying to break into the industry at the 2017 SynBioBeta synthetic biology conference told me, "It's the shit that matters."

Synthetic biology has also almost always co-existed with social scientists studying the field in proximity (Rabinow and Bennett 2012; Frow and Calvert 2013; A. S. Balmer et al. 2016; Calvert and Schyfter 2017). But rather than collaboration, my primary interest in synthetic biology is as something that has failed and is trying to reorient itself. Something that focuses on the deflation of interest in biotechnology in general, and the failures of synthetic biology in particular, as the object of study, as a form of failure. It's a moment where the researchers are looking for the right door out, the right exit. And another approach might be to think about the restless reframing as itself the object of study, and how people begin to rethink and rebuild things when they feel they aren't working.

Exiting: On Being a Good Modern

Finding a new way of doing things after discovering your old way of doing things doesn't work is a question of *exiting*, which, according to Michel Foucault and Immanuel Kant before him, is a central posture in modernity. He was wondering, late in life, what it was inquiry was for, and to give himself an answer, he went back to Immanuel Kant's writing on modernity. And Kant said it was about the exit: the continual exit from immaturity to find a different way of thinking about things.

Foucault posed modernity not as a period of time, but as an ethic (Foucault 1984). By ethic he meant sets of practices for conducting a self in a relationship to its

external environment. Foucault did not conceive of modernity in a historical or temporal sense, as in, a period with origins after European medievalism, that picked up in earnest around the 19th century when colonialism, and steam engines, and nation states were in full force, which, since the mid 20th century, and with ever increasing speed, seems to be shifting to its dubious predecessor, postmodernism. All these things are related to modernity, and they are normally the primary framing of what it means to be modern – a period of time, a suite of political circumstances. But Foucault, instead, locates modernity centrally in a posture. Foucault pulls on Kant's 1784 essay *What is Enlightenment?* as a piece that offers the skeleton of the attitude of modernity.

Kant says that Enlightenment is a process that releases us from the status of immaturity. Immaturity is a state of mind that leads us to accept another's authority in a situation that we should use our own reason. Parsing where exactly to exercise our will over another's authority, is, in a sense, the entire question. Because exiting from immaturity and into a state of self-possessed maturity, and enlightenment, is never a blank slate. The exit, as Enlightenment, is "defined by a modification of the preexisting relations linking will, authority, and the use of reason, and always in reference to what existed before" (Foucault 1984, 34)

The Enlightenment is not a revolution, in this sense, because revolutions end up looking like, lifeless modernist futurist Le Corbusier-inspired Brasilia (Scott 1998). Things like Brasilia try to build so much from scratch, from an independent assertion of pure reason, that they end up with no self-awareness about what they're connected to, where their ideas do come from, the relationship of the past to the present, and, as a result, often unwittingly replicate aspects of the world they're trying to leave behind.

This posture of modernity is also an ongoing process, or a practice. This is not just a relationship to the present, but a mode of relationship to establish with oneself –

an ethic. A commitment to Enlightenment isn't a commitment to as set of ideals, but rather "*the permanent reactivation of an attitud*e… a philosophical ethos that could be described as a permanent critique of our historical era" (Foucault 1984, 40).

Critique isn't meant in the more colloquial sense of wholesale criticism – as Foucault quotes Baudelaire, "you have no right to despise the present" (Foucault 1984, 38). Critique isn't a rejection, but rather an attitude that perpetually points to limits. Foucault's strategy as a historian was to seek limits by seeking the historical forms that drifted into practices of the present for constructing ourselves – the ways, for example, contemporary sexuality is in continuity with Victorian sexuality, and how these exist in a genealogy from the construction of selves from the medieval confessional.

An enduring question for the social scientists reading Foucault's work is how to direct inquiry in this style while translating his historical approach into an approach toward contemporary elements. He gave us new ways of thinking by following a string (in material environment) to see how we thought about it in the past. But how does, the ethnographer – with a certain commitment to understanding the contemporary, who wants to formulate the present by studying the present, and not the past – name critique and offer alternatives in the same way?

Foucault may have been a historian, but he was also, as he said, a historian of the present. A series of his published interviews shows the ways his method keyed into contemporary forms creating human subjects in reference to contemporary alternatives (Foucault 1980). For example, he speaks with Maoists trying to form a people's court to try the police and tries to convince them courts re-establish the same state apparatus authorizes the police in the first place (1). He first steps back to establish the ways courts and the judicial systems started in the Middle Ages as a mutually agreed upon form of arbitration and then later became solidified in institutions which increasingly linked the

judicial system to armed power (4). Foucault suggests that, rather than re-inscribing state and armed power through the pursuit of justice in courts, the Maoists pursue methods like guerilla operations that prevent judicial power from being exercised (33).

In a very different example, he pushes on the legal fights for the right to die as reinscribing themselves within the same biopolitical regimes of the hospital that demand that a patient must live. He proposes instead suicide be pursued as creative aesthetic act: "If I won a few billion dollars at the lottery, I would create an institute where people who would like to die would come spend a weekend, a week, a month in pleasure, under drugs perhaps, in order to disappear after, as if erased" (Golder 2015, 128). Death is reconstituted in aesthetics (and maybe at least a little of gay San Francisco) rather than an object of medical authority. While he does formal inquiry in the genealogical method, what the contingencies and evolution of that genealogy allows him to see, and us to see by extension, are other latent contemporary forms connected to other apparatuses of power that might be better suited to our ends.

Foucault's late work in the early 1980s was also keyed into the incipient neoliberalism on the rise. By locating modernity in an ethic, he locates modernity in the realm of individual action, and the way a self navigates metastructures of power. And the self's navigation through overlapping, changing, contested apparatuses of power are arguably even better suited to studying the early 21st century than the late 20th. As you step out of something, what do you step into, and how do you find it, and if your restless feeling comes up, do you move again? There is always a balance of what you are submitting to and what you are exercising agency over, and while these seem very in flux now, they have always been in flux.

And while not explicitly tied together, these considerations of modernity as ethic overlapped with his analytical projects with ethics and practices of self (Foucault 2005).

Cultural anthropology has more recently taken up ethical practice as an object of inquiry in the contemporary (Foucault 2005). Ethics in projects like Jarrett Zigon's are described less as formalized codes of conduct than "processes of local moral reasoning," "a form of embodied dispositions, cultural scripts, or moral choices intimately tied with emotions and feelings" (Zigon 2008). Following Foucault, this work looks to a generative, rather than repressive notion of ethics as the emergent, world building practices of the self, or subjectivation (Fassin, 2012; Foucault, 2005; Mahmood, 2012; Zigon, 2010, 2008). This work focuses on the dynamic, multiple, and sometimes contradictory practices by which people cultivate themselves into certain kinds of beings, best characterized through ethnographic inquiry. This attention to practices is warranted as soon as an ethical subject is not taken to be a singular rational individual programmatically reasoning their way through right and wrong, but instead a subject embedded in institutions, public discourse, embodied dispositions, and particular cultural histories (Zigon, 2008). The ethical breakdown has been recognized as an object for ethnographic inquiry, guiding us to the moment where the normally invisible, taken for moral habituese breaks down in such a way that an individual or institution must navigate moral uncertainty through ethical practices (Zigon, 2008). To make the payoff a little overly instrumental, the result of this kind of inquiry is a toolbox of the developing repertoire of practices of self.

To date, most work in the anthropology of ethics has focused specifically on groups most imagined as powerless in repressive accounts of power – the Islamic feminine subject (Mahmood 2004) or targets of the war on drugs (Zigon 2018) – and show the ways these subjects enact agency in their constitution of themselves within their lived environment.

My aim, in a sense, is to flip this analytic of power. I focus on an imagined free agent, the technologist, and the ways they come to terms with pressures in the material

environment they are imagined as free from. I show the ways place is understood and worked through as a practice, and also like Zigon, target moments of breakdown. But rather than moral breakdown, I focus on material breakdowns and fracturing – in the crumbling of synthetic biology in a set of labs in the San Francisco Bay Area – and ask about all the different movements out people are trying. In this moment of fracturing, trying to crystallize all the ways people are trying to think and do and be otherwise, to better characterize a set of options habitually turned to, and to multiply perspectives of all the ways people are trying to exit, in sometimes inarticulate, sometimes more explicit modes.

Anthropology of the Post-Colony and the Anthropology of Science

A central methodological and conceptual question of cultural anthropology is how to exit fieldwork having been undoubtedly changed by the period of extended fieldwork (Rabinow 1977).

At least two paths were charted forward after postcolonial anthropology's explicit reckoning in the 1970s with the ways the discipline was complicit in the colonial project. In addition to the move to exoticize the West (including in the hallowed labs of science, mentioned above), there was work that looked to return to the postcolony on a different set of terms, less amenable to the project of colonial administration and governance.

On the one hand, there is the theorizing in the 1970s in *Writing Culture*, of the analytic lens being turned back on the discipline itself. This work shows the ways the discipline is built on certain presumptions of time, place, kinship, religion/secularity (Asad 1995; Clifford and Marcus 2010). This is the project of "provincializing Europe" (Chakrabarty 2000) and provincializing the discipline that had worked sort out the provinces of the rest of the world.

Another direction for postcolonial anthropology has been to take concepts of radical alterity seriously. This sensibility is at play in the writing of someone like Levi Strauss (Lévi-Strauss 1966). Jean Favret Saada recognized the ways she could best understand witchcraft in rural France by accepting her interlocutors' charge that she was a witch (Favret-Saada 1980). In more recent projects, the Amazonian rainforest has been used to rework a more capacious understanding of thought and multispecies interactions (Kohn 2013); Islamic dream interpretation has been used to introduce a more a more capacious sense of a shared social imagination (Mittermaier 2011); indigenous cosmopolitics in the Andres have been used to reformulate political subjects to include mountains and (what the West imagines as) the natural (de la Cadena 2015).

This has also been a zone of more formal experiments. Stefania Pandolfo wrote her ethnography *in* the forms of representation and transmission she studied in southern Morocco to fragment and multiply new ontologies of shared space and public memory (Pandolfo 1997). Or in experiments like Vivieros de Castro's cannibalization of French theory through the metaphysics of Amerindian cannibalism, that most exoticized feature of human behaviors (de Castro 2014).

The return to the postcolony and the exoticization of the West are, artificially, two branches of cultural anthropology, but they are constantly in conversation with each other. And a product of that exchange is noticing overlaps and mutual influence and compatibilities between the most exoticized forms of knowledge and the forms of knowledge taken as the most direct representations of reality.

This dissertation seeks an exit with the recognition that radical alterity doesn't need to be found in a postcolony in Africa or Brazil. In a way, the project is to bridge these two separate projects of a postcolonial anthropology more and to exoticize the

familiar with sources of exotic that are already in the familiar. This type of project is possible in North Atlantic modernity through a focus on place.

These fields start to merge, for example, in the branch of science studies that thinks about the ways science interacts with its perceived opposite in, religion, and considers the ways the two are co-constituted in the present (Latour 2013; Hurlbut 2017; Bennett 2018b). This type of work is possible because of the work of secular studies, which has shown the ways religion being a contained zone in North Atlantic modernity for all manner of unmodern, superstitious things, and science's other – the unreason to reason – and the secular is its own cultural historical formation (C. Taylor 2007).

There are also people like Anna Tsing who say there isn't that much space, in the literal sense, between the places people assigned the most exoticized forms of knowledge and the people assigned the most scientific forms of knowledge. While her early fieldwork was situated in Indonesian rainforests, she extended its conceptual project into more recent work, for example, economically marginalized Hmong populations collecting mushrooms in Oregon forests (Tsing 2015). Work in feminist studies has also made this point that the imagined third world exists within the imagined first world, and both are mutually constituted against each other in constantly interacting ways (D. Taylor 2003; Mezzadra 2013). Charles Hirschkind accessed one of these zones of interchange in his book on the sensorial practices of Andalucisma, which regenerate a "feeling of history" particular to Andalusia as a historical zone of interchange between Europe and the Islamic world (Hirschkind 2020).

Catholics are also a reliable source for finding the enchanted in the North Atlantic. They, after all, set the template for the (Protestant) disciplining out of religion in European colonies (Comaroff and Comaroff 2008). Robert Orsi has proposed scholars of European history not take for granted the loss by the Catholics in the European Wars

of Religion. He suggests that, in not taking the loss of Catholics for granted, historians might reimagine what it would look like to rewrite history with real presence (Orsi 2018). And analytical attention to place may be one site in the contemporary to reconsider real presence.

And real presence has been accounted for in exemplary works of cultural anthropology: whether Earth Beings in Bolivia, Amazonian forests that think, souls with knots in Egypt, the wisdom that sits in places in the Apache landscape (Kohn 2013; de la Cadena 2015; Basso 2017; Pandolfo 2018). And while thinking forests and political mountains may not seem like the kind of actors at play in, say, the San Francisco Bay Area, and other cosmopolitan centers of the North Atlantic, consider again the difficulty repeatedly run into in articulations of place and its relationship to technology.

A place like San Francisco, or any other city of the North Atlantic, might think that it's not subject to forces like earth beings or thinking forests. That's because San Francisco and cosmopolitan cities of the North Atlantic operate under secular modernity, in which religion and superstition are progressively subtracted from the world. But, as scholars of secular studies have shown us, the subtraction story is only an imagination of secular modernity, and secular modernity is its own cultural historical formation (Asad 1993; C. Taylor 2007). It's a formation that, in fact, continues to propagate religion, in legal codes of the modern state (Mahmood 2016), in the private lives of the most disenchanted figures of European intellectual history (Josephson-Storm 2017). In the same way religion isn't actually being subtracted out of public life, even though many institutions operate on the presumption that it is, real presence and earth beings aren't being subtracted out of place.

The idea of a subtraction of place in secular modernity is obvious in the generativity of the concept of the "nonplace," places that defined primarily by their lack

of social significance. Nonplaces are taken as the products supermodernity, and designed primarily for the processes of commensuration to move people and capital (malls, condos, airports) (Augé 2008). The nonplace presumes modernity has the power to subtract place, and that we are masters of our environment, and that place wouldn't find a way of leaking through.

Consider a speech from a developer central a Bay Area suburb's tech boom, cautioning a visiting international group of city planners from trying to extrapolate lessons from his city's success, because of the inarticulate "chi" involved in the city's renewal (Arias 2021).

Chi is a word he shouldn't be using – he might not even use now six years later in 2022 – because it's appropriative, and because of that appropriation, it's been cleaved from an ontology that could connect that word to meaningful understanding and action. Which leads us directly into the question of how you start to recognize and narrate presence of place in the North Atlantic. It doesn't work to transpose Earth Beings into the North Atlantic, because, after all, those Earth Beings are of Bolivia, not universal timeless placeless categories. But knowing about Earth Beings in Bolivia and the thinking forests in the Amazon and soul knots in Morocco and having been persuasively argued their agency and relevance to social life, might make us more sensitive to elements of the San Francisco Bay we wouldn't think to notice otherwise.

Eve Tuck and Marcia McKenzie have recently prompted the social sciences to theorize more deeply about place. They assert that while the social sciences require researchers to specify many aspects of embeddedness in their work – what was learned, how it was learned, and when it was learned – *where* things are learned is still given much less systematic attention (Tuck and MacKenzie 2015). They also recognize recent turns to space in the social sciences as part of an effort to specify this "where" and

localize knowledge, but they also assert that understandings of space continue to reproduce the problem of de-localization. The problem with "space" is the way it reduces the material world to a receptacle for social significations. And this has important political consequences – namely that it imagines locations as once again inert, neutral backdrops that 1) are only determining factors for those stuck in the past, traditional, or nostalgic (Tuck and MacKenzie 2015, 20), and that 2) for the modern, global, and progressive, place only exists as a resource to be managed and exploited (Tuck and MacKenzie 2015, 13). This matters because the under-theorization of place, and even the turns toward conceptualizations of space, are parts of the habits of thought that authorize settler colonialism, neoliberalism, and environmental destruction (2).

Because the illusion of placelessness troubles inquiries into place, I specifically focus on the ways placelessness in fact exists in place. And to do this, I specifically focus on the ways science and technology exist in place. Science and technology are especially taken for granted as placeless. And existing work in studies of science and technology contextualizes science and technology by specifying the places they emerge from. These approaches have largely focused around two poles: the nation-state and the organization. As Latour poses, pasteurization emerged from a set of material configurations specific to 19th century France (pastoral land, dairy centrifuges, industrialists, the scientific establishment, etc.) (Latour 1988). Similarly, Shapin and Schaffer narrate the development of the visual cultures that have become the bedrock of scientific empirical practice in the localized conditions of Reformation-era England (Shapin and Schaffer 2011). More contemporary accounts operating in the ethnographic mode have focused on the level of the organization, a level of specifiity that can show the ways localized forces like the forms of white male-ness specific to Silicon Valley (Forsythe 2001), or a set of assemblages specific to the San Francisco Bay Area in the 1970s and 80s (Rabinow

1996) converge in a circumscribed material space. Thinking about biotechnology as it exists in Emeryville works at a middle ground between these poles. I take this meso-level approach in order to specifically think about the relationship between placelessness and place.

My contribution to this literature is to show the ways the aspiration to placelessness exists in places. I look not just inside the organization, but outside the organization, in the suburb organizations exists in, and the way that suburb interacts with a broader metropolis. This kind of vantage point shows the ways not only 1) technology exists in place, but 2) technology still aspires to placelessness, and 3) the ways that placeness is materially configured in a city. The aspiration to placelessness depends on the existence of certain material elements, modes of subjectivation, and historical conditions. Specifying these will help the effort to not only reject the illusion of placelessness, but also begin to identify where placelessness is operating as a part of place. This, on the one hand, allows us to see more causal factors at play than just social agents, in the development of technology. In the social sciences more broadly, this approach allows us to see the ways place is a relevant aspect of social life even for the modern subject at an imagined leading edge of progress, as much as it is for the colonial and postcolonial subject. Finally, understanding how the aspiration to placelessness exists in place matters because of the unintended but real forms of social suffering that are a part of technology development and zones of innovation, which are currently actively contested in the San Francisco Bay Area.

San Francisco as Place

San Francisco is a city that likes to write about itself, and a lot has been written about San Francisco. Recently, most of what is written about San Francisco is an elegy

for whatever it was before tech arrived: Richard *Walker Pictures of a Gone City*, Rebecca Solnit's dotcom boom lament *Hollow City*, and *The Last Black Man in San Francisco*, most explicit about the racial dynamics of change (Solnit 2002; Walker 2018). San Francisco tends to eclipse representations of the San Francisco Bay Area but writing about Oakland has more recently come to the fore, also heavily lay into dynamics of gentrification bringing in white tech hipsters and forcing out residents of black and brown neighborhoods: Tommy Orange's *There, There* and Boots Riley's *Sorry to Bother You*. In addition to academic works inside the Silicon Valley organization, there is similar writing in the mode of popular memoir, like *Uncanny Valley*, that dish tales of new money and vacant meaninglessness inside the fortress.

San Francisco is in a moment of handwringing about becoming a nonplace. So much so, that where, in the 1999 *The Matrix*, the simulated Matrix world only existed in a kind of nowhere-anywhere airless cubicle within a nameless American city, in the 2021 *Matrix Resurrections,* the Matrix very specifically exists in a tech company with floor to ceiling windows looking out to the San Francisco Bay. San Francisco, was invaded by Twitter and internet 2.0, as a more lively and real and urban alternative to Silicon Valley (Li 2019). But tech brought Silicon Valley along with it into the city, and now San Francisco has transformed so significantly that it effectively operates as the backdrop for Keanu Reeves to lie in limbo, making silly video games, drinking cappuccinos on top of reclaimed wood unable to talk to Carrie Ann Moss. San Francisco is now a more effective symbol of a radiating illusion, than the generic and unnamed city of the original.

While that anxiety over a loss of essence is pronounced in the post Twitter Tax Break San Francisco, it's also not new. The city has long been plagued by anxieties over tourism the fear of "disappearing into its own postcard" (Kamiya 2013). Contemporary local writers have named the "go-go 80s" as the most odious chapter of city history,

during an influx of finance in the downtown's Manhattanization (Kamiya 2013), a sentiment mirrored in a popular book of the period, *The Golden Gate*, self-deprecating account of self-absorbed 80s yuppies. Even Joan Didion's essay on the hippies and Diggers in Golden Gate Park, the moment often looked to in nostalgic moments for a real San Francisco, has its own sense of overwhelm, young wanderers dangerously off kilter – "where the social hemorrhaging was showing up" (Didion 1967).

What unites all these accounts is a sense of a kind of spirit of San Francisco with a vanishing essence, at perpetual risk of overwhelm by tourism or other outside forces. And at risk of overwhelm, in part because of its geography, its smallness, the ways that ephemerality is also the product of the land itself, and its smallness, hemmed in by the peninsula, and surrounded by water, which is what makes it so pretty in the first place, the water, the mist, the wind, "pretty in spite of itself," as a friend visiting from Ohio once told me as we walked along the strangeness of the city's alternating shuttered storefronts and glass tech buildings along the city's Mid-Market corridor with sky darkening, the sky scrapers lighting up, and the fog rolling in.

In addition to this attention to ephemerality, at least partly the product of the physical environment, there's also a long tradition of accounting for city history through walking. There are the enormous number of walking tours, and some of the best-selling written text about San Francisco is narrated in the form of a walking tour (Solnit 2010; Kamiya 2013). There are also a number of radical walking tours linked into people's school tradition,[1] and this political orientation toward embodied and material reality that meshes with walking pedagogy. But it's also just a nice city to walk through, because of hills, and the microneighborhoods and microweather that form within the arrangement of hills, and the fact that you can walk clear from one end to the other seven miles away

[1] See Shaping San Francisco (http://www.shapingsf.org/tours.html), Berkeley South Asian Radical History Walking Tour (https://www.berkeleysouthasian.org/)

within a few hours (*7x7*, the namesake of the major local lifestyle magazine for the 7 miles north to south and 7 miles east to west).

It's smallness, and the related enduring self-consciousness about being one step away from not a real city, is what led Gary Kamiya to call San Francisco a "toy city," the namesake for this dissertation. Because a toy city evokes both an overactive social agency, artificially constructing a city into a toy, but also suggests the way that social reality is in direct relationship to a physical reality of the land, its smallness and occasionally surreal quality in the fog and water, and the ways these exist in an iterative relationship to each other enduring through time.

The image and spirit of San Francisco oversaturates public perception of the Bay Area and the tech, but it's not the only character in this story. This ethnography is not set specifically in San Francisco but the San Francisco Bay Area. The Bay Area runs, depending on who you ask, from San Jose to Santa Rosa (south-north) and from the ocean to somewhere past the Berkeley-Oakland hills (west-east). The dissertation also visits Sonoma, the south peninsula, Oakland, Berkeley, and other cities of the Bay Area. But as an account of friction, the dissertation is interested in ugly cousins, edge cases, monsters, and there is also a considerable amount of attention also directed at the small, strange suburb of Emeryville, the second toy city of the dissertation.

This was the city where most of my fieldwork with biotechnology companies took place and is often read as not much more than an empty receptacle for tech companies, malls, and other institutions of neoliberal capital. But Emeryville is a heightened case to think through the ways the relationship might be read the other way – the way the conditions of a place like Emeryville allow for not just a biotech corridor, but also, the first ever biotech company in the 1970s, and soon after, likely the first city level tech boom soon. The ways the city can read as blank space can help characterize that

relationship between place and placelessness. Not least because of the ways Emeryville was the center of pre-colonial indigenous life and the unceded ancestral homeland of the Lisjan Ohlone who are the original inhabitants of the San Francisco Bay Area. The legacies of settler colonialism are part of the accounting for the ways technology industries occupy space, including San Francisco and the peninsula as the unceded ancestral homeland of the Ramaytush Ohlone peoples.

Method and Story

This dissertation syncs, in the broadest sense, with the decade I spent involved in biotechnology from 2010-2020. Following Anna Tsing's methods for analyzing zones of friction, that resist birds-eye narratives while still working to analyze modes of interconnection, this dissertation is conducted as patchwork ethnography (Tsing 2004).

I began working in a biotech lab as a microbiology undergraduate at UC Davis in 2010 and moved to San Francisco after graduating in 2013. I worked as a lab technician in Emeryville and lived in the attic of an old Victorian owned by a 90-year-old man who called himself the Mayor of the Mission on 24th Street, from 2013-15.[2] I moved east of Lake Merritt in Oakland for a shorter stay after that, about six months, before I moved to Phoenix for a graduate program in the Human and Social Dimensions of Science and Technology at Arizona State University.

I spent my summers and winter breaks for most of my graduate program (2016-2022) with friends in Oakland or Sonoma Mountain Zen Center (more on that in chapter three). I'd also almost always get drinks with old friends from my biotechnology days, if I wasn't staying at their houses, many of whom had migrated on to other biotech companies. There was a short trip where for two weeks I spent time at three different

[2] https://www.sfchronicle.com/the-mission/tassio/

biotechnology companies (one in Boston, more on that in chapter one) where I did observation and interviews and attended the 2017 Synbiobeta conference.

From October 2019 to March 2020, I spent three months in a basement with a strange roommate in South Berkeley and, after I ran out of money, three months an hour north in the cabin behind two friends on Sonoma Mountain. This six-month stretch was centered in fieldwork in another biotechnology company, and included wandering around the city to where different threads in lab led me to different aspects of city history.

I left the Bay Area, abruptly, at the end of March 2020, when I was living in the mountain cabin, and it became clear the Covid-19 Pandemic would last more than a few weeks. I moved back to Phoenix where I started the process of writing, while also contextualizing my in-person experiences with archives of local online magazines and newspapers: mainly, local newspapers *E'Ville Ey*e, *The San Francisco Chronicle, East Bay Express*, *Poor Magazine*, and *Found SF*. I did a more interviews online, mostly with people related to Emeryville's urban renewal period, but more than anything, consumed media about San Francisco rationalized as "research" bled into inordinate amount of completely pop culture, television, novels, and movies I had denied myself the last several years as a graduate student in newfound free time in the early days of pandemic and video meetings with colleagues and interview subjects began to exist in the same physical space as documentaries about the I-Hotel, then documentaries about 80s LA punks, then Matrix reboots, and so on.

I mention this bleed over, because it's started to affect the way I wrote and thought about things and became influential in the shape of the dissertation. Because, as J.J. Storm has put it, the social sciences are "circling the drain," arriving again and again at the same conclusions in ever more obscure jargon (Storm 2021). But amidst this

existential anxiety within the academy, all manner of non-fiction forms have been flourishing outside the academy, also conscious of the changing terrain of objectivity, truth, and reality.

There has, on the one hand, been a broader shift and expansion in journalism, in the looseness and amateur influences of the internet, to a sense of accountability that doesn't come from clinical objective voice of authority but the voice of authenticity, that talks to you like a friend, and tells you how they figured the thing out they're about to share (Abel 2015).

It's also the era of *How to with John Wilson*, which begins with the conceit of instructing the viewer in twenty minutes "how to make risotto" and then gradually degenerate as John Wilson burns his risotto, looks for a new pan, goes to a garage sale, has a conversation with a Wrestlemania fan – a show who's central delight is the feeling somewhere in the third act of every twenty minute episode of, "woah how did we end up here?" Because the how-to conceit becomes a skeleton to hang on a meandering but obsessive documentation of New York, a woman stuffs a pigeon into a plastic bag before walking into Times Square, an amateur conference on wormholes and the Mandela Effect. It's a project of capturing reality, somewhere squarely in between that realist empiricist and metaphysical sense, in a moment John Wilson felt nervous that New York was on its way "to become boring" (Pemberton 2020).

It's the age of Karl Ove Knausgard and Elena Ferrante ascendant (Rothman 2015), and their kind of attention to everyday life and the ways this, formally, creates a chaotic style, conspicuously run on sentences, diversions, doubling back, lost threads ring differently for different people, and the ways these all end up generating a kind of breathlessness. I'm inspired by these styles in the way I write for the rest of the

dissertation, and try to tilt toward knowledge on "the plane of immanence" (Deleuze and Guattari 1987, 266).

Cultural anthropology has written often about writing, and recognized the ways genre conventions of the field shape the kinds of knowledge the field produces (Geertz 1973; Rabinow 1977; Clifford and Marcus 1986; D. Taylor 2003). Many anthropologists have recently written their manuscripts as more formal experiments, like Stefania Pandolfo's uptake of Moroccan religious aesthetic forms in the style of her ethnography; Anna Tsing's mirroring of mushroom sprawl in her "riot" of small chapters; Viveiros de Castro's intellectual cannibalization of French intellectuals in his book on Amerindian cannibalism – even Bruno Latour's associative quality in bringing attention back to the missing agential masses in the material world (Pandolfo 1997; Tsing 2015; de Castro 2014; Latour 1993). They mirror the world they try to capture in their writing, and in doing so, bring new life to the discipline.

This dissertation leans toward a writing style that primes feeling and the material world, splintering and eruptions, and a searching quality that I felt in my time in the Bay among the technologists. I draw on the styles of non-fiction I describe above. I prioritize moments of material vividness and social confusion over abstraction. I let analytical reflections emerge from these secondarily.

The conventions that discourage those tendencies are, after all, part of what make it so hard to notice place. To talk about place, some messiness is required, more immanent accounts, sensitive to agency of material environment, open to exploring new modes of causality.

A Tour Through Ethics of Place

In the following chapters, I show a dynamic between place and placelessness at four different scales. First, I demonstrate it in the biotechnology labs and organizations that I begun fieldwork in. Then, I'll discuss these motions in the city of Emeryville these labs were based in. Next, I'll talk about the broader metropolis of San Francisco Bay Area and the imagination of the history of counterculture that shows up in technological practice. I'll end by thinking about the technologist as an apparently placeless subject and the ways this has been critiqued by local anti-gentrification activists. At each of these levels I highlight a particular concept that highlights this tension between place and placelessness.

Each chapter begins with an aspect of synthetic biology and exits into an aspect of place. While there are meaningful differences between the ethics named in each chapter, they also converge toward an ethic of place that valorizes an individual constructing an ongoing, consistent relationship to the place they occupy, in contrast to the placeless cosmopolitan subject that moves freely in space.

The first chapter, on *The Organization and Institutional Knowledge*, is based on fieldwork inside three synthetic biology companies in my fieldwork in 2017, and also refers to personal experiences working in these kinds of laboratories from 2013-2016. Two companies were in the Bay Area, one was in Boston, and in all three institutional knowledge was invoked as an important element of operations. Institutional knowledge is a kind of tacit knowledge that exists interstitially, between people and within the material arrangements of specific labs. The chapter shows how institutional knowledge has become important in constructing the infrastructure meant to produce a kind of placelessness – a digitization – of biological work. It also shows how institutional knowledge was activated because of a sense of the ways it was perpetually lost within industry conventions of career advancement, reward structures, and layoffs. Finally, the

chapter discusses how these kinds of complex contingent material arrangements are being made manageable through – universalized – methods of statistical quality control and how these in turn affirm retaining institutional knowledge and consistency of workers in particular places.

The next two chapters center on fieldwork conducted in the fall of 2019 through the winter of 2020. The second chapter, *Emeryville and Weirdness*, walks outside the lab to think about the ways tech organization exist within a city, in this case, the post-industrial suburb of Emeryville. But the chapter decenters tech, as well as regimes of city governance, and instead centers the feeling of inarticulate weirdness in the city. It follows Timothy Morton's suggestion to notice the uncanny as a potential site of causality in ontological accounting of the world. The feeling of inarticulate weirdness does, in fact, connect directly to histories of settler colonialism, neoliberalism, environmental destruction, and remediation, and I use the feeling of weirdness to narrate these converging histories. I then show the ways these convergent histories enabled the construction of biotechnology labs and one of the earliest urban renewals centered on a tech boom. I also speculate on how this inarticulate weirdness might understood as be a corruption of what Robert Orsi calls "real presence," the nonhuman agencies that have been systematically left out of European accounts of history – and how a recognition of real presence might reframe the development of biotechnology and tech development.

In the third chapter, *Counterculture and Re-enchantment*, I talk about the ways this kind of real presence can be legible and partially recognized in the spiritual history of the San Francisco Bay Area. I consider the ways the lineage from 1960s counterculture to internet tech culture charted by others (Turner 2006; Vettel 2013) becomes a resource for technological practice. Specifically, I look to the impulse to make science better by making it more like religion, especially by drawing of ideas of Buddhism imagined as the

scientific religion. I consider, on the one hand, that the resource of this intellectual history that's the product of the transpacific population and San Francisco's Asian neighborhoods. I show how interest in an idea of Buddhist interconnection and nonlinear time has specifically been instrumentalized in different technological projects. I close by juxtaposing the iterative relationship between self and environment in an engineering setting to the emphasis on *form* in the Buddhist practice center Sonoma Mountain Zen Center. Form offers an alternative ethic more directly rooted on the religious traditions technologists draw on.

In the fourth chapter, *Move Home with your* Parents, I consider the ways technologists operate as gentrifiers in their physical presence in the Bay Area. I center the critique of gentrification made specifically by *Poor Magazine*, a revolutionary press self-identified as a a landless people's movement. They have been central to publicizing issues of gentrification in San Francisco, and, as landless, also stand in a privileged position to critique the ways land and the landed operate. I work with their writing and pedagogy (including their online public events through 2020 and 2021, and an online workshop I attended in early 2022) as theory to consider the movement tech workers as much as academics and other varieties of the placeless cosmopolitan subject. Their imperative to "move home with your parents" articulates an alternative ethic of place, self, and kinship.

Ethics is an analytic still angled toward the individual making sense of their world, and throughout the dissertation, I try to linger on zones of overwhelm that occasionally seep through the rhythms of everyday life – mist off the ocean, the sound of a BART tunnel, sleep demons in old Victorians. Place, in the end, outlives us all. As Abraham Lincoln told us, "Laws change. People die. The land remains."

CHAPTER 2

ORGANIZATIONS AND INSTITUTIONAL KNOWLEDGE

This chapter focuses on the aspiration to placelessness as it exists in the material realities of the organization. I show the ways certain biotechnology laboratories aim to make material work of biology into digital abstractions, through forms of automation and digitization. This has proved a difficult project, and these organizations have encountered significant technological and financial difficulties.

I show the ways this setting has created an interest and attention toward "institutional knowledge." This phrase exists as part of the effort to understand the ways that employees frequently leave the organization in addition to the ways important information leaves with them. Institutional knowledge is articulating more than just the fact that people accumulate more knowledge about an organization the longer they spend in it. It also grapples with the ways people's personalities are baked into a constantly evolving infrastructure. The need to articulate institutional knowledge shows the ways the placeless abstraction of editing genes on the computer is made possible through these accumulations of personalities building in specific organizations. It also makes obvious the ways the organization as a place is troubled by its own cultivation of the tech worker as a placeless, mobile subject.

I was never a great lab technician, but I became much better at my job once I started asking who had actually built the infrastructures and processes that I was operating, and who had modified them since. That's because the process of laying out the infrastructure that guides day to day operations is, not exactly arbitrary, but also not a direct application of engineering principles, and therefore personality driven. Instead of thinking of the processes as a straightforward application of engineering principles, the

rhythm of operations was much easier to parse and follow, when looking to who exactly built things out and decided to make them one way or another. Was it the guy with a manufacturing background who liked to work fast at leave at 3:00 pm with enough time for a vape break every hour; or the man with a PhD in robotics who left the company to become a vending machine kingpin in Indonesia and never bought a bought a mattress the eight years he lived in the United States because why buy a mattress when you can stack eight comforters on each other; or the woman we hired from a big pharmaceutical company, and who has much more of a silly side than you would guess when first meeting her, and so on. That's because the engineering of the biological via new robotics and software, the premise of synthetic biology, is not a straightforward process, and so, becomes the judgement call of a person with their own idiosyncrasies.

The organization is a layering of personalities over time, translating into arrangements of built space. The infrastructure is bespoke and personality driven, best understood, by me and by others, through the specific personalities putting things into place under specific circumstances. And these specific circumstances have a very strong material element. The infrastructure is necessarily so shaped by personalities, as opposed to stepwise engineering principles, because of unpredictable material elements in the lab. When I could see the infrastructure as the accumulation of personalities over time, the infrastructure made more sense to me, and when I started training people, I could see they also understood better when I explained things in this way.

The consequence of this kind of layering of personalities in the built environment was the importance of a form of knowledge the people in the lab called institutional knowledge. When people started talking about institutional knowledge, most often, they were talking about what a pain it was when someone left the company, either by choice, for their next pay raise, or not by choice, during rounds of layoffs.

Institutional is a kind of tacit knowledge, the unconscious elements of work that have been observed as so important to getting lab work done, and also similar to the mangle of practice that lies behind neat abstractions that come out of labs (Collins 2012; Pickering 1995). But tacit knowledge is the territory of the individual, even if not a fully conscious individual. Tacit knowledge focuses on a person and the way they make things work with bits tucked back in their unconscious, and what's less emphasized in tacit knowledge are the ways this kind of intuition always comes from the world they're interacting with. Institutional knowledge is a kind of tacit knowledge specific to place, that lives between people, interstitially, and lives in physical space through a process of iterative construction.

The two together, idiosyncratic personalities and idiosyncratic lab materials, build a recursive energy that creates a specificity of place in lab operations. Which is something much more material, and a different kind of social, than the organizational culture named used to provincialize other scientific institutions (Forsythe 2001), and even the construction of knowledge through the fusion of the intellectual work of a team of people (Rabinow 1996). It's place made by people actively constructing material space in a way that was so contingent on so many small things, it couldn't be easily replicated elsewhere. Even as the circumstances that produce one synthetic biology laboratory or another are similar, or nearly identical, the operations of one laboratory versus another often look quite different. Institutional knowledge doesn't often carry over from one company to another in straight forward, universal, way. The way a DNA construction platform takes shape through all these people and instrumentation was, in my field work, demonstrably different in an organization in Emeryville compared to one in Boston, or even to another down the street in Emeryville.

The lab, as Bruno Latour has always said, is an intensely materially configured space, a form of intellectual work that depends on autoclaves to sterilize things, centrifuges to separate them, pipettes to transfer liquid, thermal cyclers to amplify DNA sequences, and so on (Latour 1986). The ways the materiality of biological science exaggerate a material dynamic makes more obvious the importance of institutional knowledge, a specificity of place that makes the things we take as placeless science and technology operate – something that likely applies also to universities or silicon wafer fabrication but can only be seen and understood in the specificity of one of these types of organizations (in this case, synthetic biology). But what's more, it shows the ways the dynamic of place has not only not been eliminated, but maybe even intensified, in projects to remove place and the material in digitizing work, the project of synthetic biology.

The 2010s synthetic biology laboratory arguably has even more material elements than the 1970s one, with new forms of instrumentation, like robotic liquid handlers attached to software that still exclusively operates on Windows 95 and, instead of just one -80 deep freezer, hallways full of -80 freezers that now and then might start spontaneously melting. There's an idea that institutional knowledge is the sort of thing that fades with progress and modernization. This in fact, was the very explicit project of synthetic biology, which was posed as an effort to take the life sciences out of the dark ages by standardizing the highly specialized, ad-hoc, and labor-intensive intellectual work of the bench (Endy 2005). But synthetic biology laboratories still involve benchwork that has become more complex with the introduction of new pieces of digital and mechanical equipment.

At one level, institutional knowledge, knowledge that lives between people and a place, is obvious and intuitive – anyone who's spent time with an elderly person at the

end of life has likely seen the ways their cognitive functions drop the minute they move from their home to a relative's house or nursing home. But institutional knowledge was on the minds of the people in the lab because it was a problem – it was such a terrible pain when people left for their next pay raise, or there were layoffs that eliminated a third of the people working somewhere. Institutional knowledge was a problem because of the ways this wasn't formally recognized enough in career ladders, hiring processes, certain practices imported from financial organizations or Silicon Valley start-ups, presuppositions about value and intelligence were at odds with the things that seemed to make things work well, and companies, as one scientist said to me, were shooting themselves in the foot.

Institutional knowledge is very much in conversation with "facility building" Gaymon Bennett has pointed out is a key feature of value capture in biotechnology today. He described this as "physical and intellectual equipment flexible and dynamic enough to be adjusted in response to both the successes and failures of their work" (Bennett 2015a). I use the phrase institutional knowledge because it's the phrase my interlocutors used and carries a slightly different valence. But I also see this chapter as filling out the idea of facility building proposed in a short essay with ethnographic specifics (not least because of extensive conversations with Gaymon Bennett and Emma Frow writing a never funded grant proposal on value capture in synthetic biology facilities).

The main difference in the valence between institutional knowledge and facility building, is affirming a form of knowledge specific to the non-scientists who work in the laboratory, on operations rather than development, existing in a group labeled technicians. This affirmation came in large part from Marxist influences leaking into the organization from the longer histories of political thought in the Bay Area outside the lab. While institutional knowledge is minimally familiar to most people inside the

laboratory, and brought up by many people, it was brought up the very most by a smaller number of people inside labs with a background in radical politics invested in helping technicians recognizing their own value to the organization.

Because one of the ways institutional knowledge becomes less obvious and less visible, is the through an imagined division of thinking work and material work. This is connected to the idea that the material work is standardized, reproducible, because there is standardized and reproducible pieces of equipment and software. But in fact, the introduction of these pieces of equipment seems to have complicated many aspects of benchwork, even as it made entirely new scales of work possible.

While Marxism and value and political economy are often invoked as their own universal values, the presence of these influences are also specific to place. But these ideas are also instantiated by place, through a specific political history from outside the walls of the organization, from Oakland and Berkeley and San Francisco, that creates its own material effects in the lab. Just a few private lives within the communist party and radical organizing leaked through, in this otherwise fairly conservative industry, and activated, as the Marxists would say, a latent consciousness.

Marx in the Lab

I was the first or second hire after layoffs, the weird white-collar experience of, without warning, watching a third of your coworkers get fired, and to then count yourself lucky to pick up all the slack they left behind. I didn't know this when I first arrived, but when I did learn several months later it made the mood of the world I had just walked into make much more sense. There was an edge to nervousness to everyone, and a breathless too busy-ness that had less excitement than an edge of hurt and anger.

In this environment right after layoffs, I was approached by a coworker about a year after work at the company who asked me, in a low voice, how do you like it here? How's your boss treating you? Are you making enough money? In response to my responses, he told me I should come to a bar, a few hours after work later in the week, and went to my first organizing meeting. People were mad about how much work they were doing for the pay and credit they were getting and wanted to form a union. And this started to inform a lot of how I looked at work.

The moment was primed by other moments – in particular, as an undergraduate, I watched Occupy unfold on the University of California Davis, as a voyeur and not a participant, including college students getting pepper sprayed in the face by a campus cop, which didn't actually register as something very significant to me until the Casually Pepper Spray Everything Cop meme took over the internet.[3] And then I was trying to catch up on something I saw I didn't understand, and people like Angela Davis in Oakland saw something was happening on our unlikely little agriculture science campus and came to give lectures to keep fanning the flame. And these events carried over into a life in San Francisco, where it made sense to me to try to slog through *Capital in 21st Century* on my BART commute, feeling like I was working too much, and seeing lots of unhoused people on the street every day to and from a job where I was spending hundreds of thousands of dollars on reagents every month. I felt compelled to read hundreds of pages about of economic modeling (maybe 200 pages, before skipping to the end) feeling weirdly reassured that these problems – poverty, overwork, police state – have been around awhile, and that they were related to each other, and that people have also been thinking about how to solve them for a while, and that you didn't necessarily need to reinvent the wheel in trying to fix them.

[3] https://knowyourmeme.com/memes/casually-pepper-spray-everything-cop

So, I was very excited to be approached about workplace organizing, having realized that I would not be finding meaning in my work by making biofuels because we were making shampoo ingredients, and to start asking, as a group of lab technicians, for uninterrupted lunch breaks and to send around spreadsheets of people's salary, position, gender, race, and to be told this was all part of a picture much bigger than ourselves. Not everyone liked the hour long lectures about the difference between Gramsci and Mao over pizza that came along with these affirmations, but I liked them best of all.

This more general, or at least regional, political energy intersected with things specific to a biotechnology laboratory. I didn't have to experience layoffs, but I walked right into an environment where nearly everyone else had. And even though the energy leveled out with the passage of time and with more and more new hires like me who were hired after it, the people who were there never seemed to really get over it, and they seemed emotionally raw or angry when that period of time came up in explaining a project or the person whose personality was inflected in the naming conventions of media plates before they got fired.

Layoffs, this white-collar convention, to grow and grow as much as you can, and then, as needed, cut back, is one of those things, my coworkers and later my interlocutors told me, that translates very badly to the operations of a biotech company. But layoffs continue because biotechnology is an industry so premised on its futurity, and so is always growing and then realizing its grown a little too fast. And people were mad and raw, because it multiplied the work on their hands by factors beyond the pair of missing hands. But the anger was about much more than that because institutional knowledge is partly interstitial knowledge, existing between people, and this ties you much closer to the people work with.

At one point when I was working at my biotech job, I paid $200 for a theater ticket to watch *The Flick*, a play which takes place in an empty movie theater with different pairs of clean-up crews having conversations with each other, because I heard the playwriter Annie Baker on the radio saying she wrote the play because there wasn't enough art about the weird relationships you form at random jobs with your coworkers. I was very eager for any resources to help me figure this sort of thing out, outside the saccharine figure of the "work family," because your coworkers are not your family, and the relationship is much more ill-defined and fleeting and strange. But they are like a family in that you don't get to choose them, and these people who I wouldn't make a point to get brunch with once a month, they still knew every last thing going on in my life and I did in theirs. Because if you're working a 12-hour day with people you don't have the same buffer and reprieve of space alone if you say, just got dumped, and even if you manage not to cry about it, everyone can see your eyes look like prunes today.

I felt very close to these people in a way I could see didn't totally make sense and that it was a level of emotional intensity that didn't feel totally appropriate to the professional relationship we had. I had Stockholm syndrome, and I talked about them all the time, enough that more than one person commented when first meeting me, "you talk about your coworkers a lot," and I felt embarrassed but also couldn't stop.

And on one level this all seems to be a normal stage of the boundary issues of early professional life. But I always suspected our boundary enmeshment was worse than my friends in say, nonprofit administration or teaching or retail, because of the specific kinds of pressure cooker we were in, a pressure cooker who's functioning depended on our relationship to it and each other. More than any of my many random jobs, more than my own job at the movie theater, or Blockbuster, or even working in the garden at the Buddhist monastery, and obviously more than being an academic.

And it wasn't just me because I saw it in others. I saw one woman start to cry at a bar on her boss' last day of work and then half apologize, "I see her more than my mom." When that boss came back for a happy hour a month later from her much better new job, she said she still missed working at her old company, and that it was "like my first boyfriend." People never seemed to get over lay-offs, and some people often never got over a friend leaving. People would leave, and then the people they left behind would feel sad by their departure and frustrated by how much work they had, and then they would also leave, and so on, and the company bled employees. Going away parties were excessive and often descended into blackouts.

This is a detour meant to give a sense of a particular kind of paradoxical energy of intensity and malaise, and the relationships that build on top of that kind of intensity malaise. It was the kind of energy that looks for vents out, and then found a vent and got amplified in workplace organizing. It became a more specific perception that the ship was buckling, and that the technicians were picking up the slack. And that became a kind of moral energy in that, as the main organizer said to me when he saw he had an attentive listener, "Ideas are cheap. The value comes from making them work." As Marx told us, even if the capitalists own the means of production, the only real value is in human labor.

While usually not posed in such absolute terms two hundred years later, this sort of emphasis also being consistently laid by the STS' Marxist feminists who have been building a literature to show the ways labor falsely enchants automation. Starting with observations on the ways the industrialization of the home has never led to less housework for the housewives, the apparent enchantment of technology through erasures of labor has been an enduring theme in feminist social studies of technology (Cowan 1976; Chasin 1995; Suchman 2007). New iterations on the theme have focused

on the ways computer screens and digital infrastructures are especially effective erase and minimize labor in novel configurations (Irani 2015). And they have shown this erasure is most especially effective when the labor behind the computer screen falls on the wrong side of race, class, and gender divisions (Atanasoski and Vora 2015).

It's one thing for these ideas to being circulating in writing about high tech in the academy, and another thing, a remarkable thing, to see the same ideas finding traction with the people working in the relatively conservative industry of biotechnology. The main organizer had been a member of the Communist Party in the 1980s and a force in Japanese American reparations for World War II concentration camps. He had also been working in biotechnology all that time, and he had never thought to bring his political life into his work one. But he had recently seen there was an escalating frustration and openness to politics that were too radical for several decades. Neoliberalism kept pinching people harder, and then there were the layoffs. And, having worked since the 1980s, he was old enough to retire and liked the idea of getting fired in the largest blaze of glory possible.

Something that the Marx or the feminist Marxists don't emphasize, is the way that the failures to really automate demand a kind of knowledge that stays in place, and that this is specifically devalued in the ways career ladders are set up. One of the things people were eager to agitate for was a standardized career ladder that would eliminate the illusion of meritocracy that governed promotions and pay raises. This has become a standard ask for unions, and when this isn't in place, white men tend to register as more meritorious in the eyes of management. But aside from being fairer, the career ladder was also important because of the ways it would reward people for staying in the organization, and everyone would lose that much less institutional knowledge.

The Work of Synthetic Biology

Part of the trouble of recognizing this form of work and knowledge is the fact that it didn't really exist in the initial vision of synthetic biology. In fact, the entire premise of synthetic biology was to do away with the materiality and medieval craft of lab drudgery that continued to linger in the life sciences relative to forms of mechanical and electrical engineering (Knight 2003; Endy 2005; Herper 2017).

Synthetic biology is a field of research which seeks to develop the tools to re-engineer the natural world. Drew Endy and visionaries like him proposed agriculture, health, and environmental sciences would see more dramatic advances with the adoption of engineering principles to develop technological platforms and, ultimately, deskill biological work (Endy 2005). The rise of an engineering approach to biology has largely been understood in terms of technological advances, namely, DNA synthesis, sequencing, and computer processing capabilities. But less appreciated is the way this shift is also connected to changes in understandings of work processes and livelihoods. Synthetic biology reimagined the formerly artisanal work of the lab as a standardized engineering discipline, in which scientists are freed to focus on the creative elements of their work (Frow 2013). This freedom would be newly achieved by streamlining and automating laboratory processes with advanced robotics and digital capabilities.

It would make bioengineering the sort of thing, eventually, you could do at your computer and then produce on a bioprinter (Endy 2014). The vision of the work of synthetic biology focuses primarily focus on the work of biologists as these kinds of designers at their computers, not just liberated from the minutiae and drudgery of lab work, and also, the institutional pressures of academic or industrial labs. For this reason, the figure of garage scientist, as Gaymon Bennett points out, has received disproportionate attention in social scientific accounts of synthetic biology (Bennett

2015b). The press can't resist the anarchist garage scientist either (Tucker 2015), and DIY bio labs in shared spaces like Oakland's Omni Commons are truthfully a very fun place to spend an afternoon in. But they're also not biohacking away at their biocomputers and bioprinters. It's more puttering around a lab with rickety lab equipment, and engaging in "artistic critique," a symbolic Marxist middle finger to Monsanto and big pharma (Wilbanks 2017), but not a materially or scientifically significant one.

While the initial vision was very much to create an infrastructure that could pull biologists out of the institutional lab and into garages, synthetic biology is, twenty years later, still only meaningfully operable within these kinds of institutions. The promotional materials of the institutions I visited in my fieldwork often did display scientists at their computer, from the comfort of a cafeteria, airplane, or couch. Or alternatively, they showed video of swiftly moving robot arms and liquid handlers without a human in sight.

The most extensive writing to date about the labor and work of synthetic biology comes Sofia Roosth's account of the industry – my committee members have heard this story before – which proports to deliver a Marxist critique of the industrial labor practices. The critique is directed at the progressive erosion middle class being built in a science without scientists, as she narrates a journey through a company tour where "the only thing absent from the facility… are the scientists." It went on:

> *"Automated software designs a protocol by which to stitch together a series of up to nine genes in a single one-pot reaction, forwarding that protocol to robots that then perform the genetic recombination… An automated computer system (named THUMPR) assembles genetic parts into combinations of around nine*

genes. By 2012, over five hundred genomic assemblies were performed each week. None are assembled by human hands"[i] (Roosth 2017, 117).

I actually worked at the exact robot Roosth describes in this passage, and part of my job included setting up the robots when lab tours would come through and walking out of the room while they were still running. I was very possibly the person that day who pressed go on the robot before Sofia Roosth walked in. While THUMPR was very necessary for making that many genetic assemblies every week, but certainly not without the help of any human hands.

Customer Service

And this gets to a key part of the complexity when sophisticated robots and software are introduced in order to advance an engineering process. The robots and software on display in the lab tour made possible a scale of work and efficiency that wasn't possible without them. A number of DNA constructs that took, say, a molecular biology graduate student several months to produce, at the company, could be delivered within three weeks after submitting construct designs to a computer.

Making those DNA constructs in three weeks depended on people pulling overtime alongside the robots. But these companies were able to show off pictures of scientists genetically engineering things from a laptop in a way that wasn't a lie because of the ways organizations developed over time into divisions of customers (the genetically engineering scientists) and service groups (the people handling the robots for DNA construction and strain testing).

At one company I visited, a founder shared that the initial vision for the company was a tiny company with just his three cofounders and a rotating cast of college interns to man the robots. There were several hundred people at his company now, and the

growth fell implicitly along the lines of a customer-service organizational model. Explicitly, the company's laboratory operations were divided into the sections of an engineering workflow Design-Build-Test. Scientists leading projects made up most of the Design group, that submitted requests for DNA construction to the Build group and strain testing to the Test group. The Test and Build groups often adopted the language of customer service when talking about their relationship to the Design group. This tacit division was consistent in all the companies I visited. The members of these service groups were at least equal to the number of designers, and only seemed to be growing.

At another company, one manager of a DNA construction service group would joke to his reports, "As soon as the robots get here, you're all going to be fired." Everyone knew there was only going to be more work to do when the new robots got here. They would be hiring two more people alongside the new robots. Business was going well, and the group was expanding, and the new robots plus the two new hires would be operating at more efficient economies of scale. There might be a two-fold increase in adding two new hires to their twelve-person group along with the new robots. But no one was getting fired.

At the company that first thought it would only be hiring interns, the founder explained the expansion of the groups in this way: "What you have to understand is this company was started by a bunch of engineers. In engineering world, everything is clean abstractions. One plus one can only equal two… In biology, one plus one is never going to be two." A different kind of manpower was necessary to operate the kind of machinery where one plus one never equals two.

This sort of disconnect between imagination and practice happens over and over again with digital infrastructures, and infrastructure studies is in the business of continually drawing attention back to the work needed to build and maintain the

consistency of an infrastructure (Bowker and Star 1999). While standards make a new type of work possible, they also don't naturally conform to the variations of the natural world. This observation doesn't render the infrastructure useless. It only emphasizes the new kinds of translation and mediation work needs to happen for the infrastructure to operate.

But infrastructures have a certain place specific materiality, and while Bowker and Star draw attention to all the underappreciated work nurses are constantly doing to produce universally legible patient records and make them accessible in online systems, they don't specify the ways this work might be different from one hospital to another. Maybe it's not meaningfully different in nursing hospital to hospital. But in synthetic biology, the introduction of all these material infrastructures, fussy liquid handling robots and dozens of -80 freezers and thermal cyclers that start short circuiting from their constant use, adds another level of material complexity even as it standardizes and makes consistent other aspects of the work. In other words, it possibly amplifies the amount of institutional knowledge at play in operations.

Troubleshooting

This level of material complexity introduces what Charles Perrow called normal accidents, the routine accidents that we should always anticipate in a system with several tightly coupled interlocking parts, like a nuclear reactor (Perrow 1984). In the synthetic biology lab, there were no accidents as dire as Three Mile Island, but the principle of normal accidents was very much at play and was usually called troubleshooting.

Troubleshooting is the work of tracing and correcting faults in a mechanical or electronic system. Troubleshooting is a form of skilled labor that comes from the types of instrumentation meant to deskill labor. It therefore is a source of ambiguity in assessing

what effects new kinds of technologies have on work. It is ad-hoc, intricate, and for both those reasons, difficult to see. But it is maybe most difficult to see and assess because new technologies are usually buggy, and in the future, there will probably be fewer bugs and less troubleshooting. Only time will tell what will be massaged out and what will remain a sore point in the work process.

There's a fuzzy line between development and troubleshooting. Building a new piece of equipment, is in one sense, an ongoing state of troubleshooting. And even the most finished products, like a printer purchased from Staples, occasionally run into a problem that needs some troubleshooting. And everything in between, requires a different degree of troubleshooting, that is imagined to continue decreasing overtime. This makes the question of whether something is working or not a very ambiguous one.

During my field visits, I frequently encountered hiccups in the complex interlocking digital, robotic, and biological systems the technicians were mediating. Two technicians apologized to me one observation morning spent almost entirely on the phone with the support services of a gene sequencing company for help with an error message they did not understand. By the time I left two hours later, it was still unclear whether the error message was a bug on the supplier end, if customers had given them incorrect sample information, if they themselves had made a mistake in the two-week process which led up to loading sequencing, or, as it sometimes happened, if the problems were the result of unknowable biological machinations within the microorganisms they were working with. The next day I walked into the lab to another technician trying to "game" one of the pieces of equipment that mapped gene fragments; since the technicians had to redo some of their work in the face of the gene sequencing failure, they had used the machine more than expected in the last week and needed to extend out their remaining bottles of gel until a new shipment arrived. In another lab, I

encountered a pair frowning at a transparent flask one morning that they were expecting to be opaque. This was a sign that their yeast colonies had not grown overnight, and they had to consider both what might have gone wrong (the incubator wasn't working? The new person forgot to inoculate the culture?) and how best to move forward and catch up their operations, now a day behind. This last incident elicited faces of concern and some visible anxiety, but the first brought up low-level irritation and the second laughter: the average emotional register of these three incidents point to the ways these interruptions while chafing, were not out of the ordinary emergencies.

Work along workflows consisted of frequent troubleshooting. When I asked one technician in an interview how frequently troubleshooting came up as part of daily work processes, she answered indirectly and explained that their work relies on chance. The overarching premise of biotechnology is to take a microorganism's natural tendency to generate DNA, proteins, or other biological products and mobilize that tendency toward productive ends. Sometimes organisms can die suddenly, for reasons that can sometimes be pin pointed and other times never become apparent; they can also, by the natural mechanisms of variation and natural selection, mutate out of their genetic modifications into forms more advantageous to their own evolutionary fitness, but outside the intended design of the technician.

The suggestion here is that work that depends on chance – that is, that depends on living microbes – is always to some degree unpredictable. Microbes retain some agency even when new instrumentation allows work with microbes to be done at new scales and speeds. In fact, the scale and speed can amplify the difficulties in working with unpredictable microbes. The elements of chance the technician described are multiplied many times over when working with 1000 samples instead of 10, and when trying to move those samples through 8 different laboratory processes that day instead of 2.

Furthermore, the instrumentation that allows this scale and speed (for example: robotic liquid handlers, gene sequencers, capillary electrophoresis), itself is mechanically intricate and often delicate. One scientist joked that the DNA plasmid construction service was a Rube Goldberg machine on a skateboard. Such a contraption requires a considerable amount of fluid, uncertain, uncodified work to keep moving, and to move according to predictable schedules.

One manager of this group used to work as a scientist, both at the company and in a more traditional academic lab, and he compared his experiences across these groups. In moving from a research group into an operations role, he shared his days had become progressively less predictable. While as a self-directed scientist he had a clear view of any given day's work, and ultimately, control over it, his days in the operations group had become what he had taken to calling "feast or famine:" some days were full of fast-paced investigative work of finding where mistakes came from and how to route around them, while others were quiet. These uneven workdays could not be relaxed into a more consistent schedule because there was often little forewarning of when problems in operations would surface.

I asked him if this shift was surprising, that life in a more standardized group created less standard workdays. He said it had and started to reflect on how standardizing infrastructures begin to lead to less standard workdays by way of analogy to an evolving human brain: "Your brain, at its core, is like this reptilian brain and we just keep building on top of it. But all that old stuff has to be there because you can't start over. You have to keep building on top of it because you can't just kill the organism and start over with a brand-new brain… You wind up making these really complex designs that may not be ideal or as ideal as if you had just started from scratch with that new idea in mind and then design it from the ground up. You don't have the luxury to do that

when you're talking about the human body or the brain and evolution or even if you're talking about infrastructure. The pipeline has to keep running."

As opposed to a careful rationalization, he posed the workflow as organic evolution, a contingent, imperfect object that nonetheless does a certain work in the world that would not be possible otherwise. Like the arbitrary development of the human brain, things were still possible by virtue of its crystallization (as this manager also said during the interview, "honestly, I can't believe this works as well as it does" – but somehow it does work). But the result is still a far cry from the strictly repetitive, mindless work often imagined as the consequence of standardizing digital and mechanical infrastructures.

A Comparison of Pipelines

When infrastructures are developing in this way, ways that are a little bit arbitrary, because the pipeline needs to keep going, they end up different company to company. This kind of organic evolution develops in different ways in different places. Troubleshooting suggests an irregularity, but these irregularities were also a regular part of operations. Troubleshooting was both unexpected and routine. This tension created patterns of work that managed irregularity, and these patterns varied from organization to organization. During our conversation, the same manager also emphasized, "that's not to say things are off the rails." In other words, operations weren't a disorganized free for all, and there was enough regularity to their processes for things to work. But the manager's impulse to clarify highlights a tension.

Early in my fieldwork, I went to three different synthetic biology companies to see how the same DNA synthesis process worked and noticed how differently work rhythms looked place to place. At one of the companies, I ran a workshop, to learn about

the company's DNA construction process. The company had just acquired a smaller organization which specialized in assembling DNA. While they had the opportunity to compare technical details, it had so far been difficult to share work practices in their entirety. The process of mapping a workflow, the manager who helped me organize the visit figured, could help start the sharing.

While I imagined mapping a workflow would happen on a whiteboard, the participants resisted and insisted it was easier to show me the actual workflow on their laptop, by clicking through these interconnected software programs on his laptop and projecting the image onto the back wall. This workflow like all the other workflows I had seen strictly tracked information about biological samples with no representational element of the work itself. When I asked about the processes themselves, what for example a technician was doing on the day or week this software was being used, I first received indirect answers.

For example: "The SOPs are all hammered out." Like the manager of the previous section, this participant was careful to emphasize an organization undergirding the process. Each step in the workflow in some way connected to a standard operating procedure (SOP). The steps of the process – the timing of enzyme addition, the concentration of solutions, the length of a DNA amplification cycle – were all predetermined. These predeterminations were what the workflows linked to: sample positions for assembly, concentration of reagent additions, their corresponding metrics of quality control. This work was determinate and routinized ("all hammered out") in the sense that the protocols for constructing DNA are decades old, often learned in introductory molecular biology courses. But the participant was careful to emphasize this precisely because interspersed with these predeterminations are the routine emergence of unexpected inconsistencies. DNA sequencing runs fail; concentrations do not reach

acceptable levels; yeast refuse to grow overnight. This made it difficult to abstract or generalize how work layered on top.

What we found after enough back and forth, though, was a process of elaborate temporal complexity which moved DNA constructs through the pipeline and along the digital workflow. This DNA construction service operated on a turnaround time of five weeks or less, and on these deadlines, failed constructs routinely and had to be reattempted. But within the process, different DNA constructs (of the many thousands moving through a workflow at any given time) might fail at different times, for different reasons and with different delivery dates ahead of them. As a result, batches of constructs had to be funneled back into the work process at different points, depending on all these variables. The result of this was that, within any given day, thousands of samples are moving through a workflow, batched into different points in that workflow. This was why there was no neat correspondence between a point on the workflow and what a technician was doing: multiple points of the workflow were always being mediated simultaneously by the one technician and sometimes two working on the pipeline at a time.

In the sharing of practices, participants from the acquired organization were careful to flag that this temporal complexity depended on a few things. First, was the number of operating hours: this style of work would not be possible unless operations were almost always running. An early shift started at six in the morning, which handed off to an afternoon shift, and then to a swing shift that ends at one in the morning. These 6:00 a.m. – 1:00 a.m. operating hours ran six days a week, and technicians on and off the clock communicated progress and problems to each other through an instant messaging service. Second, managers with well recognized bioengineering expertise, advanced degrees and perhaps a decade of experience in the field, were available for

technicians during the most complex types of troubleshooting, and to bridge the interfacing of their service group with an external customer base. Third, they were careful to flag was that the workflow would not be possible without what they referred to as “mature operators.” Maturity, they explained, was connected to a feel for the rhythm of operations, an ability to understand unpredictable modes of failure and improvise plans, and to multitask between multiple batches of assemblies at once. It took a technician about a year or two to find this rhythm enough to work independently, in their estimate, three or five years before they would have acquired the reservoir of experiences and expertise to be considered mature.

The host organization shared that their processes also relied on the expertise of both managers and experienced technicians. They accommodated routine interruptions, though, in a distinct way. Rather than running the constantly streaming a workflow operating at multiple temporalities to accommodate frequent modes of failures, the long work process of DNA assembly was split into smaller, discrete, and ultimately more predictable units of operation. A design scientist would ask for help with a particular procedure that was part of the DNA assembly process (for example, a half day process in DNA purification). Scientists simply requested any of one these processes on an as needed basis, and the cumulative effect of unexpected errors never got too out of hand. While less efficient than the other organization’s batching system, their facility had prioritized flexibility as an overarching organizational principle, and this granularized system allowed them to make quick changes.

One manager had once worked in the DNA assembly department of another company and put their process in comparison as well. This organization had a long, continuous workflow like the one we had just mapped, but instead of the batched, overlapping temporality, it operated sequentially. Every three weeks a new cycle began

and followed each successive step of the process day by day. Technicians working flexible hours, on some occasions twelve-hour days or weekends, make up the work to keep the schedule on track. This kept all the samples in any given cycle moving through the same processes on the same schedule. The workflow was further broken up into three sub-processes and a partnered team was responsible for each one of these sub-processes. As a result, technicians who pulled late hours one week would have a lighter schedule the subsequent week and were also always aided by the emotional and physical support of the other half of their pair.

In short, all three organizations accommodated regular troubleshooting in the construction of DNA sequences, but in different ways: 1) operating dozens of points on the workflow simultaneously in an order that had to be constantly improvised, 2) breaking up a workflow into smaller workflows that were no longer than a day or two, 3) building a thousand constructs at a time in a single continuous cycle that often demanded overtime to keep the operation on time, staggered so that technicians could rest after heavy weeks. All these strategies depended on a technician workforce that can do more than mechanically reproduce stepwise protocols, with an expertise that is difficult, if not impossible, to codify. The regularity of the workflow can only be maintained by irregular work, which can fall into any number of patterns depending on the circumstances of that organization.

Materiality of the Lab

Part of the onboarding process for any biotechnology company I've worked at, visited, or heard about is learning the jargon that's specific to that organization. While these companies might, from the outside, be providing the same service, and while they might share the same basic grounding in molecular biology, they speak in a language of

strange objects that is specific to that organization, takes several months to learn random names, and in no way translates organization to organization. This is sometimes partly done in the name of secrecy and intellectual property (IP is itself a disciplinary force generating difference organization to organization, because value comes from a uniqueness worthy of being intellectual property). But when pressed, no one was all that concerned about the outing of company secrets – the company's value was in these sets of interlocking operations that could not be easily reproduced even by someone working inside the company who went to start their own new company. So, intellectual property wasn't the sort of thing that could be snatched from fragments of an eavesdropped conversation where employees referred to DNA as DNA, and not their company jargon for DNA, say, mules.

At one of the DNA construction companies I visited, they referred to some of the DNA they worked with in their operations as mules, and some of the DNA as stitches. The DNA was a mule or a stitch depending on where it fit into the process, and the distinction is so complicated it's not even worth summarizing here. Part of the reason some DNA was called a "stitch" was because multiple genes had been stitched together in it. Part of the reason some DNA was called a "mule" was because it wasn't meant to be duplicated. But, since that initial nomenclature, mules had become often replicated pieces of DNA, and stitches sometimes only had one gene in them. The initial reasoning naming convention was almost completely obsolete, but it didn't change, not just because certain software programs and printed labels were already in place, but because mules and stitches once embedded in a tightly coupled interlocking process start to take on a life of their own.

DNA had funny names, in house software had funny names, and pieces of equipment had funny names. The cute faux animism of naming a robot "Bumblebee"

was, in part, to be cute, but it was also necessary at a pragmatic level. You could have the exact same version of fragment analyzer, but one is a year older and one year more worn down and synced to a completely different service schedule, or one is closer to the autoclave, so it rusts faster from the moisture, or one is in the sun, or one is closer to the door. Sometimes you can specify or at least guess at where these sources of variation come from, but you can't every last one, much less know how all the sources of variation add up together. Then it becomes necessary for your equipment to have its own name. When I was a lab technician, this all felt a little twee for my taste, and I resisted routinely referring to a piece of operating equipment as "Mopsy," but I caved very quickly, because it's so necessary to distinguish one from the others in the fastest way possible.

Consider in one lab, the eight mass liquid handlers have robot names. Liquid handlers are able to do pipette transfers – which you could usually only do one at a time – at the scale of thousands at once. But they're touchy instruments, and enormously expensive, and so each one was bought at least a year or two apart when the company had enough cash for one. And part of the reason liquid handlers were so touchy was because they weren't being used in exactly the way they were meant to. Liquid handling robots are often talked about as one of the most promising ways to eliminate the sources of variation and human error in the lab (they replace liquid transfers done by hand with a pipette).

But liquid handlers were developed for the needs of the pharmaceutical industry, and not synthetic biology. The pharmaceutical industry needed to transfer solutions of chemicals from one place to another. Synthetic biology needs to transfer solutions of DNA and yeast culture, which are much more viscous, lumpy, and inconsistent. Liquid handlers were not built for yeast, and they couldn't be built for yeast, because synthetic biology wasn't nearly a big enough market to make it worth lab manufacturer's while to

build things for their little start-up needs relative to the multinational Bayer's and Roche's of the world.

So then the people in the synthetic biology lab using the liquid handlers had to be very specific about which liquid handler they would be using, and each had the name of a robot from the movie Transformers. The fragment analyzers (fragalyzer), similarly touchy, an instrument that ran gel electrophoresis at the scale of thousands by running the gel and DNA fragments through tiny copper tubes that easily clogged, each needed a Fragglerock names. Things that were more reliably interchangeable, as far as the technicians could tell, mechanically simpler pieces of laboratory equipment, like centrifuges to separate solids from liquids or autoclaves which sterilize equipment with heat, did not have cute names because it was less important to specify.

Materiality and Futurity

This thing called institutional knowledge seems especially pronounced in materiality of biotechnology and work with agential living things. But something that makes it difficult to parse the more wide-reaching relevance of something like institutional is the hanging question of how well biotechnology works. On the one hand, institutional knowledge might be a much less significant kind of knowledge if we expect that it will go away eventually. But, even more, the entire premise of biotechnology stands on the shaky ground of wieldy life's agency toward productive ends. The agency and natural generativity of the microbe is imagined in synthetic biology to be a key to unlock new levels of productivity, but of course that agency also makes that microbe more unlikely to have the machine-like consistency for industrial scale production (Bennett 2018). Biotechnology is made out of this double bind, and this kind of skilled

work and institutional knowledge might be a symptom and sign of the shaky ground the field is standing on. Or maybe the ground won't be so shaky in another ten years.

Much of the writing to date about biotechnology characterizes the ways a future-more-real-than-the-present shapes the political economies of high technology (Fortun 2001; Cooper 2008; Sunder Rajan 2012). This dynamic is possible and constantly appears in a world where modern imaginations of progress privilege technology as the primary driver in generating new futures (Jasanoff and Kim 2015). This means that technologists, above others, are authorized to make claims about what the unknown future might look like (Hurlbut 2017). This sometimes leads to the kind of discursive act called hype, an extravagant promotion of the potential benefits of a technology. Whether hype is ultimately true or false is less important than the material discursive effects it has on the world: the accumulation of intellectual property, movement of stocks, acquisition of talent, and so on (Sunder Rajan 2006). Hype orients the present and is generative of futures, though not necessarily generative of the futures initially imagined.

And while these elements are often thought about at the level of flows of capital and intellectual property law, these dynamics also at play in the registers of the microeconomic, in the organizational dynamics and work practices talked about in this chapter. Hype affects the movement of broader political economies, and it also affects the kind of work going on within an organization. It effects how technologies get built, the urgency of the timelines they are constructed on, and the types of work that become necessary to keep instrumentation-in-development moving. Hype creates a situation in which humans serve as patches – temporary labor outsourced through Amazon Mechanical Turk, as well as labor on the company payroll continually troubleshooting equipment that doesn't quite work the way it one day might.

The content of the chapter probably reveals that I'm skeptical that a significant amount of these inconsistencies will go away and could ever be worth the money it costs to operate. Synthetic biology has crashed and burned and rebranded and is still limping along – instead of synthetic biology, called biochemical engineering, instead of new biofuel companies, new vegan meat companies, which I anticipate will run into the same problems the biofuel companies did. And all the while, labor is propping the whole thing up.

I've actually been surprised by how often scientists in fieldwork will share a similar sentiment (as one technician described his company to me: "95% bluster and 5% potential"). I attended a workshop on synthetic biology that put engineers and social scientists in pairs to map these types of work processes. During our mapping session, a bioengineer was talking about all the troubleshooting that happened as part of the work process, and reflected that it might be a fool's errand trying to engineer biology – only for a social scientist to then point out that she was talking about the robots breaking down as often as she was talking about yeast doing something they weren't meant to (Hammang and Frow 2020). At the same time, the yeast exacerbate the robot problem and make the interface thornier. But the relative of breakdown of yeast versus robot does open the question of what kind of material is agential.

There isn't even a universally agreed upon definition of what life is (Jabr 2013), and the new materialists have been telling us for several years that the material world is more agential than we think it is. I once talked to an electrical engineer about this paper, once, he said, well, that's exactly what things were like in our industry 30 years ago. Etching a silicon wafer is a precarious 200 step process. Silicon wafers are very delicate and need to be handled with complete sterility. It seems silly to say DNA synthesis is any more precarious.

More recently, I talked to a former chemical engineer who migrated into synthetic biology, who agreed synthetic biology was in trouble, and he was insistent that the thing synthetic biology needed more of was statistical quality control. I was a little suspicious of this idea at first, because at one level it looked like another proposal that with just enough data, we would be able to fix every problem. But that's not quite the point. Quality control operates in a specific way, on the factory floor, so to speak. Statistical quality control isn't data that provides you with causal explanations or accounts of how the world works. Quality control gives you a simple binary yes/no about whether the enormously complex system you're working with "worked," worked well enough, or if you need to take a step back and start thinking about where things went wrong.

Consider the control chart. Control charts are a quality control metric that tells you either yes/no the process you just finished worked well enough. The metric of "good enough" is an average of the percentage of how well the process has worked in the past. You work at a cafe, and on the average day, 10 people out of 500 come back and tell you they got the wrong order. So at the end of the day, even if 10 people tell you they got the wrong milk in their latte, you still know you're in good shape, because that is the historical average of bad lattes in a day. Your control chart gives you the historical average of your quality control metric, with 3 standard deviations above and below that average. If your quality control metric for the process you just ran falls within this range, then that process ran well enough. So, you could see that, hypothetically you made as many as 13 bad lattes, or as few as 7, and still had a normal statistically average day. The window of acceptability for a process is not determined by a Chief Scientific Operator or a peer reviewed article written by an academic lab in Boston – the window of acceptability for a process is determined by the process.

I made a control chart once for a PCR service I operated in the lab. Coworkers told me I had a manic look in my eye after I finished it. I was very excited, excited enough to feel a little embarrassed, but it did kind of feel like magic. Because it's a mode of standardization that's always in reference to itself. I could wade through all the steps to run 10,000 PCR wells with DNA from 30 different people at the same time and then feel confident about whether it worked well enough or if I needed to start over. Because the signal of ok/not ok wasn't coming from clueless overambitious management or an angry scientist or a brain riddled with self-doubt or unearned confidence. It was only in reference to itself.

Control charts and bigger systems of quality control don't fix everything, and they might not even fix synthetic biology. But they're interesting in that they point to a way so many of our technological advances have come from: managing unpredictability and indeterminacies that will always emerge on the ground floor. Control charts come from Walter Shewhart, a method he developed out of a probability theory and – more mysterious – "know how" while working at Bell Labs in the 1920s (Wheeler and Chambers 1992). They were then even more widely applied and proselytized about by the midcentury management theorist William Deming, who played a major hand in Japan's car – and then electronics – manufacturing success after World War II.

Control charts helped develop those industries because unpredictable elements are also a part of making and implementing all kinds of technologically complex objects. Like: a lot of silicon wafer that are especially touchy, or car parts not arriving on time, or putting phone lines into the ground across the world, across radically different soil types, weather conditions, houses, city, state, and national governance contexts. And they suggest biology wouldn't become more engineerable once we've deduced the mechanics of vitality and consciousness with enough data and then appropriately harnessed them.

Rather, it's saying you don't need to deduce causal mechanisms because they can stay bracketed as unknowable, unpredictable – car manufacturing and electronics manufacturing and telephones all had and have their unknowable unknowns too.

What got me very excited about a conversation about statistical quality control, which early on seemed deathly boring, is that it valorizes labor. It says innovation doesn't come from a clever idea from a group of Stanford grads in a room with pizza and Mountain Dew and venture capital, or that it doesn't come strictly from there. It says it comes from dealing with things you're not even thinking to look for, and that's only realized on the factory floor. The fact that quality management is immediately treated as boring is political because it at least partly rests on the assumption that nothing important happens at this level of technological work. William Deming, one of statistical quality control's main champions, as it turns out was a very pro-labor individual.

His writing and theorizing and lecturing often made the case for the kinds of organizational practices my Marxist friends in lab wanted: the elimination of meritocracies, transparent seniority-based pay scales, workplace security, sick days. Deming says you need this because you need people who are ready to deal with the uncertainty that will inherently be on ground floor, and it's better if they can stick around on that floor for as long as possible because knowledge doesn't always translate well floor to floor (Deming 2012). Deming waxes metaphysical about this knowledge – his most famous book on the topic is, the dramatic, *A System for Profound Knowledge* – and he said he hoped the world would remember him as "someone who spent his life trying to keep America from committing suicide" (Yates 1993).

For several years I've increasingly thought of more and more of biotechnology as scientists getting carried away with their own cleverness, and I've said to others that if I could burn down every lab in Emeryville and build a yak farm in its place, I would. But

maybe more than anything else in the last several years, the idea of quality management has mellowed this stance, because it tells me the materiality and the futurity of biotechnology, together, exaggerate a situation that's always at play in technology development. That kind of material agency is exaggerated in newer kinds of biotechnology, where people spend time wondering whether bio makes a very good technology. But the work of trying to get things to work isn't specific to biotechnology, and neither are the elements of unpredictability and tacit knowledge and profound knowledge and institutional knowledge that go along with it.

One of my opening questions in thinking about these sets of materials was how it was the biotechnology company I worked at, founded to make antimalarials and biofuels, was making shampoo ingredients by the time I left the company. There are political economic forces to point to that drive this kind of "diversification," as they called it, but, also, and maybe more than anything, the reason they were making shampoo ingredients is because it would be such an enormous waste to throw all that capacity building away.

Abstracting Life

Part of my half-joke inclination to burn down every lab in Emeryville is the fact that I hate being in the lab. Anna Tsing asks us to notice smell in our ethnographic work – and the lab smells like latex and ethanol, formaldehyde, betamercaptoethanol (the smell of rotten eggs), stale coffee, sometimes someone's cigarettes from outside, outside cigarettes, stale coffee, and occasionally a cloud of cologne from a tour of executives wandering in and out. Which are, respectively, the smells of the practices of sterilization, denaturation, productivity, capital. These aren't smells that are smelly so much they are temporary and disorienting, because the most common smell was no smell at all. But above all, they're uncomfortable, however fleeting, because they're the product of

chemicals meant to arrest, kill, control microbial life, which is not so very different than human life. Abstraction has a smell, and it smells viscerally dangerous.

Abstraction has a feeling too – equally uncomfortable – of quickly alternating between heat and cold, hands sweating in latex gloves next to a flame one minute, digging around the cold room for your back up media plates the next, opening the autoclave to a cloud of steam in your face the next. Spraying everything down with alcohol, it's thinner than water, it dries up faster, your hands dry up from it, or the occasional prick of the needle. The entire promise of biotechnology, and synthetic biology especially, is that the abstraction, universalization, democratization of life itself, and the appeal of that is precisely that we are life itself. And that's exactly what makes the work so uncomfortable, because trying to abstract – manipulate, control – this thing that's so close to what we are.

And the point of that isn't that behind the appearance of science is in fact violence. It's rather the processes of disaggregation and abstraction that are part of the machinery of the organization are experienced in very literal ways – smells, rubber on skin, needle pricks, flames, freezer burns. Labs aspire to placelessness, and the abstraction for that placelessness is violent on the living, and sometimes other living things besides the microbes get knicks along the way.

And these get intensified with the scale that's part of the promise of digitization of life. When I worked in the lab, I would often twitch while I was in the light sleep headed toward dreams, having some level of body memory of the -80 freezer. Part of the operations of the lab were working in these big scales, giant scales, that's the whole value proposition of these biotech labs, doing things at scale in a way you couldn't before. That has a relationship to the big data stuff, doing this big data approach to things, that translates to material in the lab. It's living material though, not digital, so you need to

preserve it and the only way you can do that is in freezers. There are so many -80 freezers, and to work with your materials you need to go into the freezers often. There are so cumbersome to be able to protect you from -80. The threshold is where life stops moving, it's incredibly cold. But we needed to move fast. The burns, more like stings, weren't that terrible, but the sounds things make at -80 degrees were what still makes me shiver just to think about, brittle and inhuman like the sound of rubbing to Styrofoam blocks together.

The other material condition this kind of sterility at these kinds of scales depends on are large amounts of waste. A lot of plastic gets thrown away in the lab. So much so that when a new lab tech is working their first industry job, part of their seasoning period includes getting used to the volume of plastic they dump on a daily basis. A new lab tech often tries to find ways to reuse the plastic pipette tips and wase time contriving all these backbends ways to try to use less, which is ultimately trivial compared to the amount of stuff still needs to go into the garbage bin. Eventually they would get desensitized to constantly throwing plastic in the garbage and give up.

But these forms of wastefulness are their most intense in the movements from outside the lab. Like, spending $50,000 on one enzyme that will last less than a month, while telling someone on the way to work you couldn't give them five dollars. Half hour later, you might be spending $50,000 on Taq polymerase at a desk. And these disconnects, of place leaking into the aspiration to placelessness, the materiality arguably being amplified in the aspiration to placelessness, become even more visible when walking outside the lab and into the city.

CHAPTER 3

EMERYVILLE AND THE UNCANNY

This chapter focuses on the aspiration to placelessness as it exists in the material realities of the city of Emeryville. I focus specifically on the social fact of Emeryville's weirdness, or uncanniness, and the ways this connects specific political dynamics and social histories that place the city in an awkward zone between a "place" and Marc Auge's sense of the "nonplace".

By centering the feeling of weirdness, I show the ways visceral material elements – like industrial contamination, empty warehouses, local developers, the destruction of a sacred shellmound – are part of the conditions for the construction of biotechnology organizations and their moves to placeless universality.

My old job, and later, nearly all my fieldwork with biotech labs, were in a suburb called Emeryville. When I would tell people I worked there, they would almost always say, "Emeryville is weird." And then the conversation would usually stop there, they couldn't put their finger on quite what they meant. But there's a strangeness that hangs over the city that everyone feels, and no one can quite describe.

Emeryville is mostly new condos and big box stores and biotech and software companies, along with some bars and restaurants for people on their breaks. And that's nearly it, because the whole city is one square mile, and a lot of the mile is taken up by freeway on ramps and off ramps. Emeryville is busy during the day with professionals, but people don't stay more than a drink or two after work, and the place is mostly cleared out by night. It has a too new kind of feeling where all the trees are little and twiggy in that way they still need plastic ribbons to prop them up and all the buildings are made out of the same kind of glass.

Emeryville is often read by its Bay Area neighbors (who are the only ones who have heard of it) as an empty receptacle for tech companies, malls, and other institutions of neoliberal capital. But Emeryville is a heightened case to think through the ways the relationship might be read the other way. The conditions of a place like Emeryville allowed for not just a biotech corridor, but also, the first ever biotech company. Cetus Corporation, maker of PCR, was first founded there in 1971, in the abandoned campus of the old Shell Oil and Gas research and development facility.

It's a city that created the entrepreneurial empty space for the bio + tech project and made it possible house the kind of materially complicated organizations with clever ideas that almost never end up making money. It was a strategically developer friendly city and was the first to take up strategies that have since been taken up in Berkeley, San Francisco, and many other cities around the world looking to cultivate their own innovation enclaves.

When I say the "city" made space for this tech entrepreneurialism I don't strictly mean city governance did. When I've asked the city officials involved in Emeryville's urban renewal period from the 1970s through the 1990s, they don't claim credit for engineering the entry of biotech and internet tech companies into the city. The tech companies, along with the big box stores, are just the ones that moved in when the city was trying to make deals with developers to clean up and build out the abandoned industrial wasteland that Emeryville had been since the midcentury.

It just happened, not strictly through city planning documents or philosophies of urban renewal, but through diffuse elements of the city. These are elements that exist in other cities, but they exist in a heightened way in Emeryville such that Emeryville crystallized them first.

To think about these diffuse elements, I take a step back from tech and biotech and city planning and instead center the inarticulate weirdness everyone in the city seems compelled to comment on. I focus on the weirdness, following Timothy Morton's proposition of object-oriented ontologies. There have been several thinkers in the ontological turn of the last decade, who suggest the humanities and social sciences have directed too much attention toward epistemology, rational thought, and straightforward social agency, and that we now need to reorient toward the material world (Bennett 2010; Barad 2006; Kohn 2015). Timothy Morton says a way to locate material agency and characterize more sophisticated ontological understandings of the world is in identifying felt moments of the uncanny.

The uncanny is a felt reality of unsettledness. It's a phrase first coined by Sigmund Freud, in a strange, mysterious, and somewhat ultimately unsatisfying essay. Freud introduces us to the uncanny as an effect that "is often and easily produced when the distinction between imagination and reality is effaced, as when something that we have hitherto regarded as imaginary appears before us in reality" (Freud 1955 [1919], 14). The uncanny is some sort of stimulus that is so confusing, it confuses our sense of reality itself. Freud walks us through strange dreams, Sandman mythology, severed hands, an image of you seeing the back of your own head without a mirror, only to wrap things up into a tidy a bow by the end: nothing to see here, just an unconscious projection of previous experiences.

But Freud also identifies the uncanny as a feeling emergent from things existing in an unsettled space between categories of understanding. The uncanny is most invoked today while thinking about artificial intelligence and other human simulacra – the bad feeling robots or CGI get when they start to approach human likeness while still missing the mark. If something is uncanny, it's in between two things in a way we can't

immediately place and triggers some level of a warning signal. Timothy Morton suggests the uncanny signals a material agency, aspects of the physical world breaking through from one assigned category into another (Morton 2013). It's a moment that defies understandings of the world as inert, knowable, and controllable. Focusing in on those moments of breakthrough, that we know are happening because we feel them in a visceral way, might help us make better sense of a more fluid and unsettled ontological reality.

Something about Emeryville strikes people in just this way. Which is interesting because at one level, Emeryville isn't any different than a hundred other kind of places in California. It's what Marc Augé called a "nonplace," the kind of place defined by its absence, meant to move people through interchangeably: shopping malls, airports, parking lots, condos, business parks (Augé 2008). Emeryville is the exemplary nonplace, but it's also not a nonplace at all because so many people need to remark on its weirdness even if they don't know what to say beyond that. Or they only have a half-articulated explanation – "I bike through it sometimes and it's weird. Its size is weird." Or "No one really lives there," or, "The whole city is an IKEA parking lot." Or "did you know the town used to be a dump?"

In the spirit of centering different modes of causality, through a focus on place, I'm going to decenter the forms of human agency exercised in the development of technology or the planning of cities, and instead center this weirdness. Even people's vague intuitions – the city's size, its IKEA, its dirty industrial past – start to point to specific histories and political dynamics. These are points with interconnections that prompt the feeling of strangeness within the otherwise unremarkable. When you follow the points far enough, a different picture of the city starts to emerge than the empty receptacle.

In the rest of the chapter, I start with moments of weirdness in moving through the city in the ethnographic present and thread these to older histories. With this version of a city history, I then return to the period of redevelopment and emergence of biotechnology and retell their emergence from the forms of material causality that we see once we start seeing the uncanny.

Its Size is Weird

I started looking for information in those half-articulated explanations people seemed to fall back on. “Did you know the town used to be a dump?” Told to me while driving my coworker, a fourth generation San Franciscan to work during a public transit strike, on our way to work. After a half hour awkward, stilted car conversation, she probably saw she struck a nerve and kept going – where the Pixar campus is now used to be a giant car dump; the city used to be overrun by brothels and gambling dens; the bougie restaurant where the executives eat lunch? Townhouse? Used to be a brothel and it’s where the old mayor who pretty much ran the police got busted by the FBI. After the FBI raid, the developer who built our building, and built all the buildings around here? Wareham, the Wareham guy? He bought up all the properties in the 1980s and turned the city around. I was delighted by all this information, and when I told it to my other coworkers once I was in the building, they liked it too, especially 80s Wareham guy. They imagined 80s Wareham guy, alone in an abandoned paint factory, on top of an Iron Throne, surrounded by piles of cocaine – and we all thought that was pretty funny.

80s Wareham guy wasn’t actually ever sitting alone on an Iron Throne with piles of cocaine in the shell of what’s now an office building, as far as I know, but the point of 80s Wareham guy is a certain tone, and how easily all this stuff starts sliding into the register of urban legend. Emeryville’s weirdness is a social fact – people remark on it or

shout “yes!” when you ask them about it – and it’s difficult to pin to material facts. But its weirdness has a relationship to the rapidness of turn around, dump to biotech corridor, the transformation of something sinister to something clean, and the sense that something sinister is still beneath the clean. Emeryville has this feeling, something too careful and manicured, with a lot of shit just under the surface.

There’s the intuition: “I bike through it sometimes, its size is weird.” The city is mostly a narrow, one-mile strip that borders Oakland with no obvious relationship to any geographic features. It only manages the square mile because of landfill built west into the San Francisco Bay for the Watergate condominium complex, which is also built in a way that it’s mostly inaccessible to everyone except the rich people who live there. The result is most movement through Emeryville is experienced as a tiny sliver in front of the bay shore; or as five minutes in the car from the north of Oakland to the south of Berkeley; or as a walk through manicured business parks and streets with traffic only during rush hour and eerily quiet after happy hour. If the walker walks east any longer than ten minutes, they’ll find themselves at Oakland’s San Pablo Avenue, with speeding traffic, aging storefronts, and many more unhoused people on the sidewalk.

The abrasive transitions are partly the product of the nineteenth century liberalism that helped create the city. Emeryville’s incorporation in 1896 was mostly read at the time as a move by local entrepreneurs to avoid annexation by Oakland. Emeryville is so small it would have made sense for it to be a neighborhood in Oakland but being part of Oakland might have meant letting go of a lucrative red-light district, the West coast arm of a nation-wide gambling ring, brothels, and saloons (Perrigan 2009). The city was also safe haven to a thriving chemical industry that included iron mills, paint factories, and oil companies.

After postwar de-industrialization and a period of economic depression, a pro-business city council in the 1980s steered a redevelopment through generous deals with big box retail stores, high tech research campuses, and housing developers. The result was an almost unparalleled economic boom in the region. But some have argued this turnaround was made possible partly by the ways it failed its residents in nearly all metrics of social services and has shifted these burdens onto neighboring cities (Greenwich and Hinckle 2003). In this way, the strange size and border with Oakland is not just a quirk of the city, but fundamental to its liberal, then neoliberal manipulations of geographic space.

You feel these at the level of a bike ride through the city that seems a little funny – or see it in the irritation expressed on Emeryville's East Bay local wiki page for city officials and local residents' reporting all crime as "on the border with Oakland," when the city is so small that "everywhere is the border with Oakland" (Local Wiki 2014). There's a meaningful consensus of suspicion toward a neighbor shirking accountability. Emeryville can be business-friendly and crime-lite because of its borders, which attract business in with tax increment financing and keep others out with the police.

The dynamics also play out in an interview with council member Nora Davis about what kind of city she was trying to build while overseeing the city's urban renewal. She laughed at the ideal of a "vibrant city" and spoke the virtues of the kind of place where, "you call the cops, you got a cop on your door in 5 minutes. Unlike across the street, in one of our neighboring cities…"(Arias 2015). The emphasis on police presence and the ever-present specter of Oakland make obvious the ways this nonplace can only be a nonplace because of the ways it's embedded in a metropolis places.

The borders can be manipulated, politically, and the physical experience of being at the city's borders is possibly the strongest sense of the city's weirdness. It's a sudden

rupture, where two very different kinds of populations interact with each other, encounters that aren't controlled for, aren't meant to happen, between beneficiaries of Emeryville's policies and the nonbeneficiaries. Like in the Emery-Go-Round, the cheerfully named shuttle which takes tech workers from the closest transit in Oakland to the major business parks of Emeryville. Long before Google busses, the city and the local developer Wareham coordinated a public-private partnership to ferry people from the closest transit station at Macarthur Station in Oakland to the main business parks around Emeryville, for free.

It's been hailed as a clever innovation to transit limitations in a city, now widely replicated by other tech shuttles around the Bay. I've also heard it called, by the people who ride it, a fucking horror show. The material experience of an Emery-Go-Round, which I took twice a day nearly every day for three years, is a tiny, cozy shuttle, ferrying the two types of people that would be on a free business shuttle: people on their way to tech jobs and unhoused people looking for shelter. People in Patagonia, or suits, are side by side with people living on the streets, literally side by side, since the shuttle is so mall, and there's almost no one in between these two extremes. If, once at your lab job, you are in the habit of spending $50,000 on just one of the reagents you use every three weeks, something about this picture starts to feel obviously wrong.

Green Goo

During fieldwork, I met a friend of a friend of a friend who lived on a houseboat on the Emeryville marina, and I asked him if it was weird, and he said it was, and when I asked him why, he started to tell me a story about his friend. His friend grew up in Emeryville, and the Sherwin Williams paint factory was a mile away. When he was a little boy, and when the wind was blowing in the right direction, he and his friends would play

a game where he would stand in front of a building and stand still as long as he could and make an outline of their bodies with the paint blowing toward them.

The toxic waste in Emeryville is maybe everyone's favorite thing to talk about. Newspapers through the redevelopment period quoting city officials seemed compelled to lavish a poetic relish on the chemicals and industrial destruction in the city, "a ghostly apparition of tattered warehouses and dead industrial buildings" (Wasserman 2001); "a stigmata there"; "a devil's cauldron" of "solvents, heavy metals, and 44-gallon barrels of chemicals buried before"; "the orange blog from the pigment factory. 100,000 gallon vat of acid. Ground bubbling with acid. It had white streaks from where the arsenic was. You could see every time it rained this pollution was flowing out readily into the Bay" (Cediel 2005). Earlier turn of the century newspapers seemed unable to mention Emeryville without mentioning its terrible stink on hot windy days of meat carcasses, dumped into the Bay by the local butcheries.

A history of toxic waste is part of the weirdness, and part of the weirdness is about contrasts. People like to talk about an old dirty Emeryville right beneath the new. The uncanny is partly an effect of the new paving over old a little too quickly, disconnected from the accumulation of time in the rest of Bay. This is what the editor of the neighborhood news microblog *Eville Eye* suggests. We meet and start with some straightforward questions about urban renewal and eventually see I can say what really interests me about the city is its inarticulate weirdness. Oh yeah, he says, Emeryville has an aura. When I ask him to speculate on where that aura comes from, he seems unsure, maybe that there's old vestiges of the city just beneath the very new.

But the contrast of the old/new is a contrast like imaginary 80s Wareham guy in an empty warehouse full of piles of cocaine, before he turned it into the bright shiny biotech building we were all working in. It was so dirty and now it is so clean, but the

cleanness depends on the dirtiness in a very direct way. You don't get a glittering building out of the 1980s without some sleezy business guy doing tons of blow to keep himself and everything else going.

And the trash dump of yesterday does have a direct relationship to the seeming sterility of Emeryville now. The trash, and the unusual combinations of trash, trash and waste so totalizing it covers the full expanse of the city, is paradoxically what also enabled such a sudden, totalizing city redevelopment, because the entire city qualified for money for redevelopment programs. The heedless industrial destruction of Emeryville became a windfall for the city.

As Emeryville city officials have told me, early the full square mile of Emeryville qualified as blighted, which qualified it for California redevelopment funds. This was a law, passed in the 1950s, that since became very controversial. Redevelopment law said that if a neighborhood qualified as blighted, any increase in property value, for that chunk of property tax to go to redevelopment. The idea was to incentivize redevelopment and create a kind of runaway effect – the more a city could increase the property value of their blighted neighborhoods, the more cash they would have at their disposal to keep increasing the property value.

What became controversial about Redevelopment Law was the way it redirected resources away from public services like schools, roads, and public transportation and toward private developers. It also allowed the privileges of eminent domain to be wielded for private companies, not just public works. Redevelopment money had leeway, and that leeway, in some of its worst moments, was directed towards things like golf courses in Palm Springs, or a $7 million mermaid bar in Sacramento. The mermaid bar, just outside the state capital, was the last straw (Skelton 2011), and Redevelopment ended in 2012.

The mermaid bar gives you a sense of the types of power put in city's hands by virtue of its blighted neighborhoods, and the power that would be put in the hands of a city with 90% of its land in a redevelopment zone. It could be very welcoming to developers, and in a way it had to be because of the ways federal laws around environmental clean-up work.

One of the things the city pioneered was its work in brownfield redevelopment (Wasserman 2001; Dayrit et al 2002; National Service Center for Environmental Publications 2007; Perrigan 2009; Hemsley 2016) Brownfields are old, abandoned industrial sites (brownfields in contrast to greenfields, uncontaminated unused land). Brownfields are a classification from the EPA, a tier below superfunds in terms of contamination level. Superfund sites are toxic enough to get a clean- up overseen and conducted by the EPA. Brownfields are a lower priority for the EPA, and while the EPA has some money and some advice to offer for local brownfield redevelopment, states and cities mostly need to work out for themselves how they'll clean up the mess (Eisen 2007).

The main legislation launched by the EPA was the Brownfields Program in 1995, a program to incentivize developers to clean up old brownfield sites and build new properties on them. To coax a developer to build on a brownfield, instead of a much less risky greenfield, incentives were necessary. If a city could declare a property a brownfield, they could give a new set of tax breaks to its developer, and some money to help them in the clean-up. So to have an economically blighted area on top of an industrially contaminated one was in some ways a double boon. The industrial decay became a huge windfall for a city entirely consumed by industrial decay as the EPA was first coming online in the 1970s.[4]

[4] Which makes Emeryville's redevelopment success an interesting counterexample to the narrative that environmental regulation is bad for business (BondGraham 2012).

But the windfall only came through a permissive relationship with developers, and this relationship has its limitations. Most developers like to develop simple projects that clear through regulatory tape quickly, like big box stores, and IKEA and Targets are the Faustian bargain for getting toxic waste out, or most of it out. The Brownfield Redevelopment program has its critics, including the Center for Public Integrity, who points out developers clean up with no federal oversight and no standards for clean-up and no verification even that any work was done. The developer dictates the terms and, "the result is a level of trust unheard of in other contexts" (Eisen 2007). The EPA has bigger superfund fish to fry, and some of the arsenic and chromium gone is better than none of it.

City officials are also straightforward about the fact that environmental remediation is a new and not at all a straightforward science. Aside from being handled by several different regulatory structures, every kind of contamination requires a different approach to remediation. Often, when you arrive on the land, you have no idea what's in there. You do your best to find out what's there, and then different chemicals will get treated in different ways.

Very rarely is there just one toxic chemical in the ground, and the multiple chemicals are probably interacting with each other in additionally complicated ways. Lead or arsenic is different than lead and arsenic. The waste might also be leeched into the soil, or into harder sediment, or worst case, might have made its way into the groundwater. Sometimes you can put in tubes to vaporize chemicals. Sometimes you vacuum dirt out, treat it, and send it back in. Sometimes you put up a barrier to keep it from getting into the groundwater. Most often, you can't meaningfully reduce the toxicity, so you dig up the dirt and send it to an incinerator. If all else fails, you put a big cap of concrete on it and make sure no children or elderly people are on the ground floor.

A city manager explaining this to me explaining the complications and strangeness of environmental remediation hits the point home by telling me his favorite remediation story, of a crew cleaning up an old chromium plate plant transformed very toxic hexavalent chromium into harmless trivalent chromium by spraying the site with thousands of gallons of cottage cheese.

Managing the toxic waste also interacts with city boundary manipulations, like when Richmond (neighbor to Emeryville) residents woke one recent morning to a pile of PCB contaminated dirt under a tarp in an empty lot near homes and an elementary school, sent over from an Emeryville developer. They sent it, specifically, to the now fallow site of the old Pixar headquarters, Pixar originally founded in Richmond and later lured to developer friendly Emeryville, and the irony was not lost on Richmond resident Edie Alderette-Sellers who lived nearby: "Emeryville took Pixar out of Richmond and literally shipped back to us toxic soil. That's how it feels. It's a real kick in the teeth" (BondGraham 2016). Wareham responded that although though there was a tarp that said it was contaminated with PCPs, it wasn't at an actionable level of toxicity.

Local muckrakers keep their eyes peeled for sinister colors at construction sites. A local blog posted pictures last February of a Lennar construction site with green goo seeping out of the ground. Lennar put bigger fences up, and then the blog posted that no matter how big Lennar's fences were, their green goo would still be spreading to the rest of Emeryville on a windy day (Donahue 2020; 2021). I heard a rumor that a major remediation project in the city was declared complete based on whether a tomato could grow in the soil or not – and it did. I've heard other stories I've been asked not to repeat.

A lot has been cleaned up out of industrial Emeryville, but plenty is still there. So, the weirdness could be a very literal material sensitivity to toxic chemicals, the old paint still getting to us on a windy day. Which would make the uncanny less the quick

turnaround from dirty to clean, than the terribly dirty right beneath the clean, the veneer covering over the toxic sludge with unclear effects on the people walking over it.

Or that might not be it. The Emeryville news blogger who speculates the city's aura comes from the old and new fused together wants to change his answer. He asks, well you know about the shellmound right?

Shellmound

I first heard about the shellmound during a bad day at work. About six months into working at the biotech company, I was having a meeting with my manager, and I started seeing spots and felt like I couldn't breathe and like I might die. When I said I couldn't see and felt like something was wrong, he asked me if this was my first panic attack. I said I guess so, because I didn't realize that was what was happening, and he reassured me that it was ok, and that this happened to people here all the time so I shouldn't feel bad about it.

And then he said, I should get out of the building to relax a bit, and recommended I take this walk to the Bay Street shopping mall, that it was about an hour there and back, and that there was this fucked up sculpture that I might like to see. So I went on the walk, and just outside the parking lot to the IKEA, there was this grassy mound with these basket sculptures and these placards about the Ohlone Native American tribes. It was really confusing, why this was in the middle of an IKEA parking lot, this mound and this basket and these random facts about Ohlone.

The IKEA parking lot is on Shellmound Street, which is called Shellmound because it used to be where the world's largest shellmound in the world once was. Shellmounds are sacred burial sites you find by oceans, where people are buried in abalone and mussels and dirt and ash are packed on top, and it builds and builds and

this one was so old it had hundreds of Ohlone buried in it. Shellmounds used to completely surround the Bay, and Emeryville's shellmound was the biggest, almost four hundred feet long, sixty feet high, and thousands of years old.

They Emeryville shellmound survived settler colonialism longer than most shellmounds in the area, until 1920 when it was leveled to make way for a paint factory. And then paint factory was abandoned and brownfield redevelopment and urban renewal attracted Madison Marquette, a developer with aims to make a shopping mall, but who first needed to clean out the lead and arsenic in the ground. Eventually, it got out that there were still bodies underground.

Word got out because, according to California law, if any pre-settler colonial architecture or remains get dug up in a development project, developers need to bring a "most likely descendent" on site to consult. The first most likely descendent, initially hired by Madison Marquette to consult on a cryptic "archaeological problem," got fired, and word of the bodies got through to organizers in the local indigenous community who started activating protests around the issue. Accounts about the dig and the protests that followed were captured in the documentary *Shellmound* (Cediel 2005).

The documentary interviews the most likely descendants that were on site, along with the white archaeologists, and local historians involved in the development. One incident multiple people bring up is someone dragging a backhoe along the ground and pulling up skeletons: "There was a lot of human bone over the site. It was a matter of just dragging backhoe along ground" (Chuck Striplen, of the Ohlone tribe). The archaeologist on site, Heather Price said:

> *"When he pulled the backhoe, and immediately it exposed several skeletons. It was just one skeleton after another, they were packed next to each other so closely. But they were so saturated with this stuff, none of us wanted touch it even with gloves on. Many*

different kinds of ooze. One that made bones rubbery. This was probably the worst I saw: you picked up the bone and this orange and black oozy goo would run out of it."

People talk about everyone on the crew being sick and being unsure if they were sick from the physical effects of the chemicals or the psychic ones of a desecrated graveyard. Heather Price again:

"Some people feel it. Some people don't feel it. I think I feel it. I get very uncomfortable when I get near it even though I don't think I did a bad thing being out there. I served as a witness… I think it's a very toxic place. I can't imagine wanting to spend too much time there. I can just keep remembering the sounds and the sights. It's not a place to live. It's a burial ground. A contaminated one."

Kathy Perez, Ohlone tribe:

"I got this overwhelming compulsion even though I know the ground was toxic and anything you touched there could contaminate you, I couldn't help but pick up bone fragments. A jaw actually was what it was. I picked it up and dug a hole and covered it up and said, 'Forgive me'… Inside I was feeling this emotion of wanting to scream, wanting to cry at the same time. And every time I think about it, it's a place I don't ever want to set foot on again, not because my people are there, but because of what has transpired…. This is a cemetery like any other cemetery. And if you walked on that site before it was developed, you would have known it, you would have felt it. You would have seen it. You would have had the same feelings I did."

The documentary also covers protests and legal action attempted by the local group, Sogorea Te' Land Trust, an Ohlone group organized to reclaim land in San Francisco's East Bay. They wanted to protect the sacred land, or at the very least be able to rest the bodies somewhere. But the developers said the land and the bodies were too toxic because of all the paint that had seeped into the ground the last century. The most toxic parts (along with the bodies within them) were sent for destruction to an

incinerator in Texas, and what was left was capped, by concrete and asphalt, and turned into the parking lot.

The one concession required of the developer Madison Marquette was a memorial to the shellmound on the mall's grounds. It's confusing to encounter the memorial with no context – a fountain coming out of a mini-shellmound next to a series of stones engraved with a misleading history of indigenous peoples in the area. There are facts about shellmounds, mostly described as piles of waste, and about Ohlone, described entirely in the past tense, and as having abandoned the area 500 years before the Spaniards arrived. You would have no idea why this tiny outdoor museum was built right behind P.F. Chang's and mostly out of view of the rest of the mall. Probably because there's no reasonable way for a mall to commemorate something it helped destroy. But the memorial still does work in the world, radiating a vague sense of something being only half acknowledged and something else being avoided.

Aside from confusing the occasional stray shopper, the memorial has also been co-opted in ways never intended by its developers. The shellmound memorial has been the site of a now twenty-year running Black Friday protest organized by the local indigenous Ohlone activist group Sogorea Te' Land Trust. Andrés Cediel's documentary captures one of the events where protestors hold signs, burn sage, and hand shoppers maps marking known locations of bodies under the mall. The reaction of the mostly white shoppers is mixed, usually defensive or hostile, a handful respecting the boycott and leaving, but all made aware of the ground they stand on. This nonplace within a nonplace, the generic fountain inside the luxury mall inside the business suburb, has become a site for activities far outside the monetary exchange the nonplace was meant to facilitate – activities convened precisely because the nonplace was built to systematically exclude them.

The Bay Street Shopping Plaza was a major site of property damage in the Bay Area during the 2020 summer uprisings in the wake of the murder of George Floyd. The local news blog captured some of the tweets from the evening:

> *"People online are mad that people are going to Emeryville strictly for looting instead of protesting. Emeryville is a literal neoliberal hellscape of big box corporations that go there for the tax break, built on the stolen shellmound, a sacred burial site."*
>
> *"I'm going to guess most of those young people would have been less compelled to loot Emeryville if we had an economy that hadn't screwed them over repeatedly since they were born."*
>
> *"I'll be clear. I don't care about Emeryville. I live on the border of Emeryville and Oakland. Emeryville is a corporate tax break playground built on top of indigenous land, whose residents claim that the only crime there is when Oakland residents go there."*
>
> *"FUCK EMERYVILLE & BAY STREEET MALL!! It's literally called Shellmound St. because they tore down sacred Ohlone shell mound burial sites to develop it. Liberate ever pair of Vans and piece of makeup from Sephora then burn it to the fucking ground."*

The article summarized the tweets: "Some of the most retweeted comments pointed out Emeryville's 1924 Ohlone Shellmound destruction, our city's affinity for 'big box' retail and willful participation in capitalism as justification for this looting. That this was a form of 'reckoning' for Emeryville's past and current sins" (Arias 2020). The damages in combination with the nation-wide decline in the brick-and-mortar shopping mall, accelerated by the pandemic, have induced a progressive emptying of the plaza, whose vacancy rate teeters on the cusp of a ghost mall.

Huey Newton in his early writing as founder of the Black Panther Party, said that riots were a form of proto-political action, a rage and intuition of something

systematically wrong, without political tools to identify those systems (Bloom 2016). These ideas were cultivated in Oakland, and parts of North Oakland on the border with Emeryville (the famous picture of Huey Newton in the peacock chair shows their address as a P.O. Box in Emeryville). His affirmation of the riot has since been taken a step further – as evidenced in the tweets above – not proto-political, but a form of the political, when every other route to political action has been systematically closed down. And it's resonant with this idea that you can feel things without necessarily knowing the particular history of Emeryville or Oakland and their border: something seems obvious about the fact of walking a half mile east and taking things from the luxury shopping mall when you're not being paid enough.

Christina Sharpe's work to refigure ontologies of racial violence is helpful in reinterpreting the nonplace. Her reflection on residence time, a term borrowed from fluid dynamics, draws attention to the material presence of death, specifically, the bodies of enslaved people thrown overboard in the Middle Passage which remain four hundred years later as atoms in the ocean (Sharpe 2016). A nonplace is created through an act of leveling, of covering over a former place, but erasure is only possible in a strictly modernist imagination. A mall is built on the concrete that permits a nonplace, but something else is still beneath the concrete, at the level of local knowledge, or a weird feeling, and even in the most literal physical sense.

The act of leveling isn't so much an erasure as it is an action with material effects. A burial site becomes a different thing in the world when it is so saturated with toxic paint that the human bones have turned the color orange and the texture of rubber. A sacred site that has been desecrated is biochemically different than one that has been honored. The difference amounts, in this case, to a bland fountain where people convene for twenty years to pass out maps of the bodies underground and cultivate forms of

resistance that may prove to eventually kill the mall. The place never leaves the nonplace, not only because old histories live on, but because the very act leveling continues to build on the legacy it seeks to destroy.

Real Presence

In *History and Presence*, Robert Orsi re-examines the metaphysical debates in the sixteenth century about the presence or absence of presence in the host – a debate which the Catholics lost and Protestants won with respect to the dominant social imagination (Orsi 2018). He then asks his readers to imagine an alternative history: what it would mean to write history with the real presence of special beings.

Weirdness suggests a kind of real presence, bubbling up in secular language. And at some level the coining of the idea of the uncanny can be read in this way. Freud has become a figure of high modernity and scientific paternalism that gets reflexively contrasted with his student, Carl Jung, and it's easy to read his essay as Freud being needlessly scientific and paternal toward materials that obviously defy those kinds of instruments. Jung might have been the one tripping on mescaline and painting illuminated manuscripts so he could write about synchronicity and the like (Jung 2009), but Freud is also a figure that sits between both the worlds of scientific and the unscientific.

If you go digging deep enough into his personal life, he was spending his weekends at pagan revivalist retreats in the Swiss Alps (Josephson-Storm 2017), and even psychoanalysis was the end result of a quest to translate the therapeutic effects of hypnotism into a more enduring and scientifically verifiable procedure that could sync with the medical establishment (Kline 1958). Even Jung didn't publish the Red Book and show all his cards until after his death, and both were careful about how closely the could

toe the line without getting pushed into a no man's land of pseudoscience. Read in that way, the uncanny is a concept rooted in this kind of intellectual work to rework boundaries of science in modernity.

Weirdness could be read as a kind of corrupted real presence. Which isn't the same as haunted native American burial ground trope, though that trope likely is at play in some of the ways the shellmound gets talked about and more broadly remembered at the bottom of the mall. But the idea that the land is still sacred, even if it's been desecrated is a different point. The land is charged. There charge can have sinister forms – meat carcasses get thrown into the Bay at night, paint gets dumped and turns bones the color of orange and the texture of rubber. The charge can have an inarticulate awkwardness. But in all these forms is a kind of radiance.

Corinna Gould, one of the primary organizers behind Sogorea Te' Land Trust has said of the Bay Area shellmounds: "It doesn't make it any less sacred because now there's a parking lot on top of it or there's a mall on top of it or there's a school or bar or railroad track on top of it" (Roosblad 2019). Which starts to open up a different understanding of place. [5]

The sacredness of a shellmound under a parking lot is part of an entirely different ontology of the sacred and ethic of place in secular modernity. It's different than the ontology and ethic that designates the Notre Dame or Coliseum or pyramids or even the California missions, or other historical-spiritual sites recognized as significant in the

[5] I focus here on Sogorea Te' Land Trust's language around the shellmounds because they are the organizing group that's been most active in trying to reclaim the Emeryville shellmound. But, in focusing on Sogorea Te' Land Trust, I leave out a considerable number of other Bay Area indigenous perspectives on the land and the shellmounds. This multiplicity is especially important and complex in the ways there are more federally unrecognized indigenous tribes in California that any other state. Thanks to religious studies scholar Abel Gomez for walking me through some of these dynamics. In future drafts, it would be key to capture a more multivocal account of the shellmound, minimally through the already existing extensive documentation of the archaeological digs done with the Muwekma Ohlone Tribe (Muwekma Ohlone Tribe n.d.)

European gaze – some of the comparisons made in arguments against protection of the shellmound (Egelko 2021). The Notre Dame or Coliseum are historical, sacred, protected because they are big sturdy buildings frozen, for the most part, in their original form.

The shellmound controversy makes visible not just the political mechanisms by which indigenous stewardship and land back reparations are considered and then swept aside. It also makes visible a very different understanding of place – maybe not one with enough traction to get land back through the 9th Circuit Court of Appeals in 2021, but one with enough traction to get published in news outlets constantly and inspire people to smash windows in the Bay Street Shopping Plaza.

Religious studies scholar who does work with Ohlone groups, land reparations, and the shellmounds. He says he loves the shellmounds because there's because Californians always say we don't have history in California. And yet the San Francisco Bay is covered in these things that are 4000 years old.[6]

The shellmounds are thousands of years old, and the shellmounds are covered by parking lots that are twenty years old, but the shellmounds are still there and they still count. As Corinna Gould says, it doesn't make it any less sacred because now there's a parking lot on top. And that's a beautiful and arresting idea entirely beyond the particular case of the Emeryville shellmound. It suggests there's redemptive possibility for all our nonplaces, and that they were never really nonplaces to begin with. You can level things, but the steam still leaks through. You can't erase history even if you try.

Part of what makes Sogorea Te' Land Trusts organizing so effective and sympathetic is that they're taking land that has been desecrated, that is being used in an offensive way. The people hate parking lots, bougie condos, and Forever 21s. It seems

[6] Abel Gomez' manuscript in progress and podcast appearance on this topic (Gomez, n.d.; Rizzo-Martinez and Stonebloom, n.d.)

obvious that the land could be going to much better use under different stewardship part of Sogorea Te' Land Trust's work involves sharing what they will do with shellmound sites when and if they're reclaimed: a shellmound reconstructed to its original height, covered with grass, planted with poppies and redwood groves. This is effective as it is, not just because we'd all prefer a park to more condos, but again, it's not just any park: it's a park affirming something older under the ground.[7]

I went to a talk Corinna Gould, one of the leaders of Sogorea Te' Land Trust, gave at the Berkeley Art Museum and Pacific Film Archive (BAMPFA), and one of the things she said was, you all benefit from the shellmounds, all the thousands of years of prayers my ancestors laid in the ground. There are magic movements here. Anyone that's lived here knows that. The All Indian Movement, the Black Panthers, the technology. It's because of the prayers my ancestors laid down. When she says this at BAMPFA, the audience of mostly white people claps very loudly. It makes sense to the crowd.

Mudflats

The Emeryville mudflats were a part of Emeryville in the 1970s and 80s,where people used to build big sculptures out of driftwood on Emeryville's shoreline, right next to where the i80 freeway goes over the Bay Bridge into San Francisco. Anyone of the thousands of cars driving into San Francisco everyday saw them. These were guerilla sculptures, often built up at night, of: windmills, airplanes, giants, sphinxes, spaceships. They were big, ephemeral, new ones would go up and old ones would go down every day and enchanted many Bay Area residents.

The sculptures started out of a California College for the Arts sculpture class that built a final project in the mudflats. When one of the main organizing artists was asked

[7] https://shellmound.org/

why Emeryville, of everywhere in the Bay, he said, "I chose the Emeryville flats because they seem to be the catch-all for all the debris that floats into this part of the Bay" (Enos 2016). I've re-read this quote several times, because I've been unsure if Emeryville is "the catch all for debris" in the metaphorical sense – a symbol of industrial decay – or the literal sense – a point in the water where things collect. And likely, it's both.

In both senses, there's something extravagant and fecund about the decay in 1970s Emeryville. "The post-industrial sublime," to use a phrase from Thom Anderson in his extended video essay *Los Angeles Plays Itself* (Andersen 2003). The post-industrial dystopian Los Angeles of *Blade Runner* is sublime because it's in one sense a hopeful portrait of the future. The city, for once, is full of people walking in bustling streets, absent of cars, free rent at the Bradbury Hotel – something more beautiful emerges out of the grimy decay. Making art out of trash for thousands of people on the highway is another industrial sublime.

The symbol of possibility of life out of ruin was potent enough to have a significant influence on a fateful summer solstice party in 1986. The part had been a long running summer solstice party just for friends on Baker Beach, until one day, they decided to build a man out of the driftwood on the beach and set him on fire – the first of what would become the annual tradition of Burning Man. The San Francisco writer Gary Kamiya suggested the Emeryville sculptures were the source of inspiration, and if you compare pictures of the mudflat to the first burning man, they look like they could have been taken in the same place (Kamiya 2013).

The moment the summer solstice party started burning a driftwood effigy was just before the moment that the mudflat sculptures were getting cleared out for the urban renewal and environmental remediation underway. It was a period of time nearly everyone in the Bay was driving by the sculptures on a regular basis. While no one's on

record saying they were a direct influence for the first bonfire, one early organizer did say the mudflats were the inspiration to move to the Nevada desert: "The Black Rock's this sea of nothingness, and setting art on the desert reminded me of these sculptures in the mudflats of Emeryville that I admired as a kid" (Wieners 2012). In one way or another, the mudflats were the inspiration for the ultimate counterculture desert dystopian cosplay of the possibility of life in the ruins.

The mudflats made possible a fecundity of trash to collect and rebuild and have witnessed by a road thousands of people could see it every day, and to be reproduced in a desert in Nevada every year, and in turn, be reproduced in knock off festivals around the world.

And pre settler colonialism where most of the food was and was where most indigenous people were thought to have lived pre-settler colonialism – not sandy foggy San Francisco, but Emeryville was the site of activity. The silty mudflat was actually supposed to have been the richest, most diverse site in the whole world after the Pleistocene (Reynolds 1980). It's likely how the biggest shellmound in the world ended up there. And it's also what allowed redevelopment and environmental remediation to happen the way they did in the city. It was a blessing for the city's renewal was the ways the toxic soil could, literally, be renewed. You could sweep off the loose mud and sand, renew, in a very physical literal sense, compared to renewal that hinged on remediating toxic chemicals that have gone into hard rock.

Redevelopment and the Birth of Biotechnology

"Magic" in Emeryville is spontaneously invoked again to me by a man who did work with redevelopment period, when I was trying to understand how the city had this remarkable, fast turn-around from abandoned factory town to business burb.

He tells me how he got Emeryville the Bangemann Prize, that put it on the map for more EPA money. How Emeryville was able to get this money was he was from Sweden. He had this proposal for Emeryville to apply for this off-brand Nobel Prize from the King of Sweden. He said I'm going to pick kind of obscure category on this day there was this giant blowout with Oakland police, border, something huge happened, and then they had five minutes for his long presentation and, with other things on their mind, gave him the go ahead without much follow up.

And then it won, and then this random city manager from Emeryville was taking pictures with king of Sweden, and that made it more possible for them to get more funds from EPA brownfield redevelopment. The spectacle of this put Emeryville on the map, some random Emeryville program manager shaking hands with the king of Sweden in a picture. People said what's Emeryville and if they knew Emeryville, why Emeryville? So has a thing where things happen quickly, partly because small and it was made for liberal and neoliberal purpose. But also a certain something, a rapidness to change.

He narrates the kick start to redevelopment in this way too – chance moments, quickness, an element of surprise. The final straw for old Emeryville was the Watergate high rise condos. Emeryville could do what it wanted but not if they started to block the Bay view of the Berkeley hills. After a century of running interrupted, Berkeley put its foot down, expose, worked to flip city council. Completely reforming the city council actually only amounted to persuading maybe a hundred people to flip their votes to three new city council members. Possible by virtue of only a few people knocking on doors a few weeks before the elections, boosted along by the KQED expose, *Million Dollar Mudflats*, intimating corrupt development right before the city council elections in 1974 (Phinney 1983).

That group of three people, that named themselves the All Emeryville Alliance, campaigned on an environmental reform agenda. And it was an environmental reform agenda that was not just made consistent with business agendas but made possible by them.

There's a trope you hear often from city officials involved in this period who also say, when asked about how elements of redevelopment played out: things just happen quickly here. They happened quickly because there's less bureaucracy than Oakland or Berkeley. Ultimately, that smallness which gave Emeryville its political consistency – and corruption – for so long also made it possible to change things in a short period of time.

This environmental agenda and new city government came online as new philosophies of urban renewal were emerging. The city policies for tax increment financing as well as California's Redevelopment law all came from an idea in city planning called enterprise zones. The idea was coined by Peter Hall, a self-described socialist British urban planner, after World War II in response to the economic decimation he saw in Liverpool. As the New York Times wrote in his obituary, he envisioned a future of urban life with "clusters of creative professionals dwelling among and reshaping the remnants of an industrial past" (Yardley 2014). Enterprise zones were meant to construct this future, by granting specific industries (often associated with "creative professionals") lower taxes and fewer regulations for limited periods of time to jump start a hub and bring people back into decaying Victorian downtowns (Hall 1988).

Enterprise zones played well with both democrats and republicans in the United State in the 1980s and 90s, though the theory never made it through legislation at the national level. As a result, the theory played out patchwork, most often in cities, and sometimes states (Peters and Fisher 2002). The earliest experiments with enterprise zones happened in old industrial warehouses of the North Atlantic in 1970s, and

enterprises zones had taken off in earnest in several cities of the United States by the 1990s. Its originator, Peter Hall, made a home in UC Berkeley's Urban and Regional Planning department just before that, in the 1980s (Yardley 2014).

I talked to a former professor of urban planning at UC Berkeley, and he said, at the time, urban planners housed in UC Berkeley saw Emeryville as a kind of testbed to experiment with some of their theories, and to try retrofitting old factories into new kinds of buildings. What those industries would be was part of the experiment.[8]

Biotechnology was another industry that evolved out of this moment. The first biotechnology company, Cetus, was founded in 1974 in Emeryville. During that period, UC Berkeley professors were sometimes contracted on a part time basis by big pharmaceutical companies. But some of these people became interested in working for themselves and starting their own companies. Things were starting in Berkeley lab benches, but in order to make product, they had to find more space.

Rich Robbins, a local developer of Wareham Properties (the real 80s Wareham guy), said he played golf with some of life sciences professors at Berkeley and coaxed them into building out companies in properties (Arias 2021). He would make the buildings for them – retrofit old warehouses so they were lab safe. The city of Berkeley, in that period, took a certain cut of intellectual property developed in the city limits, and Emeryville was ready to bend over backwards with tax breaks for anyone that wanted to move in, and certainly wouldn't take any of their intellectual property.

The first biotech company – preceding Genentech in South San Francisco by two years – was Cetus, and it was built in the old Shell Oil research campus, one of the first

[8] This professor initially came from agricultural redevelopment. And, he shared, similar philosophies also helped make the wine industry, as old farms emptied out (during agribusiness consolidations), as well as tourist sites like the Monterey Bay Aquarium in an old cannery (Bradshaw and Blakely 1979; Leigh and Blakely 2016).

ever research campuses old industrial Emeryville. And Cetus wasn't just the first biotech company, it was the one that invented PCR, a foundational technique of DNA manipulation that allowed all other biotech to take off in earnest the way it did.

In a way, it was a transition like the one Michel Foucault traces in a *History of Madness*: leper colonies are made at the edge of town in medieval Europe, and eventually leprosy dies out, and Europeans start sorting out different populations of people into the old building made for this kind of separation. First undifferentiated masses of people who don't fit into the gears beginning to turn for industrial capitalism and an able population – the poor, the sick, the mad – and then these kinds of buildings get more refined. But this essential mechanism within the operations of modernity – separating out the people who can't be properly modern – is the byproduct in part of buildings that were a built for a purpose that no longer exists (Foucault 1965). The exact mechanism and effect changed with time and circumstance, but the building gave an endurance to the underlying form.

It's a way the development of technology industries aren't often thought about, the path of development carved out in part by city planning, real estate developers, empty buildings that need filling in specific periods of economic depression. And these new industries somewhat take the form of the old – biotech research reoccupied the old Shell research campus. But these new industries were the creative industries of the knowledge economy, away from an outdated past of heavy industry and into the future.

Emeryville preceded San Francisco by several decades in using these types of policies that, for San Francisco, reached a peak in the Mid-Market Payroll Exclusion Tax, or Twitter Tax Break, in 2011. The exact influence of Emeryville on San Francisco is unclear. Reports leading up to the Payroll Exclusion Tax in San Francisco's City Council pointed to the development of the Dogpatch's biotech alley built along the industrial

shoreline as a precedent. They also signal the dotcom boom in the late 90s in the old industrial zone of South of Market before that, and the breadcrumb trail ends there, aside from gestures to the much slower evolution of the tech industry in Silicon Valley just south (City and County of San Francisco, Office of the Controller 2011)

When I've talked to Emeryville's city planners about the period of urban renewal, they almost all emphasize the environmental clean-up as opposed to the tech boom. When I've asked them directly, whether they think they pioneered the sorts of philosophies taken up by San Francisco, they say the tech was more an accidental by-product. It wasn't so much an explicit part of their urban renewal policy, as a by-product of the waste clean-up, which created a lenient relationship with developers. So whatever business – come in, we'll give you tax breaks if you clean up our trash. One city manager said to me, if Emeryville was really the first to get a tech boom, maybe it was more of a "synergy."

Which is an interesting word – a class of event outside any particular human agency. Synergy happens in Emeryville, then happens soon after in South San Francisco, and happens so effectively, San Francisco proper catches wind, and starts to skim some of the cream off the top of the peninsula, and Austin and Miami and Tempe and Delft and Berlin all catch wind too and we live in a different kind of city now.

Robert Orsi says that places can have presence, and that presence is diffuse, but then can crystallize under the right circumstances (Orsi 2018). The change seems sudden, out of thin air, but it's a change that wouldn't be possible if the diffuse presence, the older history permeated into inarticulate layers wasn't available, in which sets of seemingly random influences synchronously converge.

And so, the sinister, and the weird, and the sacred are all aspects of the same thing. Consider the one place that feels good in all of Emeryville: my therapist's office. Its

goodness is another social fact – I've talked to some of her other clients, and without any prompting, they've all told me how there's something special about the way it feels in there. What I've told her other clients is what she told me, when I told her how nice her office was and asked her for design tips. She said she didn't really have any, but that she did fly out a priest and pay him $10,000 to bless it, and it was worth every penny. And that was the sort of thing that made sense to her because for ten years, she was a Buddhist priest herself and lived in the San Francisco Zen Center. With a priest's blessing, it got reactivated, what Corinna Gould called the magic in the area, in this specific city, and in the more general new age soup of the Bay Area, which Corrina Gould says has a direct relationship to the shellmounds in the ground.

CHAPTER 4

SAN FRANCISCO AND RE-ENCHANTMENT

This chapter focuses on a form of backlash which attempts to escape the sense of placelessness and absence produced by technology industries. It thinks about the ways the imagination of the cultural history of the San Francisco Bay Area, and specifically 1960s counterculture, become a self-conscious remediation of technological practice. Specifically, I look at the impulse to make science better by pulling on aspects of counterculture, new age spiritualities, and, especially, Buddhism. What this makes obvious is a sense of absence that's identified with science, technology, technology cultures, and tech cities. It also shows the ways that sense of absence (or placelessness) is productive of attempts to reactivate an idea of an older history of that place and the Asian diasporas that are a part of the city.

During fieldwork, I watched a video to remind myself how PCR worked, the foundational molecular biology technique that allows someone to create millions of copies of a DNA sequence and start working with it. It's so routine in everyday lab work that it's sort of shocking to start thinking about the basic principles again and to think about how someone had to think of these up. It just made sense to someone to co-opt the basic machinery of cells toward different ends. Molecular biology techniques are dreamed up by people operating on a completely different plane of thought than the one I live on. PCR seems like the thought of a high person which, in fact, it was.

So the self-mythology goes at least: Kary Mullis of Cetus Corporation, first biotechnology company in Emeryville, dreamed up PCR tripping on acid driving up highway one with the convertible top down and the wind in his face (Mullis 1998). That at least is the story that Kary Mullis told in his life-long self-stylization as rogue agent.

I'm always a little suspicious of the ways these moments get overplayed because after all, ideas are just ideas, and being high is just being high. The entire lesson of the ethnography *Making PCR* was that a whole team of people and set of emergent circumstances in the life sciences made PCR, not just high, moody, petulant, Kary Mullis (Rabinow 1996).

It's easy to be suspicious of stories like these, even as they make sense at some level, when PCR seems like the thought of a high person, because of the way the hallucinogenic origin story has become so routine in Silicon Valley. It is, in part, an attempt to play up the counterculture influences at the base of the technology industry. Many of the attempts to account for Silicon Valley, and biotechnology, in place specific is through accounting for its influences from San Francisco counterculture (Markoff 2006; F. Turner 2006; Vettel 2013). Some writing accounts for this influence in the framing of a Fall from grace (Frank 1997), others, a continuity of spirit in the "baby-boomer communards" that "leave behind a frightening, if unintentional, inheritance" (Wiener 2018).

But rather than stopping at the dismissal of self-stylization, in this chapter, I examine that deliberateness in bringing aspects of counterculture, New Age spirituality, and religious experience into the engineering world. This chapter investigates the practices by which self-consciously modern subjects and institutions appropriate religion to reconstitute perceived absences of the secular.

This chapter thinks about this habit, to seek out something better for science in religion, and thinks of this habit as of a particular place. It reflects on the habit of re-enchantment that, as a thing people are doing all the time. It reflects on what that means for expanding social sciences in post-modern, post truth moment that seeks to expand

the registers of the epistemic and reflect on whether it's a fool's errand to go looking for that in religion.

There are any number of examples to draw on that exemplify the tech sector's overlap with Buddhist spiritualities – Steve Jobs' enlightenment seeking in California Zen monasteries to mindfulness centers placed on tech campuses in the name of worker productivity. I specifically focus in this paper on an interest in recursion and ritual I heard expressed in multiple settings during fieldwork. These cyclical temporal modes were expressed as an antidote to what are seen as limitations of linear, Western thought.

I focus on these tendencies and patterns as they appear in San Francisco technology cultures and their affinities with Eastern spirituality and orientalism. The relationship between a Silicon Valley ethic and Buddhism has been well established, especially in the ways these relationships were built in the counter-culture history of the region (Turner 2006). Remedies are found in this localized version of perennialism, which looks to common threads throughout religious experiences. But there is a particular focus on Buddhism which has come to earn the status of a uniquely scientific religion (McMahan 2008).

The San Francisco Bay Area is a place where I can sit in a café and find myself eavesdropping on tech bros planning their Burning Man ayahuasca trip and feeling judgmental about people doing good things the wrong way – because this is a world I participate in too because of the ways my life as a lab technician in the Bay led me deep into the world of Zen Centers. The irritation is specifically of a place where Buddhist temples are, like my old neighbor used to say, Starbucks (one on every corner) in the Bay, and so are tech companies. And different people have different ideas about the right relationship between those two things.

Buddhist temples and tech companies seem to be unrelated, in fact are conceived as opposites, but people are minimally migrating back and forth between those worlds all the time. And what's more, in being told these things are opposites, working life and private life, science and religion, people are prompted to long for a world where they could be the same.

Max Weber's conceptual work on modernity and enlightenment named "disenchantment" as the processes of progressive rationalization of Western society that also progressively devalued religion (Weber 1963 (1922)). A world geared toward scientific reason and instrumentalization progressively eclipsed the value of belief that was part of a society in which "the world remains a great enchanted garden." More recently, J.J. Storm has pointed to the ways many of the main figures of the European intellectual canon were not only aware of European occult movements, but actively engaged with them (Josephson-Storm 2017). However, the nature of those engagements was often prompted by a sense that the worlds of science and religion were separate, and even Weber's disenchantment is marked by a tone of longing for the disenchanted to have enchantment.

A world as an enchanted garden sounds much better than a world of bureaucracy, capitalism, and progressive rationalization. So, the declaration of disenchantment is immediately productive of an impulse to re-enchant. This is the sort of thing that makes sense in the constitutional make up of secular modernity, in which science is posed as religion's opposite (Taylor 2007). They're made separate, and then science longs for a more holistic world where religion can come in.

But the catch is, that in order to pull religion into science, the religious has to take a different shape in order to fit in with the scientific. It has to be effectively disenchanted again. Re-enchantment is in fact a disenchantment project, because it tries to redirect

the religious world into an instrumental value of reinvigorating the sciences. We drop acid *in order* to invent technological break throughs, take on a mindfulness practice in order to stop having panic attacks at work and be a better worker bee at this job we hate so much we're having panic attacks at it, bring the biological and environmental back into systems of industrial production.

Which starts to point to the ways the re-enchantment project starts to look like a self-defeating motion, of needing to disenchant in order to re-enchant and then once again needing to re-enchant, and so on. It looks self-defeating, and maybe is, but it's also a pattern of epistemic change. Even if moderns don't know what their doing does, the doing is still doing something – the baby boomer communards leave behind their unintended, and maybe frightening, inheritance.

This is a contemporary commonplace, and specific to the San Francisco Bay Area, and in that sense, specific to place. By place, in this instance, on the one hand, I mean in one of the more traditional anthropological conceptions of place-making, of the accumulation of a certain cultural history which becomes tacit. But the interest in Buddhism, especially, connects to other elements of notions of place, as something that exists for cultural others. San Francisco is, geographically, a port on the Pacific coast, and being relatively close to Asia, is home to multiple Asian diasporas. And these diasporas have played an important role in San Francisco's place-ness, a city unlike other cities, something, for some reason, understood as less generic and vacuous than, say an even bigger port city, San Diego (which, as geographer Mike Davis points out, is in fact an unusual and specific entity, a strange fusion of a sleepy seaport and major military base (Davis 2006)).

This chapter thinks about this habit, to seek out something better for science in religion, and thinks of this habit as of a particular place. While projects to re-enchant in

response to an environment of disenchantment exist in a more generalized space – being also relevant to Weber in Germany or Freud in Austria – in this chapter, I think about the ways this impulse takes shape specifically in the San Francisco Bay Area, not only because of the imagined of legacy of 1960s counterculture, but also because of its existence on the Pacific coast and as home to multiple East Asian and South Asian and Southeast Asian diasporas.

Chinatown in particular has always played a prominent role in bohemian life of San Francisco (Smith 2020), as an object of curiosity into the city's gold rush days in the 19th century. It continues to be a main tourist destination of the city, and by extension the city's city-ness as a particular place. This is most obvious in Chinatown, with a diaspora going back generations to the early 19th century, and which very strategically Disney-fied itself while rebuilding after the 1906 earthquake (hired a white architect who designed the tea gardens and pagodas at San Francisco World's Fair) to keep a stronghold on the valuable downtown real estate white landowners and city officials were eager to sweep them out of (Mars 2018). If I'm truthful, in my first trip to san Francisco as a teenager that made me feel like it was a place I wanted to be, I was maybe most especially dazzled by the walk through Chinatown.

Japantown, while smaller and newer (with Japanese populations that moved into Western Addition after WWII concentration camps were disbanded, and after the black people who used to live in the Western Addition were forced out in some of the city's earliest urban renewal projects), also amplifies the city's Asian-ness (along with South Asian, South East Asian populations) which helps create its place-ness, particularity, and a particularity that includes as many Zen Centers as Starbucks on the city's street corners. After WWII, the California West Coast also became home to several prominent

Buddhist teachers from Japan, Korea, and Taiwan, with complicated relationships between their Asian American and white American congregations (Fields 1992).

The straw man tech bro preaching the gospel of ayahuasca or mindfulness as the road to productivity and success are annoying partly because appropriation is – in addition to participating in structural violence – annoying, a thinner copy of the original, taken out of the context that makes it whole. This also boils down to a question of place, in a space of cultural interchange that's power differentiated.

Which returns us to the theme of the exit in the introduction, and the exit as a problem relevant to post-colonial anthropology. The exit, as Paul Rabinow has said, is the exit of leaving the field, and trying to think of a way to write about the field while acknowledging the anthropologist has been changed by the field during their stay. One exemplar in post-colonial anthropology is *How Forests Think* – as Gaymon Bennett teaches his classes, not "how the Amerindian thinks forests think" but "how forests think." The exit is framing what might be taken as superstition in an older form of cultural anthropology and making it sensible within the framing of Western intellectual tradition.

If Eduardo Kohn's exit is a world class exit, what does it mean for the post-colonial anthropology engaged in studying up, and exoticizing the West? The branch of anthropology that's decided to start exoticizing the West also is engaging in its own form of exiting. It's reading Eduardo Kohn, and disciplinarily informed by the same questions. When the anthropologist in the laboratory does now believe that forests think and souls have knots that might need an exorcism, they start to look at the lab differently. Once convinced that forests think in the Amazon, how does a redwood forest in Marin start to look, or a parking lot in Emeryville? And if forests and even parking lots might think, am

I ready to also start thinking of the other kinds of religious knowledge I hear circulating in Marin, and Emeryville, and San Francisco as propositional knowledge?

However obnoxious some versions of re-enchantment are, they are part of the same circumstances where the Berkeley Pacific Film Archive hosts Corinna Gould to speak and the audience claps when she says tech comes from her ancestor's prayers in the shellmounds around the Bay. And that's a delivery on the promise from efforts to re-enchant the social sciences that re-enchanting our thought will pay off political dividends in the ways it will make space for the styles of thought and ways of being in the world that have been declared irrational in white secular modernity (J. Bennett 2010). So, it's worth looking at these subtle mechanisms of crossover, the ways they turn into appropriation and instrumentalization, and what effects that has in the world.

The impulse to re-enchant, through the localized resources available in a history of counterculture, New Age, and Buddhist movements, is also a product of the nonplace. It's a product of self-consciousness about the nonplace, and reanimating counterculture is at one level an attempt to reanimate place. But, as we'll see, many of these projects are also caught up in the universalizing impulses that are a part of technological work that both disenchant the religious and turn places into nonplaces. The confluence of these types of disenchanting motions, epistemological and spatial, are visible in the ways a nonplace like Emeryville paves over a sacred place.

But place also registers at a second level in the selection of these examples. All these examples focus on elements of cyclical, recursive reasoning as a mode of re-enchantment. Even though recursion is a universalized mathematical principle, it's one that directs attention to, and specifies a relationship between, place and environment. In a mode not dissimilar to statistical quality management and control charts in the chapter on institutional knowledge. Recursion is also a principle that organizes this entire

dissertation in its attention toward ethics as a conceptual orientation that seeks to understand the ways a subject both shapes and is shaped by places and practices. The critique in this chapter toward the project of re-enchantment that looks like disenchantment is also meant to provide resources in how place is thought about as a recursive element in the rest of the dissertation, whether in biotech labs or gentrified neighborhoods.

In the rest of this chapter, I introduce how epistemic re-enchantment is a project of interest in the humanities and social sciences. I'll then move to examples of the ways this disciplinary conversation appears in everyday practices of technologists in the San Francisco Bay. I first talk about Gregory Bateson as a mid-century intellectual who made explicit a project to bring (in his language) oriental thought in occidental thought and engineering principles in the conceptual work he did with recursion. I then discuss Stanford Design School's different projects around "ritual design," which make similar commensurative moves between scientific and religious phenomena, but in order to support the personal practices of a spiritual-but-not-religious subject.

I then contrast these first two projects with the way "form" in Zen practice referenced by Gregory Bateson is understood and practiced at Zen Centers in the lineage he practiced with. Finally, I consider how elements of these other influences converge non-deliberately in the biotech lab and projects directed toward empiricism. I position these all together to consider patterns, possibilities, and limitations of epistemic change and re-magification of modern life.

Re-enchantment in the Secular

According to Charles Taylor, the secular is popularly conceived of as an absence, that is, the result of the elimination of religion, superstition, and unreason from the

world. The secular is most often taken as the decline of religion in the rise of Western modernity. However, the secular is actually its own cultural historical formation that emerges from a particular set of religious institutions of medieval Christianity (Taylor 2007). Furthermore, the category of religion only comes into existence as a distinct feature of existence, in this set of transformations called the secular; religion only has ever existed as the secular's other.

José Casanova, another figure of critical secular studies, specifies the process of secularization within the secular, and parses three separate processes referred to interchangeably as "secularization" – first, the processes in Western modernity where religion has been separated from other aspects of life, second, the removal of religion from the public sphere and into private life, and third, the complete dissipation of religion through the rise of Western modernity (Casanova 1994). The field of critical secular studies in anthropology is built around the recognition that circumstance one, religion's complete erasure, is in fact not happening, and that secularization is in fact circumstances two and three, the effort to contain religion in its own category and within private life. The anthropology of the secular considers the (multiple, contingent) lived experiences that play out as a result these boundaries between the religious and the secular (Cannell 2010).

In the ethnographic work of this chapter, I specify sets of practices attempting to rework the siloed boundaries of religion. Because, even while we might recognize the subtraction of religion from modernity, or even just public life, as a fiction, the secular is still subjectively experienced as an absence. While this absence – the result of the evacuation of superstition, magic, and so on – is what confers authority to the secular, the absence can also be experienced as a lack. Even Charles Taylor, who helped to articulate the myth of negation in secularization, often suggests something precious was

lost in the historical transformations toward modernity that funneled a fuller world into narrower constraints of either atheism or fundamentalism and the private issue of personal belief. He seems to mourn at some level the, "the sense of fullness came in an experience which unsettles and breaks through our ordinary sense of being in the world, with its familiar object, activities and points of reference" (Taylor 2007, 5).

The symmetrical move (Bloor 1981), is to remain neutral in the relationship between the medieval world and the modern one, and whether we have in fact left our ancestor's enchanted garden for a vacant parking lot missing an elusive something. In doing so, it's possible to notice the ways the idea of absence generates actions, practices, and ideas all aimed at filling this something back up. But the religious is almost inevitably transformed in the process of remediation. It still needs to fit into certain features of the secular world, for example, not challenging any core framings of political, economic, or scientific understanding.

Talal Asad has focused on the relationship between secularism and capitalist liberal democracies in nation-states, and he has shown the ways the fundamental claim liberal secularism makes to tolerance of minority subjects is limited to forms of belief that don't challenge the premises of liberal secularism (Asad 1993; 2003). Because of the ways anthropology's engagement with secular studies emerges out of postcolonial anthropology, much of its work focuses on processes of secularization tied to the state – both in postcolonial India (Madan 1998; Mahajan 2003) and understandings of Islam in the public sphere (Asad 2003; Mahmood 2004; Hirschkind 2006). The project, in part, is to denaturalize the claims to liberal tolerance and disenchanted reason that become the warrant for colonization.

To date, the anthropology of the secular has dedicated less attention to the ways religion interacts with science (Templeton Religion Trust News).[9] Science is the mode of knowing material reality authorized by the state (Jasanoff 2004). As such, it's the mode of reasoning posed as the opposite of religion and superstition's unreasoning in the constitution of secular modernity. This has been characterized in different modes of governance, like bioethics panels constructed to include religious authority figures, in the name of democratic pluralism (Hurlbut 2017), or the figure of human dignity as an alternative to biopolitical reductions of the human body (G. Bennett 2016). As this work shows, religion is brought in to supplement a perceived moral deficiency in a scientific discourse authorizing modes of governance. But scientific discourse is still the main authority, and the pulling in of religious discourse is orchestrated in such a way that it's made to still conform to terms of reality set by the scientific, e.g., the biologist's authority to delineate the pre-embryo (up to 14 days after conception, not up for moral debate) from the embryo (14 days after conception, up for moral debate).

Science sets the terms of debate and reality itself, and religion participates in deliberation on this field of debate, but still, religion needs to be brought into the field of debate because there's a presumption that some form of moral authority is in fact missing without it. The boundary between science and religion both mandates their separateness and then also mandates their re-integration, via particular channels. This double imperative, to separate, then integrate is the warrant for not just bioethics committees, but the re-enchantment literature in the social sciences.

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[9] A gap which the Templeton Foundation funded *Beyond Secularization: Religion, Science and Technology in Public Life* project has collectively interrogated from 2019-2022. This paper emerges from conversations as a member of this project.

A whole host of literature in the academy has responded to Weber's diagnosis of disenchantment with the remedy of a disciplinary re-enchantment. This work has sought to remedy these worldviews, in large part, by showing cases of entanglement and apparent enchantment within the scientific establishment, most especially quantum physics, and also ecology, and the private lives of European intellectuals (J. Bennett 2010; Barad 2006; Morton 2013; Josephson-Storm 2017).

Like the bioethics panel, science sets the terms of reality and terms of debate. The critique of the re-enchantment through the sciences literature is that is still treats scientific knowledge as the baseline for reality, focuses so microscopically (literally) on the science that it can't meaningfully connect to the social or political, and effectively leaves epistemic power relationship intact (Tompkins 2016). A related project, the ontological turn, has also sought to integrate marginalized ways of knowing into the mainstream, by putting ethnographic fieldwork with anthropology's traditional subjects in conversation with European intellectuals. This in turn has been critiqued as essentially a form of appropriation, in which white male intellectuals are hailed for printing what indigenous groups have already been saying for centuries (TallBear 2017).

Either by re-enforcing scientific thought as the baseline for reason, or appropriating native thought, and often a combination of both, these styles of re-enchantment have been critiqued for the ways they reproduce existing inequities by reinforcing the authority of the white male intellectual. Re-enchantment conversations are selective about what they let in or out in just the way Asad says liberal democracies are limited in their tolerance of their religious minorities (Asad 1993) – a general sense of interconnection and the feeling of awe ok, reincarnation and animal sacrifice less ok.

Buddhism is consistently a resource in these projects, in general, and possibly even more so in the projects of technologists in the San Francisco Bay Area. Buddhism

has the status of being understood as a uniquely scientific religion, because of the history of its particular mode of uptake in religious studies, as well as strategic moves by non-white Buddhist teachers (McMahan 2008). The formation of Buddhism as a scientific religion took the work of emphasizing certain elements of its practice (meditation, mind, interconnection, written texts) and de-emphasizing others (animal sacrifices, reincarnation, evil spirits). This in turn, has become entangled in dynamics of white supremacy. It ultimately leads to a dynamic in the United States in which forms of white Buddhism are granted the strongest claim on true Buddhism (scientific Buddhism), and simultaneously, and forms of white Buddhism become attracted toward the problematic, unstable figure of the "ethnic Buddhist" available in local Asian diasporas (Cheah 2011).

As discussed earlier, the San Francisco Bay Area is full of these crosscurrents between white New Age inflected Buddhism and Buddhist practice connected to different Asian diasporas. These crosscurrents are directed in significant ways by the 1960s counterculture, a key turning point in American religious life as people started to leave churches and pursue the individually directed spiritual-but-not-religious life (Heelas 1996). This counterculture, in turn, has had a significant shaping influence on styles of engineering and self-comportment in Silicon Valley {Citation}

The rest of this chapter looks at this circular motion between re-enchantment and disenchantment, the translation of religion into silos and private life, and then out of silos and out of private life, through three examples. I specifically focus on something that emerged multiple times during my fieldwork, in very different contexts: an interest in recursion and ritual. This was seen as an antidote to linear, and transcendent thinking. Recursion and ritual were part of cyclical, immanent, entangled worldviews. These worldviews were being considered in light of perceived limitations of cartesian dualism, command and control engineering ideals, and teleological thinking.

Recursion

If I was spending time in a Zen Center, and I mentioned I studied technologists, or if I was with technologists, and said I spent time in Zen Centers, people who understood what I was talking about would sometimes ask, have you heard of Gregory Bateson?

Gregory Bateson was a British polymath who made a home in the San Francisco in the midcentury. He started his career as an anthropologist of Bali, and his work sprawled over the course of his life into several other fields, including psychology, semiotics, ecology, and engineering. His career was in large part an effort to synthesize these different elements into a cohesive whole. Cybernetics was one of the spaces he tried to do this synthetic work.

Cybernetics was a movement of computer programming logics, based in recursion, that emerged in the postwar period (Hayles 1999). The discipline was wide ranging, with applications in computer sciences, ecology, and psychology, but Bateson was largely the one responsible for constructing this breadth in the field (Pickering 2010). As Andrew Pickering has written in his synthesis of Bateson's life, work, and legacy, Bateson occupies a strange place of being considered one of the primary founders of cybernetics in the Macy Conferences in 1943, one of the most vocal critics of cybernetics, and mostly disavowed by the rest of the cybernetics community. The central tension between Bateson and his fellow cyberneticians was what Bateson felt was too narrow a construction of a promising discipline. Cybernetics had its origin in military applications and became focused on computer programming and electrical engineering principles. A key feature of cybernetics was the attention to recursion as an engineering

principle, and Bateson wanted recursion to do more than serve straightforward engineering and military applications.

Cybernetics is concerned with regulatory systems and lays central focus on the construction of feedback loops. Feedback loops can be a consideration in engineering – a governor senses the environment and then in sensing information from the environment, modifies what's happening mechanically, which goes on to affect the environment, which is then sensed by the governor and so on. A familiar example is a thermostat. The user sets a thermostat to a specific temperature, and the thermostat figures out how much hot or cold air to produce for how long by taking continuous measurements of the air temperature. The formulation of recursion attracted Bateson, which he saw as a way out of what he called Cartesian, occidental science (Harries-Jones 1995). A feedback loop has a more sophisticated sense of an object and environment – or a self and environment – a middle ground between artificial separation and undifferentiated entanglement.

In most famous book, *Steps Toward an Ecology of Mind*, feedback loops are theorized and used to understand phenomena ranging from schizophrenia to nuclear arms races to DDT overuse to alcohol addiction (G. Bateson 1972). He shows the way these social and environmental ills are troubled by some form dysfunction in feedback loops. His project was, in one sense, a project of commensuration – pointing to the ways unlike things were alike and behaving according to similar patterns that could be sussed out in such a way that things in dolphin ecology might help someone understand something about Cold War politics. Religion was another field on the table for the project of commensuration (G. Bateson 1972; 2002; 2005)

In *Theory of the Double Bind,* his essay which works to frame schizophrenia in terms of faulty feedback loops between self and environment, dedicates a significant

amount of time discussing Zen, and draws parallels between the schizophrenic experience and mystical practices of unknowing. He describes Zen koans as a technology of a nonmodern self that induces a double bind intentionally. Koan practice, and Zen practice more generally, is constructed to destroy the ego and what we would call a nonmodern self (G. Bateson 1972).

In the Zen koan, a teacher presents a student with an unsolvable riddle, which can't be answered logically, and must be answered in a way that exceeds a rational mind (what is the sound of one hand clapping). Bateson points to a formal similarity between an unsolvable riddle and the schizophrenic experience of being subject to two contradictory imperatives. He draws a distinction between the two in the environment in which they are experienced. Zen koan practice is embedded in a nonmodern ontology/epistemology, whereas a schizophrenic is embedded in a Cartesian world without the tools to understand what's happening. Because of these differing environments, the Zen double bind produces enlightenment, whereas the schizophrenic double bind produces madness.

The parallel is provocative (though it is worth noting more recent work in medical anthropology that has shown schizophrenia has been shown to be experienced in a distressing way in multiple cultural contexts, as opposed to being privileged as a source of shamanistic access to the divine (Luhrmann 2011)). Bateson's project is not so much as making cybernetics more Zen as pointing to some formal similarities that allow you to understand the problem from a different angle.

The assumption religion is an epistemology, and by extension, that all religions have points of alignment that can be navigated by the individual. An element of disavowal was part of this work. His relationship to eastern spirituality or Zen more specifically was never that Zen was the answer to make engineering or western

philosophy better. Rather, he was a discerning polymath. He spanned many disciplines and characterized patterns between them. But at his base, he operated from a fundamentally scientific rationalist view of reality, one in which religion could be mined for material patterns and modes of organization it had been able to characterize. Disavowal, partial uptake, personal judgement were part of navigating these different worlds.

Gregory Bateson was very involved with Buddhist centers without ever considering himself a Buddhist. Details of this relationship can be found in an essay Bateson's daughter wrote about the process of his dying at the San Francisco Zen Center. She emphasizes his individual choices in the process, and the mutual skepticism he navigates between both the medical establishment and the Zen Buddhism (M. C. Bateson 1985). He did cancer treatment in a hospital up until a certain point, and then he decided not to artificially extend his life any longer and to instead go to die at the Zen Center. Her essay is also careful to specify that Bateson was not a Buddhist and decided not to partake in certain parts of the Buddhist end of life rituals. She describes the final hours of his life, where she searches the room in the Zen Center for an object that might offer him spiritual comfort – a cross doesn't feel right, or any Buddhist symbol, and she decides to hold up a flower to him as a symbol of the beauty and form of the natural world.

His daughter emphasizes in the essay that Bateson's attraction to Zen was primarily to its form: organized rituals, altars, practices, and the ways these structures cultivated a certain quality of mind. He reflected on form and the sacred in other essays. He doesn't so much arrive at a definition for the sacred as puzzle through its relationship to form and emergent form, with the sense that religions are better attuned to notice emergent form in a way that western science fails to (G. Bateson 2002). Religion is

understood as a different epistemology. When science, religion, animism, and so on, are all epistemology, the thinking self is what navigates between those epistemologies.

Cybernetics has been influential in several domains – including psychiatry, semiotics, and cultural anthropology in postcolonial projects of the ontological turn like *How Forests Think*. But Andrew Pickering has suggested an important part of his legacy has also been as a symbol as an individual that spanned countercultural and technological worlds, the connective tissue that could and should exist between things made separate – and that Bateson had mixed feelings about this aspect of his legacy (Pickering 2010).

Other cyberneticians were not sure what to do with Bateson and felt his work was too metaphysical, and Bateson had difficulty finding an accepting home in academic institutions. On the other hand, he was welcomed with open arms by Buddhist and New Age institutions like Naropa, San Francisco Zen Center, and esyln, and Bateson was resistant to becoming reduced to a guru figure in settings like these (though he did ultimately teach at them). He felt the New Age movement oversimplified his conceptual work into a feel-good principle of interconnection, as opposed to the ways recursion primes gaps as much as continuities. Pickering also suggested that one of the main ways his legacy was translated was into his adherent Laing's psychiatric practices, which largely took the form of wild retreats (Pickering 2010).

The retreat and retreat centers, as fitting into the calendar and individual subjectivities of working individuals with temporary vacation away to experience personal transformation. Retreats are a space of personal transformation that fit within the rhythms of capitalism, especially capitalism's elite classes, and simultaneously are a spiritual technology that existed well before capitalism. They integrate so well that they can even be a part of work – the corporate retreat, which in Silicon Valley work cultures,

can take the form of outrageous hedonistic excess, as well as more staid buttoned up. These kinds of individual zones have been enduring because they were the easiest point to mobilize that complexity.

Ritual

One evening in San Francisco, I tagged along with two colleagues to learn more about "ritual design" in a tea shop from a founder of a ritual design lab. On the way in, we walk by a seminar about therapeutic uses of psychedelics, and then sit on cross legged on velvet pillows on the ground while we drink loose leaf tea. Other patrons are listening in on our conversation. The setting is apropos, maybe too on the nose, and all three of us feel funny about the encounter after, even though we participate in our own versions of a similar project.

There are at least two ritual design labs that have emerged from Stanford's Design School. Ritual Design Lab, which came first, is an academic center at Stanford founded in the 2010s. Stanford is arguably the primary institution of higher ed with the strongest ties to Silicon Valley. Ritual Design Lab will make designed to order rituals for people and organizations. The lab emerged from a class for undergrads listed in the design school as Ritual Design 101. The class garnered enough interest from their college students that the two faculty members who taught the class decided to further the project by developing an organization for it on campus ("Ritual Design Lab").

The justification runs like this: we have less religion in our life and so we have lost some of the social function religion provided us. One of those social functions is ritual. Ritual is needed as social support to navigate life's transitions, to commemorate moments of rupture and change.

These notion of ritual subscribes, implicitly, to a functionalist understanding of religion, reducing the religious to functional social needs, which Talal Asad's work moved religious studies out of (Asad 1995) – and so it's worth noting the design approach is premised on literature from religious studies that most religious studies scholars now several decades out of date. But regardless of whether religious studies scholars would call into question its underlying assumptions, ritual design strikes enough of a chord to, minimally, be written up in places like *The Atlantic* and *New York Times* (Samuel 2018; Bowles 2020).

But to continue on the premise: a new vacuum where religious institutions ostensibly don't exist anymore. And in addition, there are all kinds of new kinds of things in the world that religious institutions were never set up to handle, like parking tickets, moving, serial monogamy and break ups. Modern life is missing the social supports to commemorate the thresholds in our life. Ritual still has utilitarian value in emotionally processing these things.

So, Ritual Design Lab will step in to design rituals for you. On their website, they promise to style these rituals as quick, bite sized, irreverent, and fun. The tone of each of these is quirky. The rituals are individualized, light, and efficient. The website features cute cartoons, hand drawn diagrams, and they list irreverence as one of their guiding principles. They are specific that these are rituals for an individual, and not as a part of any form of institutional authority. The tone and context match the Silicon Valley ethos, the empowerment of individuals and disruption of old hierarchies.

The disavowal in name of individual empowerment echoes Bateson's disavowal. And there's a similar orientation to ritual as a naturally emergent, organic form. Through this orientation, they can also engage in a similar project of commensuration, that commensurated things can be collected and used by an individual missing religion in

their life. Tools are provided to an individual to facilitate their navigation through their own spiritual practice.

The man explaining his ritual design project in the tea shop explains his ritual design toolkit is better because it puts more power in the hands of the individual. He makes the (fair) point that Stanford Design School asks you to hand institutional authority over to Stanford Design School instead of a traditional church. The Ritual Design Kit, instead, presents you with the tools to design your own ritual. He and his partner have developed a toolkit, that teach you the principles to construct your own ceremonies, with the modules they supply.

The toolkit is available as a downloadable as PDF online, with modules and a set of instructions ("Ritual Design Toolkit"). The template for these modules is the mid-century anthropologist Victor Turner's definition of a ritual which identifies a universal tripartite architecture to rituals: initiation, being in the ritual space where unpredictable things might happen, and a reintegration into normal life (V. Turner 1973). It also draws on the elements Turner identifies as part of ritual, like metaphors, multi-sensory experiences. Different suggests for these kinds of elements are offered in a short list in the module, distilled from a range of rituals around the world.

The modules distill features commonly found in rituals, along with a short description of what this feature achieves. For example, a card presents the variable of "costumes," describes this as a way to manifest extreme human emotion or behavior as someone other than yourself, then offers some elements you might consider: texture, size, appearance of face, etc.. Modules are a user interface adaptation, to form complicated information into manageable chunks. The kit also recommends you make these selections for your ritual design by carving out a special time for yourself to collect your thoughts and priorities - the process of ritual design is also itself a ritual.

There are some interesting nuances. The toolkit walks you through an attentiveness to energy, smell, space. The toolkit presses upon the importance of an individual's presence in conducting ritual. You are likely to drift toward design elements that are visual in imagining a ritual, but you should push yourself to cultivate your other senses as well. One piece of advice in the manual is that if your ritual goes exactly as planned, that's probably a red flag, and that part of the design should be space to welcome things you're not expecting. The flexibility and modularity both enable the individual to individualize the ritual more and to adapt to the unknown.

The kind of secularization at play here is a religious function, ritual, being translated into an individualized framework that can exist outside of religious institutions. This is made possible through a process of instrumentalization, in which an individual designs rituals in order to achieve certain goals for themselves. Even with this instrumentalization, ritual design can remain attentive to aesthetics whose purpose fall outside of strictly instrumental reason, like, facilitator presence, embodied experience, activation of all senses – smell and sound as much if not more than visual cues - flow, space, and energy.

This responsiveness adjustable to the individual that is in line with liberal Protestantism. The heavy emphasis on self-determination in ritual is resonant with ethic defining a personal, unmediated relationship with God. As others have pointed out, the secular often follows the religious patterns of Protestantism (Taylor 2007).

Some of the piloting of these projects have been in retreat like spaces like Burning Man, another counterculture legacy, consistent with the retreat as a spiritual space away from work governed by different rules, that still fits into the rhythm of capitalist work relations (Venkataramani 2020).

Bateson was trying to incorporate spiritual language into a scientific framework, and ritual design attempts to make a secular version of something religious. But this project is an attempt to add back the right amount of religion to a secular (or else, spiritual but not religious) subject's life. But both are involved in a process of commensuration and translation with the sense of something lost in the erasure of superstition – a notion of interconnection or, in this case, threshold markers – that can be selectively introduced.

There are dozens of Ted Talks about the meaning ritual in modern life (a few examples - Xygalatas 2016; Leach 2019; Haan 2016). And there seems to be a particular preoccupation with manhood rituals. Victor Turner's notion of ritual does in fact come largely from a West African tribe's manhood initiation ritual.

Others have criticized Ritual Design Lab for the ways it hyper individualizes ritual and takes it away from the religious institutions that are supposed to help (Samuel 2018). During tea, I bring this up, and ask if designing a ritual for yourself isn't a contradiction, if ritual is about assuming an old form that's been passed down beyond the self and ego, doesn't designing your own ritual go on to reinforce that self. He says I think we have different definitions of ritual and stops making eye contact with me for the rest of the evening. I think that it's interesting he's using an anthropologist's definition of ritual and isn't interested in what a contemporary anthropologist knows about definitions of ritual, but that's fine.

When I've complained about this project to other people, the kind of people involved in the same religious organizations as me, in the process of explaining what ritual design is, multiple people have ended up asking me for a link to the toolkit. One was in the process of moving to another state, another getting ready to officiate her brother's wedding. A toolkit has its advantages. We do live in a highly individualized,

fragmented world, where no matter what kind of religious practice you are born into, there is often a host of choices and adaptations you will need to select for yourself.

But when I've followed up with those same people, while writing this chapter, no one has done anything with it, or even read through the module. As many religious institutions say, it's hard to practice alone.

Form

The definition of ritual I was drawing on truthfully did not come from anthropology, and instead implicitly came from the time I've spent at a Zen Buddhist practice temple called Sonoma Mountain Zen Center. The teacher and priests at Sonoma Mountain are in the same lineage of the San Francisco Zen Center, where Gregory Bateson taught and chose to die, and Sonoma Mountain's primary teacher practiced with Gregory Bateson. One way to read the Zen Center is as another branch out of the same set of circumstances as Silicon Valley design entrepreneurs, from the same historical soup of 1960s counterculture. Taking a step to talk about how they talk about a similar spiritual practice in a different way can refract a different light on these elements.

I first started going to the San Francisco Zen Center while I was still a lab tech. The experience immediately clicked for me, even though it felt alien to me, because I'd never been to any kind of religious service in my entire life. And so, when I started, I had made up certain boundaries for myself – I was just there for the meditation and the mindfulness, so I'd sit for the meditation period, and I'd leave before the service started with the chanting and bowing because it didn't make sense to me to do that kind of meaningless ritual.

But then, within a few weeks of going nearly every day, I just stayed for the service, and found it was my favorite part, it was a chance to be in the same state of mind

as when I was meditating, but I was using my voice and my body, but in a very structured way, like someone was walking me through the easiest way to use my body and voice in the same state of mind I felt when I was meditating. Which surprised me, because I never liked singing, but that's probably why I liked chanting, because it's the easiest possible version of singing, singing for the people, like karaoke, but even easier than that, in a monotone hard to differentiate from a bigger group of people. And then the new made up boundary became that I would never sit more one meditation period – not those retreats where people sat a full day – and within a month a was at a one day sit, and felt exasperated at myself after for the soul searching I'd try to do with dumb self-indulgent microdosing adventures, when actually it was so much simpler, you just had to be still for long enough, and I felt in touch with something drugs never gave me. But, I was in touch with it after a day, I didn't need to do a full a seven day sit, which sounded like torture, and within six months I was at a seven day sit, and so on, until I eventually getting to the point I was ready to take this thing on whatever it's terms were, however ridiculous I felt starting out on those terms, because those terms always pretty quickly proved themselves to be there for a reason. And they were there for a reason I couldn't have conceived of ahead of time, because I was going there to get my mind changed, and the things I might be most resistant to often proved themselves to be the thing I'm most missing without knowing it.

Eventually I didn't find it necessary to reduce the thing to its immediate utilitarian value to myself, and this is the sort of thing I was thinking of when I was feeling unsatisfied with the Ritual Design Kit's definition of ritual. Ritual as a part of Zen is a set of spiritual practices for the destruction of the ego, and repetitions of monastery life are there to help you break down your ego. The people at the Zen Center talk less

about ritual than they do about form – what Gregory Bateson's daughter said was his main attraction to Zen Buddhism while spending time at the San Francisco Zen Center.

Saturday was the day that at Sonoma Mountain Zen Center that was something like Sunday for church, where other people in the community would come up for a few hours to meditate, and listen to a talk, and maybe eat lunch. One of these Saturdays, instead of the normal talk, the Zen Center was going to go over the temple forms. Forms are the rules in the meditation hall, things like, where to bow, what direction to walk in, how to chant the right way, what kind of posture to use, and so on. I disappointed to get the news we were going to be talking about rules for an hour, and I resigned myself to a boring Saturday program, but it ended up being one of the Saturday programs I've thought most about since.

The main priests at the Zen Center knew we felt this way about the rules, because at one point they did too, and that's why they were having this Saturday program just to talk about form. Because it's not arbitrary rules, it's *form*. Form is a structure, and the structure helps you wear down your ego, which wants to do things this way or that way, without really thinking about it, and wearing down our ego so we can get to the something underneath the ego is the whole reason we're at the Zen Center.

There are very specific forms for how someone puts incense into the urn at the altar at the beginning of a meditation period: number of bows, walking up on the right side of the altar and not the left, and holding it between specific fingers and putting it to your head before you put it in the ash. But the thing is, it feels so different every time a different person does it. It has a completely different energy. You don't actually need to assert your personality with a specific style of putting the incense in the bowl to start the meditation – that's ego driven, and contrived – in fact, because you have this container to hold your ego, and a very specific set of steps to follow, once you get into the rhythm of

the steps and don't need to consciously think through them anymore, it actually makes it easier for a more essential essence of yourself to come through. By taking away all the variables, in a container, you become the selfest version of yourself.

The teacher shares that when he was younger and just starting his temple, he thought he had to make Zen American, but, just like the incense in the urn, he realized he didn't need to be so deliberate about it. Zen is American by virtue of being in America. Zen gets Californian just by having to house itself in old barns in rural Santa Rosa County because that's where cheap land was in the 1970s, or in an abandoned boy scout camp east of Los Angeles, and because it's figured out it was easier to make its operating costs from retreats and memberships for the kind of members who kind of want something like church to meet friends, even if that's not really the point of Zen. And through all that making do, Zen gets Californian because it can't be in a 1000-year-old temple in Japan, and it will never make its money from old family patrons who still want traditional funerals and weddings. It just happens, and your ego doesn't need to willfully engineer something it thinks of as Californian into it.

I'm blown away by this idea of form, but many of the old boomers who started attending the Zen Center in earlier decades are grumpy after the talk. In the early days there was no schedule at all, a bunch of dirty hippies hammering together cabins out of the wood lying around the old farm, and some were even high all the time, and the crabby boomers that now have white beards and mandala beads and a bunch of turquoise rings were all happy. But things changed in the last decade when the teacher's son who will take over the Zen Center went to Japan to train.

Rules especially rankle the spiritual-but-not-religious (Protestant lite) person who tell me they don't like "meaningless ritual." The meaningless ritual they hate most is chanting in Japanese, instead of English, because what's the point if you can't

understand what you're even saying, and along with the bowing, which feels very Japanese, and that this all feels appropriative and weird. When I've brought this up to the teachers, who are East Asian American, that I feel weird as a white lady doing Buddhism and maybe I should be a Catholic or something instead, they tell me I'm intellectualizing things that are just about embodied reality.

However much I like the idea of form, and the embodied reality of it, and being taken over by enduring practices that stretch back thousands of years into the past, I'm still exercising a significant amount of individual choice in choosing to participate in Zen. I grew up in a family of atheists, and most people at the Zen Center did not grow up in families of practicing Buddhists. The teacher and his wife, who are second and third generation Chinese Americans, actually also grew up in families of atheists, who were also annoyed with them when they started practicing Zen (for different reasons – namely, still fresh Japanese war atrocities against the Chinese in WWII).

When I expressed this reservation to one of the priests, and told him about an article I'd read about spiritual neoliberalism (I've since lost track of it), about people selectively picking out religious practice or parts of religious practice that suit their lifestyle, and asked what he thought about that idea. He said, it's good that there's choice, it's just important to pick one and go deep into it. Later that year, I did a ceremony, kind of like a baptism, of officially becoming a lay practitioner in Zen. The teacher described the process as getting married to Zen. Which is a form of relationship that's different than say, "belief" some sort of unproblematic rigid ideation of a cosmology a specific way but does emphasize a formal commitment.

In fact, when I asked about belief, early in my time at the Zen Center, when the teacher was talking about the way his teacher's Suzuki-roshi's presence at the Zen Center is signaled by the wind coming through the mountain, or the ways a double rainbow was

a good omen for an event, I told him, I didn't believe stuff like that, and was that a problem for my being here. And he said, you don't need to believe, it's true. The belief, the ideas, are sort of beside the point. Just keep showing up to the practice he said.

It isn't about belief, but it is about practice, I'm going to make a commitment and stick with this one, we're formalizing that we're going to try to make it work, even when I get anxious about the politics of appropriation or annoyed with the cranky boomers that also go to the Zen Center, or learn about an idea I feel resistance to, and that commitment a beautiful special thing. The solution to the spiritual neoliberalism is commitment, getting married – to a practice, to people, to place.

This consistency of place is part of what makes Zen Center special in a way that can be difficult to communicate to people. I've encountered many people who immediately have a negative reaction when they hear that the teacher's son is the next in line to take over the temple, which in fact, is one of the things the Zen Center really has going for it. That the Zen Center is a family temple, that a family has a multigenerational relationship and commitment gives it a different level of care and attention than other religious institutions that have been built to bring people in and out, at scale, and operate more as an institution, the kinds of new age institutions I'd been to before and that had really turned me off religion.

And, on the one hand, those kinds of institutions reach many people, and many people are very touched by those experiences, but there's this fluidness that makes it inconsistent too. Inconsistent, or a bit empty in the same way a mall might, or a condo. At it's worse, lifeless, and a lifelessness that isn't just about "capitalism," but life that's missing because of a semiotics of accumulation that isn't possible when people are just streaming in and out and so much energy has to be organized around treating people as interchangeable.

My first summer at the Zen Center, and in my visits since, my work practice has mostly been helping them write text for their website, fundraising letters, program descriptions. So, the whole time I've had a relationship to them, I've had a relationship trying to articulate what the space is. And it's difficult because the things that I think are most profound and wonderful about it are precisely what are illegible and even repel people initially. Like, the focus on form, and the fact that the focus on form is reinforced by being a family temple, one with multigenerational lineage. And family temple is something people are immediately allergic to – it summons up, nepotism, spoiled-ness provincialness, anti-meritocracy. Rather than being meritocratically passed on to the worthiest, most spiritual candidate, the lineage is being automatically passed on to the son. Which, on the one hand, is not how it happened at all. And regardless, as Deming and the communist lab techs told us in the first chapter, meritocracy is a lie that propels the worst parts of capitalism, and seniority-based pay scales are a much better system of valuation of a worker's worth.

Where does authority come from when you no longer believe in meritocracy. Even late David Graeber, as anarchist as anarchist could be, specified in *Fragments of an Anarchist Anthropology*, that sources of authority are a very important area of study for anarchists, because there is always some authority operating, even when you're doing everything you can to level the playing field (Graeber 2004).

To be a family temple and for people to be living intergenerationally there and for the space to really be someone's home, it has a very different feel, it feels very intimate. I was overwhelmed the first time I went there because it felt like someone's house. It is a very intense energy. And that's exactly what draws me to it now, that it has this potency to it, a small strong practice.

What's maybe most remarkable to me about whatever that potency is, is one time I was at the Zen Center is that the wife of the main teacher, who moved there with him when they first started the Zen Center, told us she cried for days when they moved there because it was so ugly, and she hated it so much. Linoleum floors, fluorescent lights, tacky wild west saloon doors, their son was just two or three and when he ran through the house, he fell through some of the floor boards. She told us this at a resident's meeting, and could tell we were all shocked, didn't fully believe her, and so they later found pictures for us, and it was in fact ugly. The property looked like rough little California shrubs overexposed by a bright sky with no trees or covering. It was ugly, and within 40 years, it's arresting, so arresting bicyclists passing over their ride through Sonoma Mountain Road will wander into the kitchen in the middle of the day, and say I had to stop and see what was here, it's so beautiful. The teacher has given us a couple of answers about how it could become beautiful, and one of the answers is, "it's the zazen" (zazen being the name for the meditation practice). That's what you feel when you feel compelled to get off your bike and wander in. And he points to these asparagus ferns that grow right out the door and they grow in a way other asparagus fern don't and he says that's also because of the zazen.

But it's also, he says, because of the mountain. They picked this place because of geomancy, because it falls on certain energetic lines. And lots of other religious organizations are on the mountain – a Mennonite community, other indeterminate New Age communities, none of them with any connection to each other aside from the mutual recognition that there's something to this mountain. The teacher has also talked about the ways his teacher, Shunryu Suzuki-roshi's presence is felt in the wind, and there's always the wind on the mountain. And that, when the wildfires blew through in 2017, and came up right to the edge of the property but didn't pass Suzuki-roshi's stupa

memorial (I have a picture of the burnt out trees feet behind it), and they say Suzuki-roshi's presence stopped it.

Asparagus ferns grow and fire stops based on the zazen happening inside an old barn, and the thing going on in the barn that you can have so much faith in, the zazen, is reliable because it's been passed down a lineage from teacher to teacher for the last 5000 years back to the Buddha. This sense of form – the form that allows you to meditate, that doesn't depend on you to "believe" it for it to work, that goes back 5000 years, and that also make the plants grow differently – has a relationship to what Carolyn Walker Bynum called a participatory ontology, a sense of the world in late Medieval Europe of an embeddedness with the physical environment (Bynum 2011) and that Charles Taylor contrasts to modernity's buffered self, no longer subject to mysterious external forces of the world (Taylor 2007).

Walker Bynum described the kind of cosmology and religious life where it wasn't that important for you personally to have a relationship to God or go to church on Sundays because the monks over there were taking care of that work, and you all lived in the same world together. Another time, the teacher at Sonoma Mountain talked to us about Sister Miriam, a catholic nun he met who did a hermitage in a cave for several years. And he told Sister Miriam when met her that what she's doing is important, because people know that she's sitting there in the cave and knowing that changes them.

When I asked the teacher at Sonoma Mountain Zen Center if he ever met Gregory Bateson, he says, he was so smart! He would talk and talk and then lay down and look up and still be talking!

He had nice memories of about Gregory Bateson, and certainly nothing negative to say about his stance of disavowal. Those things seemed beside the point.

It's somewhat like when I try to get them to talk about – and condemn – mindfulness or other forms of tech bro appropriation. In one moment, the teacher said, mindfulness is only half the jewel. What mindfulness doesn't show is that you have to let something go in order to receive mindfulness. In other moments, he's said about mindfulness, a little bit of a good thing is better than none of it, isn't it?

While I'm more fully bought in to Zen Buddhism than Gregory Bateson, I'm similarly struck by the same compulsion to use some aspect of Zen practice to show, at some level, a better version of a similar thing in the world (like ritual design, like bioengineering). And different people at the Zen Center have responded to me more times than I can count, this isn't intellectual or philosophical. This is just embodied reality.

But they have a gentle approach with me and the tech bros, and a different answer depending on what we have the capacity to hear that day because it's kind of beside the points. You risk missing the point, but it kind of doesn't matter too, because it exists beyond you – it exists and is doing work in the world beyond any individual's belief or nonbelief or instrumentalization. But it's easier to access that with other people, in institutional environments set up to make that container and those forms.

Empiricism

In my time in biotechnology labs, I often heard about a crisis of knowledge. The most dramatic version of this was from a woman who owned a company that integrates machine learning and biology. When suggesting the need for the integration of machine learning and biology, she describes a broken pharmaceutical industry, whose brokenness is especially visible in practices like the forced swim test. The forced swim test is an industry standard in anti-depressant drug trials. Before anti-depressants are tested on

humans, they are tested on rats, and the industry standard for testing how depressed a rat is, is to put it into a bucket of water and time how long it takes for it to start drowning.

The way out of this descent into apparent witchcraft in biomedical sciences, for this company, was constructing a high throughput biology lab that could screen for particular genes from single cell tissue samples (Reader 2020). I've seen several other presentations in these spaces that similarly point to an epistemic crisis in the biosciences that warrant newly available artificial intelligence – machine learning – digital infrastructures. Sometimes I heard in presentations about the replication crisis in peer review, in which most published research findings are false (Ioannidis 2005). I heard multiple times "the low hanging fruit" of life science research was gone. The easy, straightforward advances in knowledge have already been discovered, and the way forward to progress is more subtle.

But what united many of these was a sense that a newly possible empiricism with digital infrastructures (sometimes called machine learning, artificial intelligence) was the way out.

And depending on who was talking about it, the bio plus data project could easily start taking on a metaphysical register. It would be a stretch to read most of this biotechnology as an explicit re-enchantment project, but the ways life itself and data as transcendent potential both get invoked often take on spiritual inflections from the 1960s counterculture which others have shown at the baseline of many aspects of a Silicon Valley ethos. Most obviously, in someone like Drew Endy, who's pitch for synthetic biology usually involves pulling on some aspect of counterculture aesthetics,

quoting Funkadelic, visions of houses growing of trees to emulate homesteader craftsmen elements (Endy 2014a; 2014b).[10]

Many biotechnology companies are much more rooted in their visions than these kinds of early claims in synthetic biology – even put themselves at pains to distinguish themselves from wild promissory visions, but they still sit within the same ethical norms and political economy which value the sorts of things Drew Endy has successfully put into the world. Which is part of what interested me in a company I learned about called Zymergen, that said they were organized around the principle of radical empiricism.

Racial empiricism caught my attention because it's a phrase used by the pragmatist philosopher William James. James critiqued an inappropriate focus in western science on objects, and pointed to the ways this narrow approach is what usually falls under the header of empiricism. He argues this orientation is in fact not empirical enough. Rather, the full spectrum of sensory intake is more immediate, and therefore, true empiricism. This means understanding reality is made of experiences, and what he translates that into is relations. A radical empiricism should center on relationships between objects, and between knower and known, as opposed to just the objects themselves (James 1976 [1906]).

It's a conception of empiricism that has resonances with causal notions of the uncanny (Morton 2013), primes a relationship between a subject and their material world not unlike Gregory Bateson's thinking on recursion – and the kinds of recursive accumulation between people and places described in the first chapter on institutional

[10] When I spent time at the San Francisco Zen Center, and said I did fieldwork with people in biotechnology, more than one person asked if I had heard of Drew Endy. San Francisco Zen Center's vegetarian restaurant, Greens, is a neighbor to the Long Now Foundation, a project of Stewart Brand, founder of Whole Earth Catalogue and another cyber-culture-counter-culture spanning individual. Drew Endy has given a talk at the Long Now Foundation. There doesn't seem to be a formal relationship between the San Francisco Zen Center and the Long Now, but there maybe some version of a zone of interchange between the two.

knowledge in the organization. And it emerges from the same body of work as the thinker who wrote *The Varieties of Religious Experiences*, cited as influence by Stanford's ritual design labs. So I was interested in the ways a biotechnology company understood radical empiricism as a part of technological practice.

Zymergen does not use the phrase radical empiricism in reference to William James' empiricism. I was able to learn more about what Zymergen meant when they said radical empiricism after a representative from their company saw a presentation of mine at the 2017 Engineering Biology Research Conference, on an early version of the materials I discuss in the first chapter on institutional knowledge. They talked to me after, said that the talk resonated, and asked if I might like to do fieldwork at Zymergen.

The company was keyed into a similar conversation as the invocations of the crisis of knowledge at the beginning of this section. And they were in engaged in a mode of experimentation with knowledge production that was cultivating attention to the material environment, that was also dependent on the way that could be networked with digital infrastructures. During my fieldwork with Zymergen, I saw the ways this was articulated through: a focus on flexibility and modularization in equipment, the ways this in turn focused through modes of statistical analysis, and a redirection in attention away from upstream genetics and toward downstream fermentation processes.

Zymergen describes radical empiricism as a process they say means "removing the constraint of hypothesis-led discovery" (Zymergen 2018). While early iterations of synthetic biology were "rooted in the concept of programmability — the notion that biology is an information system with an instruction set encoded into DNA and executed by the molecular machinery of a cell" (Gardner and Hawkins 2013), newer companies take a less programmatic approach. As Zymergen writes on a blog, "There is a logic (or

several) to how it works at the molecular level, but that cannot be reduced to a single, elegant principle or deterministic formula" (Zymergen 2017).

They also specify on this blog post that technological progress can precede scientific understanding. While the Human Genome Project was underwritten by the idea that gene therapies and other technologies would be enabled by mapping the gene, this process wasn't able to reveal all their functional processes. But we can be assured by other examples in science – like vacuum tubes and steam engines not just preceding, but becoming the warrant for understandings of thermodynamics.

Baked into this is an acknowledgement of the fact that genetic engineering only move bioengineering so far. The recursive principle is also something that was consciously carried over from computer programming and electrical engineering into synthetic biology (Endy 2005). Synthetic biology sense came from emulating computer programming recursion, and this recursive element is even more emphasize in the growing sense in the field that living things don't behave like computer programs. Genetic engineering proved to be far more complicated, in part, because of the ways populations of living things tended to mutate out of their genetic modifications "downstream." This doesn't render the project of genetic engineering pointless so much as make it less straightforwardly about the manipulation of genes. Instead, a host of many other factors influence what genetic modifications work under which conditions. The remedy is to be radically empirical, instead of theoretical, and to direct more attention to how the biology operates in downstream processes.

Radical empiricism seemed to signal this move away from the upstream. In the lab, I was interested to see how it was articulated in practice. It was also, however, articulated as solvable through data tracking. This is also a carry-over from synthetic biology, a computer programming approach to the life sciences, and the hope that large

data sets can solve certain biological problems. Radical empiricism in this sense is about scalable output and tracking.

One of the most obvious ways radical empiricism was articulated was through data. And in an environment of lots of data, I was told noise is an engineering problem. I was also told that improvements were still possible by parsing out almost imperceptible "hits," or improvements in strain performance, and stacking these on top of each other. They're able to stack tiny fractional gains in engineering yield and stack them on top of each other and that works, they're able to get something meaningfully different. Learning about infinitesimal gains stacked on top of each other was one of the moments I was told about the ways the low hanging fruit of life science research is gone.

Radical empiricism is also articulated in a design principle of flexibility. This was visible in a system in development during my visits, called the racks. Scaled bioengineering required the movement of biological samples through robotic equipment. This equipment can be fragile and buggy (like the equipment discussed in the first chapter). As a solution, Zymergen was experimenting with treating each one of these pieces of laboratory equipment as a module, that could easily be substituted in or out. This was seamless substitution would be made possible by digital tracking systems that tracked both the performance of the equipment and the thousands of samples moving through them.

So, a radically empirical approach was made possible through data tracking, not only because of various quality control metrics that could be tracked, but also because it allowed a modular, flexibly adaptable factory line. To develop a recursive design cycle, equipment with feedback loops that could be tracked were also incorporated. It was necessary to make this infrastructure mutable enough for biological samples which are less inert than other traditional engineering materials. The racks allow material

infrastructure – which can be so fragile and buggy – to stay high throughput and also flexible at the same time. Radical empirical in this sense, means responsive to the environment, and adaptable to change.

These themes also appeared in a new direction several people mentioned at Zymergen, which was gradually shifting focus from genetic engineering "upstream" to the fermentation process "downstream" of it. The central dogma of biology has, for at least half a century, centered on DNA as the keys to all other life processes, and genetics continue to dominate many considerations of novel biological technologies. However, in some of these organizations which are imagined to be on the cutting edge of genetic technologies, are directing increasing energy toward old world fermentation. The fermentation scientist I talked to at length about some of these trends described his position in this way, introducing old world science to cutting edge science. So old to as predate many of the things we take for granted as science, and, in the European tradition, cultivated as part of monastic economic self-sufficiency.

The focus on data has a regulative effect on facility building, where knowledge and practices are both tracked in novel ways through digital infrastructures, alongside the accumulation of knowledge in material arrangements and people who work in facilities. The recursive loop allows a more nuanced, and maybe untraceable, capture of knowledge in spatial arrangements and organizational patterns only captured by a literal, physical place, as talked about in the chapter on institutional knowledge.

Last Thought

The problem with re-enchantment, and any kind of project that focuses first on epistemic change, is the ways it drifts from political stakes. The literature on the ontological turn in postcolonial anthropology is immediately keyed into these stakes,

because of the ways that intellectual work affirms the most exoticized and marginalized of knowledge in the postcolony. But political stakes, and especially the political stakes legible to the visiting anthropologist, are only a narrow element of the number of things that could be grouped into religious life and local cosmologies. Which, in a way, is the social science's own motion of disenchantment – needing to formulate and reduce things to their pragmatic political value.[11]

But the idea of recursion has appeared all over this dissertation. Bateson's focus on recursion, and Foucault's focus on recursive elements through ethics, both cultivate an attention toward the way what might be taken as a hyper-individualized subject is embedded in a material and social world – and this is an observation with its own political stakes. Other practices are being cultivated in the Bay Area, also resisting hyper-individualization through much more radical projects than the type pursued by the technologist inside the lab.

[11] Thanks to Gaymon Bennett for this point.

CHAPTER 5

MOVE HOME WITH YOUR PARENTS

This chapter focuses on the aspiration to placelessness as it exists as a part of subjectivational practices. It considers these modes of subjectivation as they have been critiqued by a local landless people's movement, Poor Magazine. The organization's main message to gentrifiers is that the most radical action you can take is to move home with your parents.

This set of materials follows from the last chapter – which characterized a self-defeating motion that seeks out liveliness in the city, preferably ethnic forms of liveliness, only to contort that liveliness back into the confines of an existing way of life that's trying to be escaped from.

The ethic put forward by Poor Magazine instead affirms moving home with your parents as a form of embeddedness exactly where a person can be their most fully realized, agential self. That ethic also makes explicit that technology doesn't just strive to placelessness. The technologist themselves also has to strive to placelessness in certain modes of subjectivation. The ethic also suggests this subjectivational mode, and the violence attached to it, can be undone by cultivating a more tethered multigenerational relationships to place.

In 2019, I'm driving off the Interchange 80 Ashby-Shellmound Street. There have been tents in the embankment next to the offramp as long as I've spent time in the Bay since the early 2010s, but today I pump my breaks because the encampment has grown off the embankment and onto the road.

Moments like these were a primary destabilizing force in writing this dissertation. They were moment where it felt like there was nothing all that important to say about,

say, institutional knowledge in the lab or tech bros taking ayahuasca. But the worlds are related to each other, not just because one is just down the street from the other, but because privilege and precarity are co-constituted with each other, including the privilege in a lab space and the precarity of tents crowding a freeway off ramp a half a mile away. At one level, there are the kind of tax breaks and city policies doing all they can to get tech companies in their empty buildings, and consequently, gutting the social services this means they can't afford. At another, the presence of tech companies and tech workers creates gentrification, housing prices creep up, and old residents gradually get pushed out.

But despite all that, once things are operating at the register of gentrification or political economy, you the tech worker at your desk about to click the purchase button on your cart with $50,000 of polymerase are somewhat off the hook. These are big structural forces, demographic change, and you can vote for the right city officials and watch A24 movies about the death of historic neighborhoods, but there's only so much you can do.

Which is what interested me in a vein of activism in the city that directs attention to gentrification at the level of an individual, and the way they occupy space and move through the city. This activism is directed at putting individual gentrifiers back on the hook with personal actions and values that stand to be reconsidered, and in reconsidering them, might significantly change tacit baseline values and actions that seem to inevitably lead to gentrification.

In this paper I want to focus on the message from an Oakland revolutionary press called *Poor Magazine* sends to local gentrifiers: move home with your parents. I consider the way their imperative to move home, both speaks to and radically alters considerations of self, place, and ethics in the contemporary social sciences.

This chapter operates as a last word on the themes pointed to in every previous chapter. Every chapter has reflected on some aspect of place, and an aspect of place that begins to point toward practices of consistency and re-solidification, in contrast to a "liquid modernity" with a normative emphasis on shifting rather than staying (Bauman 2000). My attention to this theme came to the foreground through the teachings from this landless, decolonial, black and indigenous group from Oakland. I'll suggest the ways their proposition stands as a remedy to the nonplace.

Self and Place

This vein of activism first came to my attention during the 2013 Google Bus protests. The protests were two years after the passage of the infamous Twitter Tax Break in 2011 that cut a payroll tax break to tech companies with headquarters in Mid-Market. The protests were also a few months after I moved to the Mission, ground zero for exactly the thing being protested, the Mission being largest symbolic casualty of gentrification and the tax break, a Latinx neighborhood just south of Mid-Market that had become a favorite neighborhood of white hipster artists, and then techies.

Before the protests, tech busses seemed to many of the tech people I knew at that time like an innocuous part of their presence in these neighborhoods. Tech busses were luxury busses that shuttled people from the city to the south peninsula, where many of the tech companies were located. Maybe they were a little ostentatious, but overall, they seemed like a net good because they were, after all, taking cars off the road and riders off crowded public transit. The tech busses picked up workers from public bus stops, and this is where the protests were, most especially the stops for tech busses in the Mission. Most tech workers I knew felt the protests were a little unfair and illogical. Out of all the things to protest, why protest carpooling, reducing a carbon footprint?

I lived with a boyfriend at that time who worked at Genentech and rode its shuttle during the Google Bus protests. He came home one day still sad from 10 hours earlier when he had gotten on the Genenbus and a crowd of protestors was there jeering and as it drove away someone through a milkshake right at the window he was sitting by. Even though he was sympathetic to the ways he was participating in gentrification, it felt unfair, because he felt like he was making cancer drugs, not Farmville apps, there was a difference, and how did it help anyone getting gentrified to throw a milkshake at his bus.

I always felt I had a fundamentally different experience of the city than him – he would put on his headphones and marvel at the sparkling ocean and be at work in South San Francisco in twenty minutes, and I would get on the BART then wait to transfer to the always late Emery-Go-Round over the course of an hour and half where I was looking at a lot of things less marvelous than a sparkling ocean. In retrospect, I've wondered how much our relationship disintegrated because of our different commutes, when we moved to the city and he stayed as breezy and happy as we both were where we met sleepy Davis, and I descended into one of the worst depressive episodes I've ever had.

If you consider that, that riding a luxury bus gives you that radically a different psychological experience of your city, that a commute has the potential to routinely expose you to a mess you are helping to make, and that a luxury bus makes that invisible to you, then protesting luxury busses makes a lot of sense. And if what's being protested is the privilege of this disconnect, then the most sensible thing you could do to a Genenbus is throw a milkshake at the window.

And aside from changing the minds of tech workers, the Google Bus protests were also effective as public theater in such a way that they were able to sustain several weeks of local and then international news coverage (Oreskovic 2013; Gumbel 2014). Which was a key part in the turn of the tide in public sentiment that led to San Francisco's city

council unanimously declining to renew the Twitter Tax Break in 2019, calling the policy a “shame and disgrace” (Brinklow 2019).

Which is all to say there was a savviness in these protests in deciding what to protest, to protest the ways tech workers occupied space in the city, in a way that was easy to take for granted as outside the bounds of the political, and in a way that the protests effectively moved into the bounds of the political.

This is what first directed my attention toward *Poor Magazine*. *Poor Magazine* is located in deep East Oakland, and one of the organizing forces around the Google Bus protests (Gray-Garcia 2014). They were also one of the earliest critics of the Twitter Tax Break and also instigated protests in 2011 that brought international attention to the tax break as a problem for the most marginalized living in the city (Fernandez and Redell 2013; Examiner Staff 2013). They identify as a radical, black and indigenous led landless people’s movement of the Bay Area. They identify as a landless people’s movement because the people at the center of the organization have spent periods of their life unhoused and in severe poverty (“Poor Magazine”).

In addition to public modes of activism and community support, they publish a monthly magazine, books, poetry, newsletters, and host a People’s School. This means they produce a considerable amount of writing, pedagogy, and theory from the perspective of being unhoused. This is not a perspective that could ever speak to the totality of poverty or experience of being unhoused in the Bay Area, but it is unique in that they have an organized, long running program of specifically speaking to tech gentrifiers.

In the same way critical theory and iterations of standpoint theory have come to recognize that Black people have a privileged perspective on whiteness (Hill Collins 2000), women on patriarchy, the working class on the owning ones (Harding 1987), the

landless have a privileged perspective on land. The things the housed take for granted about their movement through space and place are very visible to unhoused people systematically denied place and space. Which is an even more vital perspective when so much writing about tech gentrification and the housing crisis in San Francisco, and gentrification in general is at an impasse: writing about the immovable macroeconomic forces on the rise for the past half century, or the inevitability of demographic change, or elegies for the already lost soul of old neighborhoods.

What's more, *Poor Magazine* directs instructions specifically toward gentrifiers. In their writing and in the People's School they host, they say: the most radical act you can take is to move home with your parents. Moving in with your parents is divesting from capitalism, divesting from taking up more real estate and buying extra versions of things people you know already have. It's divesting from the Protestant work ethic and spirit of capitalism (Weber 2013) that says your source of meaning in your life will come from the right form of exciting work, and that your life should be organized around finding the place to do that work. It's re-building intergenerational ties severed in chronic individualism and the devaluation of elders. It's prioritizing an enduring relationship to the place and the people you could have the most enduring relationship to (Gray-Garcia et al. 2019).

Which is an interesting proposition on several levels. First, because of the way it affirms emergent themes around place in other chapters – the importance of institutional knowledge, the amplification of a self in recursive relationships to the environment, the devastation in creating nonplaces for people to trammel in and out of, the thin-ness of efforts to revive nostalgic moments in the city history as an antidote to these ills. In different ways, each chapter points to the value of a subject staying in one place. The proposition to move home with your parents affirms this value but carries it

many steps farther than staying at one company or "getting married" to your spiritual practice. It takes you – temporally and spatially – all the way back to the origin.

The proposition is also interesting because, despite it affirming an emergent set of observations in this dissertation, I've never heard it as an element on the table in the hundreds of things I've read about gentrification. It, as Saba Mahmood said, "exceeds the conventional political," exceeds it so much that it reads as retrograde. If "family values" are invoked at all in the American political public sphere, it's most often in association with the political priorities of the Christian right (Dowland 2015), and often, by extension, values of patriarchy and white supremacy. Moving back with your parents would be a step back, a signal of failure, and shocking to most people I share it with – which seems to be the sign of a truly radical proposition.

Finally, moving home with your parents translates the large political impasse of gentrification into an ethic and practice of self. Refusing gentrification is boiled down to a simple, if difficult, action. And it's boiled down to an action that isn't heroic or exciting. "Move home with your parents" puts gentrification back within the bounds of an individual gentrifier's choices, values, and ethics. It is a notion of self that is empowered less by individuation than by a consistency in environment, both physical and familial. The self is strongest when within its family of origin.

This orientation flips the problem of homelessness on to gentrifiers, rather than unhoused people. The literature on the anthropology of homelessness consistently points to the way homelessness is criminalized, and the ways the rise in homelessness is the direct product of neoliberal policies and practices at the end of the twentieth and early twenty first centuries (Glasser and Bridgman 1999; Gowan 2010; Hopper 2003; Lyon-Callo 2008; O'Neill 2017). These neoliberal policies have rolled back social services and encouraged market and private capital to fulfill these needs, and then enforced state

instruments of control (law, military, police services) to protect private capital and the privileged classes who are owners of private capital (Harvey 2007).

The idea that that criminalizing homelessness, and the unhoused subject, does nothing to solve the problem of homelessness is interestingly shared by even the city officials purportedly responsible for continuing to criminalize homelessness (Mark 2020). Which makes it more important to not only pay attention to policies, but ideas that continue to authorize them – the way the law, military, and police services become essential in protecting a privileged class' way of occupying place.

The law, military, and police and the ways they have become activated in the project of neoliberalism are in service of a neoliberal subject whose citizenship is increasingly disconnected from conventional places (like a nation-state) and is reconnected to aspects of market forces; highly valued individuals are mobile and can exercise citizenship-like claims in many places, and devalued citizens are subject to exclusion (Ong 2006, 6). The neoliberal subject is also related to the neoliberal policies have conceived of urban space in terms of private markets, which ultimately drive gentrification (Kasinitz 2012).

This hyper-individualization both makes and is made by nonplaces. Marc Auge defined the nonplace, negatively, as a place marked most by its absence of meaningful social signification, and positively, as a place meant to move people and capital in and out as interchangeable units (Augé 2008). Augé lists the shopping mall and the airport as canonical nonplaces – sites which facilitate the movement of people in and out in the name of consumer capitalism and travel. Which begins to suggest the subjectivizing quality of the nonplace. Nonplaces make travel and consumer capitalism possible for the kind of subject that wants to travel and buy things, and also, are an element of the apparatus which produces a buying, traveling subject.

Travel plus consumer capitalism converge in gentrification, as a kind of extended stay, where younger members of middle and upper classes stay while they're still young and without children. The emphasis on gentrification is usually on demographic changes in economic value and racial composition ("Center for Disease Control - Gentrification" 2017). But, high density gentrified urban areas are disproportionately occupied by younger people, living in the city while their still young, and likely to move out again if they start families (Moos 2016).

The nonplace cultivates a certain kind of subject that moves in and out, and needs enough disposable income to be able to move so freely. In San Francisco, they probably need a tech job for that kind of flexibility in movement, and then of course, the explosion of tech wealth continues to escalate housing prices. Off-shore capital sees the booming housing market and buys up houses and condos, many of which stay empty (Weinberger 2015). Old timer white homeowners are annoyed about the tech bros and San Francisco becoming less of a real city every day and housing restrictions multiply to prevent building high-rise condos, and unfortunately by extension, other kinds of housing (Shaw 2020). And there's only so much housing that could be built anyway, because San Francisco is a tiny little toy city, looking like the land of Oz shrouded in mist from the water on all sides on the drive over the Bay Bridge, which makes it continually appealing and pretty, in spite of itself.

The San Francisco Bay, as nonplace, "makes live," to use Foucault's phrasing, the kind of neoliberal subjects with enough income to operate in the capital-intensive nonplace, and "lets die" the subjects that fall outside that kind of subjectivity, in the embankments next to freeway offramps. The punitive approach to homelessness targets this subject that has already been left to die in the conditions of city level neoliberalism.

Poor Magazine, instead, addresses the neoliberal subject, that gentrifies, and encourages them to re-think this process of subjectivation they have found themselves in.

As *Poor Magazine* has written, specifically to Marc Benioff and his $30 million project to "solve the homeless problem," you are already off track as soon as you've started to talk about "the homeless problem" – you've made a fun puzzle for policy makers to sort out with coffee and white boards. We already know that capitalism and wealth hoarding causes homelessness, and $30 million projects to study the homelessness problem throw up a smokescreen to hide the wealth hoarding that makes the problem in the first place. Why don't you give the people without houses that $30 million dollars, and if you really can't give unhoused people that money, and you need something to think about on your whiteboards, why don't you go research the wealth hoarders making this problem (Gray-Garcia 2019).

Despite difficulties of power-differentials, this is a call that re-affirms anthropology's call to study up and to study technologists (Nader 1972; Marcus 1995; Knorr-Cetina 1999; Rabinow and Bennett 2012). In the rest of this chapter, I follow this call to study up, guided through the theorizing by *Poor Magazine* and their imperative to move home. What's under examination is not *Poor Magazine*, but the kinship ties of tech gentrifiers, as understood through the writing of *Poor Magazine*, complemented by my in-person experience of their 2022 Winter People's School, and narrated partly through the ways it's led me to question the ways I move through place and space, as a tech gentrifier. It looks at their remedy on offer to the nonplace, and, in the next section, shows how this disconnect to place is related to a disconnect to family.

Self and Kinship

Saba Mahmood's conceptual attention to performativity in Egyptian women of the Islamic Piety Movement reworks feminized domestic space as a site of political agency (Mahmood 2004). A similar frame toward subjectivation can recognize the political agency of moving home with your parents – something poor people do, which, from the point of view of culturally dominant notions of self-actualization, keeps them from being their most fully realized agential self. *Poor Magazine* says this is actually a mode of self-cultivation that recognizes the self is most amplified and agential when it's embedded in commitments to kinship and place. But, *Poor Magazine*'s idea of self is different in than the self of the women's piety movement in that it is explicitly political, and connected to revolution and institutional change.

Saba Mahmood's work modified a notion of performativity from gender and queer studies, from Judith Butler. Much of this work on agency and a notion of self rooted in performance comes specifically out of queer life (Butler 1990). When you have a self that you're told isn't supposed to exist, how does that change your notion self? You prime agency, through the notion of performance, to break out of the notion that women naturally wear skirts, date men, and show the ways this is socially constructed, and performed, and that it constantly is constructed and performed otherwise. Performance still suggests a person in reference to other things – a certain stage to be performing on – but the self is primed more than anything, in trying to point to the ways the self can improv a little, where that self might have thought it had to follow a scripted play.

This work is helpful to think about because it's a space that thinks about self and kinship, and think about them in a way that primes social agency and construction. This theorizing was in conversation with queer world building in the 1980s and 1990s – and most likely the ways this was centralized in San Francisco. Mahmood's book is also in direct conversation with a theory of self explored by Foucault and Foucauldian ethics. He

watched the Castro and queer world building of San Francisco with interest even if he didn't fully subscribe to it (Hubert L. Dreyfus and Rabinow 1983). That was part of the inquiry into practices of sexuality in the first place, to ask how else it's been done – to try to do it otherwise. You can see this in the later volumes of *History of Sexuality*, where he goes into the Greeks to think about how romantic relationships, and especially homoerotic relationships, have been constructed differently over time, for more information to think otherwise about these relationships.

Worldbuilding was part of the queer community, and especially, the idea of a chosen family. This appears, and is maybe most directly sourced from, ballroom culture in New York – as seen in *Paris is Burning* (in fact, the whole notion of performance seems to be in indirect reference to ballroom culture – where people dress not just as women, but, very convincingly as CEOs, high school cheerleaders, etc., making obvious the ways CEO-ness, just as much as male-ness or woman-ness, doesn't come from biological determination, but is socially performed). Where, partly to survive, and partly to make art, house families of drag queens get made – gender nonconforming brown and black people, subject to extreme violence, make family systems, with house mothers, to mutually support and care for each other.

The thing about this form of found family and queer kinship is that it's often premised on familial rupture and rejection from family of origin. Rebuilding, and the individual as a force in the rebuilding, is primed when it literally needs to start over from scratch. You remake your own family as your chosen family, and kinship is performative the same way gender is, because gender roles are defined in large part by kinship structure. The "It Gets Better" Project from Dan Savage (criticized by many in queer community (Johnson 2014)), for example, sends the message to queer rural kids that "it

gets better" after leaving high school when they have the freedom of movement to get to a city more accepting of their queerness.

Queer and feminist thought has informed a lot of the contemporary conversation in anthropology on kinship, and their critiques of the biological basis of kinship. After falling out of favor in most of the end of the 20th century in anthropology's postcolonial turn (Peletz 1995), this classic framing of anthropology has been renewed again, in large part because of the ways queer and feminist studies of kinship have been able to reframe the conversation (McKinnon and Cannell 2013; Ball 2018). Sahlin's book about this defines kinship as explicitly not about biological connection through blood, and instead, the more fluid and flexible "mutuality of being," as he says, "not nature but culture" (Sahlins 2013, 2). And the key part of the reframing is moving away from biological determinism and toward social construction. For example, Strathern's new book points to the shared root word for both "kin" and "friend," "freond" split in 17th century England (Strathern 2018) (and in doing so suggest the way kin and friend might be an artificial division). The project primes the agency and social construction in kinship relations, in order to open possibilities for them being constructed otherwise – especially outside the restrictions of heteronormative patriarchy.

As Jasbir Puar points out, in her articulation of homonationalism, attention toward queer issues tends to narrow to its whitest, wealthiest, most patriarchal forms (which has ultimately allowed queerness to be in service of nationalist agendas of western imperialism) (Puar 2007). This is also the subset of the queer community that has also had the disproportionate privilege to theorize queerness, which has included substantial theorizing on kinship. The most visible forms of queer theory were developed by white queer elites who have a certain freedom of movement in the ways they navigate place.

And the way, say, rich white queer men or women build found family in San Francisco may be very different than the way brown and black people in New York ballroom culture form enduring family. And that difference may have a temporal and spatial dimension.

There can be a dramatically different temporal dimension to queer world building that doesn't appear in things like performativity because it focuses so much on the individual. For example, part of the way San Francisco's queer scene was historically constructed was through gay male bathhouses, which are primed on casual sex (Bérubé 2003) – typically, a fleeting experience. A friend who was part of that world, told me once he was trying to quit bathhouses, and it was hard because he really loved the ways having sex with people gave you a way to talk with you guard down, with a stranger and he couldn't quite replicate that anywhere else in his life, even though he knew he had to quit it because he felt there was something not fully real or healthy about that hotwired intimacy. He was conflicted about the ways it gave him the feeling of intimacy, without the commitment of real intimacy.

Which isn't to generalize the queer kinship or even the bathhouse experience or even casual sex based on the feelings of this one person at this one moment in their life. But it is meant to show that, because there's not an emphasis or specification on temporality, it can be as fleeting as a one-night stand or as enduring as being a house mother for forty years of your life. And anything in between, like being less available to your found family when your career takes off, or drifting away completely, because the people you felt close to are starting to grate on your nerves, maybe because you've changed, or they've changed, or nothing's changed.

In the book, *Poverty Scholarship*, they make the concession, if your family really is unsafe, it's important to find another family. This is the exception to the overriding

rule of moving home with your parents and being a part of the place you grew up in (Gray-Garcia et al. 2019). But even this exception, a cautious exception, puts a stipulation of temporality that normally isn't a part of queer kinship. You can't move from affinity group to affinity group, city to city, however your ego pleases. If your family really is unsafe, then it's important to find somewhere else to make a commitment to and build an enduring relationship with.

This endurance is why *Poor Magazine* says family ties are so important in the first place – that an enduring commitment means they're stronger than other relationships you can build in your life – like, for example, the friends in your freshman dorm room before you move to different cities after college. In other words, by staying in one place, and with one group of people, you can affect most agency. Even if your parent is a white nationalist – maybe especially if your parent is a white nationalist, because you, as a kin member, with intergenerational ties to that person, are in a unique position to help change that person's mind (Gray-Garcia et al. 2019).

Which is very different than the psychologically based, Freudian notion of self and agency, in which a self becomes its most self like and agential when it fully individuates from its family of origin. Circa 1960s, circa volume 1 of the *History of Sexuality*, these theories of self and biopolitical governance were articulated in part as a critique of the anti-psychiatry movement, for the ways it tried to discipline out things like queerness (H. L. Dreyfus 1987). But since that period, psychology has made changes to de-pathologize homosexuality (Drescher 2015), and therapy has become an increasingly normalized part of adult life, at least especially in higher income brackets (Chamberlin 2004). Freudian psychology sees trauma as an external force which wounds people and makes their life dysfunctional, the most pernicious and hidden versions of

this introduced primarily by the family of origin. This puts a heavy burden on the family of origin, which then becomes the warrant for individuation and separation.

And, as *Poor Magazine* writes, psychological individuation is also physical individuation, and ultimately effects how we occupy land (Gray-Garcia et al. 2019). And this is important, they say, because intergenerational living is, above all else, anti-capitalist living. You are not buying an extra set of everything and taking up more resources. Because while gentrification appears as part of broader historical, hopeless demographic and economic changes, it also connects to individual decisions to live in a separate space – a decision that then demands buying another set of everything you already have access to.

Gentrification, in addition to coinciding with a period of time after World War II, on the rise since the 1950s and 60s, is also specific to a population of young people who grew up in suburbs who are taking longer to get married, and exist in suspended adolescence for longer and longer periods of time, in which they live in the city while they're still young, and while they might tell themselves they'll live there forever, end up moving once again to suburbs practical enough to have a family (Palen and London 1984). The rise of gentrification lines up with a class of people with the disposable income to be mobile, move in a place temporarily and move back out, and also aligns with a rise in income inequality (Piketty 2014).

Which takes us again to nonplace. If the nonplace is a place built to facilitate processes of commensuration – movement of people, capital (Augé 2008) – the facilitation of movement is part of what eliminates place. Maybe, what makes the Mission the Mission, is not only murals and burritos, but something the gentrifier doesn't know how to articulate, the accumulation over time of meaningful human relationships. The neoliberal subject of the nonplace works to identify elements of place

once a nonplace starts to appear, the thing that was special about a place that made them want to move there. Maybe it's the food or art, but then saving the murals or patronizing the taquerias and preserving place in this sense of place only seems to mummify whatever was there before, because it wasn't really about the food or art after all.

But this mummification is a consequence of the nonplace the gentrifier is trying to escape. If the suburb as posed as sterile, immature, and absent, this idea of absence produces is an attraction to a real place, the non-suburb, the urban, the dirty instead of the tidy, the poor instead of the rich, the ethnic instead of the white (much like disenchantment produces re-enchantment, and maybe specifically an attraction to Chinatown or Japantown). The suburb is imagined as a state of immaturity which needs to be remedied with the maturity earned in the grit of urban life.

But maybe the solution is precisely the opposite of the one imagined here – maybe the suburb which feels new and lifeless just needs to be lived in a little longer to acquire that life. Because, after all, is someone in a state of greater maturity stumbling down Valencia Street day drunk at Santacon on a generous winter holiday off from their tech job in San Francisco than they would be living in their childhood bedroom, caring for aging parents and chipping into their monthly mortgage with a non-tech job?

Moving home with your parents seen as regressive, and it's posed here as revolutionary. It's a notion of revolution that is maybe the exact opposite of what we think of as revolution, as existing in domestic space, progress that looks like regress. Which is, one way, a huge relief. Millennials are in regress, the story goes, downwardly mobile, and anyone wanting to point to the failures of the generation will point to the ways we are all in our 30s and still living with our parents (Fry, Passel, and Cohn 2020). But *Poor Magazine* points to this as progress and not decline. You don't leave, you stay with your family and in your hometown.

The Workshop

Poor Magazine hosts their people's school twice a year, that includes a track for other poverty scholars and a track for scholars with privilege. The workshop is led by Tiny Lisa Gray-Garcia, who co-founded *Poor Magazine* in 1995 with her late mother, Dee Garcia.

I signed up for their Winter 2022 People's School, on the privilege scholar track, running from mid-January to mid-March. It takes me a full year (three workshop cycles) between when I mean to sign up for the workshop and when I actually do. To do the workshop, you fill out a form, and one of the questions on the form is: "describe your mother." The question feels intrusive which means it violates my sense of what's relevant, what is public and private space.

There are lots of ways bureaucracy has been critiqued, paperwork, the language as a barrier to access (Cruikshank 1999). Members of the middle class learn from an early age how to navigate this kind of bureaucratic space in a way that works to exclude poor people from the resources they need more than middle class people (Graeber 2016) – and this form is a reversal of that dynamic. It's an intentional hack on the bureaucratic form, where they ask intensely personal questions, with the note at beginning of the form, that your education in people's school starts with paperwork.

They tell us in the workshop, it replicates the experience of being poor, where you have to constantly relive your trauma in front of people over and over, to justify your need for help. In blank space on pieces of paper, you need to constantly explain all the worst things that have ever happened to you.

The workshop is almost entirely created to help us redirect our thinking about families in less a black and white way. It shows us narratives based in poor, indigenous,

black experiences, and has us tell our own narratives, and helps us understand relationships between these.

There are four sessions in the workshop, and the first session is El Teatro de Pobre, theater of the poor, where we watch member in *Poor Magazine* re-enacting scenes of their real-life: evictions, raids by Child Protective Services, life on the street.

After the initial introduction session, the privilege scholars move into a separate session for the next three meetings over the following two months. These are organized around readings from *Poor Magazine* and movies that we break down in detail. Each of the movies has to do with separations of different indigenous families.

First, we watch *Real Women Have Curves*, a 2005 film about a Los Angeles Mexican American teenager in her summer after high school graduation, working in her sister's garment factory, and dreaming about going to college at Columbia. Her overbearing mother bullies and body shames her, her high school teacher encourages her to apply to Columbia, even as her parents tell her she needs to stay home and work. She resents her work in the factory but slowly comes to appreciate the hard work her sister does. At the end of the movie, she does get into Columbia, and leaves, though her mother, in a rage, refuses to say goodbye to her.

Tiny points out all the way this very familiar narrative – American dream for model minority achieved through college scholarship – falls fallacy to what she calls "away nation." She has met the woman who wrote the play that was the basis for the movie and tells us the ways the real life story has been exaggerated into a Hollywood version of events. The mother is a one note character and every scene with her is dripping with disdain for her soap operas and simple mindedness. To get away from her mom and break free, the daughter's only available option is to go to college – and for some reason, the only option is an Ivy League across the country when Los Angeles is full

of good colleges. Her going to college is made as a foil to her sister, who is portrayed as pathetic, when in a different story, she could easily be the hero. The sister makes an indigenous microbusiness for the family and the community to survive in together. Not to romanticize the difficulties and exploitation of factory work, but it can still be affirmed without being romanticized for the ways it's embedded in and amplifying family and community.

Tiny points out that for "away nation" and capitalism to make sense, things have to be constructed in a narratively extreme and black and white way, because "one chink in the armor" brings it all down. Where we're trained to see black and white, and the ascent from a bad neighborhood and dumb mom into a good college far away, Tiny multiplies the other options that actually exist in this scenario. The expectations for a model minority help us see the violence white people are constantly inflicting on themselves. Which sets us up to understand the more extreme version of this kind of violence in the next movie we watch.

The second movie we watch together is *Daughter of Danang*, a documentary following one of the children adopted in President Gerald Ford's Operation Babylift the Vietnam War, to take half-white, half-Vietnamese children from Vietnamese women and white GI fathers, to move them to the United States. The justification for the Babylift – which many read as a P.R. move amid growing American dissent toward the war – was that half-white, half-Vietnamese children they would be unsafe and subject to racial violence in Vietnam. Families were pressured by American social workers to give up their kids to send them to the United States, where they were promised they would have a better life and be removed from the threat of racial violence and possibly death they would meet in Vietnam. Many of these children of these international adoptions were adopted to evangelical families in the American South.

We follow the story of one of these adoptees, then in her late 20s, adopted into the KKK capital of the United States, Pulaski, Tennessee, and recently disowned by her mother. The movie follows her first visit back to her birth family. After a tearful reunion, the daughter gets overwhelmed by the amount of affection and physical contact they are giving her, and then the final straw is when they ask for money (what the documentary acknowledges is part of a normal family relations in Vietnam in that period), and the daughter is so angry and upset she leaves early and never contacts them again. It's a movie about state sanctioned kidnapping, in the name of saving people from racial violence – this becomes the warrant for removing children not only from their families but sending them all the way across the world – in a way that ultimately exposes many of them to racial violence in the United States they were supposedly being saved from, often in the very American families they were adopted into.

Last, we watch *Rabbit Proof Fence*, the most extreme instance of family separation, about boarding schools. It's a seemingly impossible but true story of two Aboriginal Australian sisters taken from their family and sent to a boarding school, who escape the boarding school walk 1000 miles back home.

Out of this set of movies, this story and the history of boarding schools is set the furthest in the past, and appears as the most extreme, and as an extreme, helps bring out a pattern of family separation that we take for granted in governance of indigenous families, because we also take it for granted in ourselves. All three movies are about family separation, in more and less extreme forms, in different points of history. But the point is to see how violence inflicted in indigenous family separation is mirrored in the priorities privileged white American families puts on themselves – it's made possible by its own values of individualization. In each of the separations, the separation is made in the name of the sake of a child's future.

The reading breaks down these systems and habits scholars of privilege might take for granted as virtuous – education, seeing the world, individuation – but after the movies, the workshop flips lens back on us. We are supposed to talk through, in different ways relationships to our family that have led us out of the city we grew up in and the life we had with our families of origin and the ways this was enabled by disdain we've learned to feel for our families and the places we grew up in.

I'm exactly the audience this message is targeted toward. I moved to the Mission and lived there only for two years. I wanted to not live on squeaky clean Valencia, and I loved 24th street, and felt like I snagged the best neighborhood in city. To be fair, it was the only place that took me in competitive market, which made it easier to forgive my gentrifying presence. But it gave me permission, a bit of a relief from choice I probably would have made anyway. And it became the only sensible choice in the situation I had set up for myself: wanting to have an interesting job, wanting to live in an interesting place, and not wanting to live near my parents. There was an effortlessness to it, and it seemed very sensible. In fact, I felt like I maybe had a claim to San Francisco as someone conceived and almost born there. My parents lived in San Francisco in the 1980s, and my mom's parents lived there after World War II just before their first son was born. But, in fact, this actually makes me the most recent in a line of repeat offenders that, like many middle class families, moves to the city for two years before settling down elsewhere.

It all makes a lot of sense to me, it's consistent with the things I've noticed that seem wrong (condos, Valencia Street), and consistent with the things that seem to be working right (a family temple), and it's also the most difficult of all to square with my life as I'm living it now. I haven't talked to my parents for the last five years, the end of a sequence of events that happened with a guidance of a therapist trying to get me to individuate, and so this is probably the most difficult message to digest, and why I was

interested in it. I went to the workshop to change my mind about the thing I'm most resistant to having it changed by.

Because psychology, implicitly forms a baseline understanding of reality, and I suspect it's an invisible unnamed pair of epistemic glasses many academics are using to look through the rest of the world. In a world where every middle-class millennial with enough money I know has a therapist, this seems like the thing maybe most taken for granted, the tendency to reduce everything to timeless category of trauma, and where the most damaging forms of trauma have roots with your family. It's an increasingly normalized part of adult life, an increasingly standardized plot beat in television shows – if I see one more novel about "intergenerational family trauma" I'll throw it out the window – a wave that feels like its due to break at any moment. I'm scouring the internet for ways someone has started to problematize it, and I also have no intention of stopping because in the end it makes me feel better, eight years ago I had panic attacks and today I don't, psychology can take all the epistemic chips on the table for its therapeutic promise.

This is exactly what I say to Tiny in the workshop when it's my turn to talk: "I used to talk to my parents, and I don't anymore, and I feel better. It's hard for me to think of even talking to them again, much less moving in with them. Which is probably a way that lots of people who come to these workshops feel about their parents, so is there a way I might think of that differently." Tiny, says maybe you shouldn't talk to them, I could never tell you what to do with your life, but I can say, I don't hear gratitude in your voice. Anywhere. And if you have gotten yourself to a place of calm, they did give you something. Whatever pain they had, they gave you enough organizational privilege, to apply to schools and keep your life together and get to a place you could feel calm in a way they couldn't. So that gratitude is something to think about. Maybe you can say

some prayers and journal to yourself about what you think a relationship to your parents could look like. And I appreciate you being willing to sit in the discomfort of this.

I turn off my camera. There wasn't gratitude in my voice because if I let myself feel any feelings about it, I'd be completely out of control. But it only strikes a nerve because it feels true at some level to me. I go to the next workshops and do the readings and make a privilege map for my homework and write a love letter to my mom as my homework the next week, but I don't send it.

People suggest I'm self-sabotaging. Maybe that's all exiting is, perpetually gaslighting myself into thinking the way I'm thinking about things couldn't be right, or why else would everything feel the way it does? It messes with my sense of reality – will this be something people look back on 50 years and be shocked about, the same way my peers all feel shocked our parents so willfully refuse to go to therapy? I tell my therapist this, and she says I keep intellectualizing things that aren't meant to be dealt with intellectually.

CHAPTER 6

CONCLUSION: CURDLE MODERNITY

This dissertation moved from the organization to the city to the metropolis to the individual to name tensions in the relationship between the aspiration to placelessness in technology and the particularity of place. Every chapter narrates a certain stress associated with placelessness, abstraction, flows of movement, and the material realities that get built to facilitate that movement.

Poor Magazine got the last word because, on the one hand, they make explicit a violence that's a part of the aspiration to placelessness that shows up in other chapters, in the contamination in Emeryville or the unrecognized labor that's a part of the biotechnology organization. But they also get the last word because they make explicit a normative stance that surfaces more subtly in other chapters: the value of staying in one place.

Staying home with your parents is a kind of mirror to the organization and institutional knowledge. "Institutional knowledge" comes into articulation while watching troubleshooting, whispers of organizing, finding the low hanging fruit gone, and trying to see if there's one more apple left a little bit higher up on the tree. Under the stressors of technological and financial difficulties, organizations are thinking through ways to encourage technologists to stay with one company, in a system which systematically rewards their movement.

These kinds of organizations exist in cities and neighborhoods like Emeryville, where "weirdness," a feeling of uncanny pervades. There's a fundamental off-ness to a city constructed for the freedom of movement of entrepreneurs and their capital. But whatever reinvention the city goes through, the off-ness persists because the place never really leaves the nonplace, and all the things that are attempted to be erased – sacred

indigenous land, toxic waste – are in a very literal sense still there even as they're imagined as erased. And their presence contributes to the feeling of something fundamentally off in this zone constructed for the movement of people and capital in and out.

Zones of imagined absence are also productive of moves to seek out imagined presence. Specifically, in seeking out something that's missing that's present in forms of nostalgia and the ethnic other. In doing work in the world, that idea of recursion that tries to conceptualize how a subject exists in co-creation with their environment, that ultimately points the higher echelons of scientific work away from the linear progress no one really believe in anymore to more cyclical modes of reasoning.

That impulse to seek out an ethnic other, something that exists in the city, preferably a not poor, but still up and coming neighborhood, and doesn't exist in the suburb, has real material consequences of an infrastructure meant to shuttle people in and out.

In the end, in response to much more intense stressors of poverty, moving home with your parents takes the imperative of value in consistency to its logical conclusion, all the way back to your point of origin, the place you were born, the people you were born with. Which is an interesting shift from the set of conditions philosopher Zygmunt Bauman was working to articulate in 1999 when he wrote of "liquid modernity," post-modernity as a posture of modernity drifting toward patterns of flow and movement (Bauman 2000).

And in this ethnography centered in Emeryville, a suburb operating at the height of liquid modernity – this site for consumer capital and condos and super financialized science projects – that has constantly reinvented itself – this set of materials points in a convergent way to people thinking about how to ground themselves and to deliquefying.

This deliquification is partly a product of stressors, heat – like lay-offs or homelessness – and could be called something like a *curdle modernity*. Liquid is still swirling around, but under duress, things are globbing together in gelatinous, incomplete ways. And that gathering together is done partly out of necessity, being strapped for cash and living with your parents until you're 35 or running out of scientific progress to keep making in the lab.

But each of these things is part of universalization and systematization depend on. And so, in this state of mid-curdle, with rats drowning in buckets for more anti-depressants, $50,000 polymerase orders, Santa-con, tent cities on the freeway embankment, and fire looming in the background threatening to burn it all down… You walk outside the troubled lab and look across the street from the parking lot down the street, and you start to shift from the question of how science lives in the world, to why, instead, why the world bothers with science.

It's a sensibility of doom on the horizon, with tech something that will disappear with that doom, like that fire. But right now, in fact, it's not so dramatic and severe, it's something much slower, things circling, coming to a standstill. There's a reconstructive energy of re-embedding. But out of that's not a failure either, it's just the liquid modern is still in the habit of seeing these things as failure, but they might be opening up to the ways this might not be failure, because of the exhaustion of this perpetual, restless drift.

REFERENCES

Abbate, Janet. 1999. *Inventing the Internet*. Inside Technology. Cambridge: MIT Press.

Abel, Jessica. 2015. *Out on the Wire: The Storytelling Secrets of the New Masters of Radio*. New York: Crown.

Andersen, Thom. 2003. *Los Angeles Plays Itself*. Thom Andersen Productions.

Arias, Rob. 2015. "An Exclusive Conversation with 27 Year Councilperson Nora Davis." *The E'ville Eye Community News* (blog). March 13, 2015. https://evilleeye.com/news-commentary/politics/exclusive-conversation-26-year-councilperson-nora-davis/.

———. 2020. "'Frustration, Disappointment, Disgust' Emeryville Community Reacts to City's May 30 Looting." *The E'ville Eye Community News* (blog). July 2, 2020. https://evilleeye.com/news-commentary/frustration-disappointment-disgust-emeryville-community-reacts-to-citys-may-30-looting/.

———. 2021. "Biotech, Pixar, Amtrak & Emery Go-Round: Emeryville's 'Renaissance' Recounted by Some of Its Modern Architects." *The E'ville Eye Community News* (blog). February 9, 2021. https://evilleeye.com/history/biotech-pixar-amtrak-emery-go-round-emeryvilles-renaissance-recounted-by-some-of-its-modern-architects/.

Asad, Talal. 1993a. *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam*. Baltimore: Johns Hopkins University Press.

———. 1993b. "The Construction of Religion as an Anthropolgical Category." In *Genealogies of Religion: Discipline and Reasons of Power in Christianity and Islam*, 27–54. Johns Hopkins University Press.

———, ed. 1995. *Anthropology and the Colonial Encounter*. Humanities Press. ———. 2003. *Formations of the Secular : Christianity, Islam, Modernity*. Stanford: Stanford University Press.

Atanasoski, Neda, and Kalindi Vora. 2015. "Surrogate Humanity: Posthuman Networks and the (Racialized) Obsolescence of Labor." *Catalyst* 1 (1). https://doi.org/10.28968/cftt.v1i1.28809.

Augé, Marc. 2008. *Non-Places*. 2nd English language ed. London: Verso.

Ayoub, H.S. 2007. "The Biotech Industry: 30 Years of Failure, Starting with Genentech | Seeking Alpha." *Seeking Alpha* (blog). January 9, 2007. https://seekingalpha.com/article/23696-the-biotech-industry-30-years-of-failure-starting-with-genentech, https://seekingalpha.com/article/23696-the-biotech-industry-30-years-of-failure-starting-with-genentech.

Ball, Christopher. 2018. “Language of Kin Relations and Relationlessness.” *Annual Review of Anthropology* 47 (1): 47–60. https://doi.org/10.1146/annurev-anthro-102317-050120.

Balmer, A., K. Bulpin, and S. Molyneux-Hodgson. 2016. *Synthetic Biology: A Sociology of Changing Practices*. London: Palgrave Macmillan UK.

Balmer, Andrew S., Jane Calvert, Claire Marris, Susan Molyneux-Hodgson, Emma Frow, Matthew Kearnes, Kate Bulpin, Pablo Schyfter, Adrian MacKenzie, and Paul Martin. 2015. “Taking Roles in Interdisciplinary Collaborations: Reflections on Working in Post-ELSI Spaces in the UK Synthetic Biology Community.” *Science and Technology Studies* 28 (3): 3–25.

Balmer, Andrew S., Jane Calvert, Claire Marris, Susan Molyneux-Hodgson, Emma Frow, Matthew Kearnes, Kate Bulpin, Pablo Schyfter, Adrian Mackenzie, and Paul Martin. 2016. “Five Rules of Thumb for Post-ELSI Interdisciplinary Collaborations.” *Journal of Responsible Innovation* 3 (1): 73–80. https://doi.org/10.1080/23299460.2016.1177867.

Barad, Karen. 2006. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press.

Basso, Keith. 2017. *Wisdom Sits in Places: Landscape and Language Among the Western Apache*. Albuquerque: University of New Mexico Press.

Bateson, Gregory. 1972. *Steps to an Ecology of Mind*. New York: Ballantine Books. ——. 2002. *Mind and Nature: A Necessary Unity*. New edition. Cresskill, N.J: Hampton Press.

———. 2005. *Angels Fear: Towards an Epistemology of the Sacred*. Advances in Systems Theory, Complexity, and the Human Sciences. Cresskill: Hampton Press.

Bateson, Mary Catherine. 1985. *With a Daughter’s Eye: A Memoir of Margaret Mead and Gregory Bateson*. New York: Washington Square Press.

Bauman, Zygmunt. 2000. *Liquid Modernity*. Cambridge: Malden, MA: Polity Press; Blackwell.

Bennett, Gaymon. 2015a. “The Moral Economy of Biotechnical Facility.” *Journal of Responsible Innovation* 2 (1): 128–32. https://doi.org/10.1080/23299460.2014.1002169.

———. 2015b. “The Moral Economy of Biotechnical Facility.” *Journal of Responsible Innovation* 2 (1): 128–32. https://doi.org/10.1080/23299460.2014.1002169.

———. 2016. *Technicians of Human Dignity: Bodies, Souls, and the Making of Intrinsic Worth*. First edition. Just Ideas : Transformative Ideals of Justice in Ethical and Political Thought. New York, NY: Fordham University Press.

———. 2018a. "Assembling the Living." In *Les objets composés: Agencements, dispositifs, assemblages*, edited by Nicolas Dodier and Anthony Stravianakis. Vol. 28. Raisons pratiques. Paris: Editions de l'Ecole des Hautes Etudes en Sciences Sociales.

———. 2018b. "Silicon Valley's Original Sin." Sojourners. November 20, 2018. https://sojo.net/magazine/january-2019/silicon-valley-s-original-sin.

Bennett, Jane. 2010. *Vibrant Matter*. Durham: Duke University Press. https://www.dukeupress.edu/vibrant-matter.

Bérubé, Allan. 2003. "The History of Gay Bathhouses. 1984." *Journal of Homosexuality* 44 (3–4): 33–53. https://doi.org/10.1300/J082v44n03_03.

Birch, Kean. 2020. "Technoscience Rent: Toward a Theory of Rentiership for Technoscientific Capitalism." *Science, Technology, & Human Values* 45 (1): 3–33. https://doi.org/10.1177/0162243919829567.

Birch, Kean, and Fabian Muniesa, eds. 2020. *Assetization: Turning Things into Assets in Technoscientific Capitalism*. Inside Technology. Cambridge: MIT Press.

Bloom, Joshua. 2016. *Black against Empire: The History and Politics of the Black Panther Party*. First edition, with a new preface edition. Berkeley: University of California Press.

Bloor, David. 1981. "The Strengths of the Strong Programme." *Philosophy of the Social Sciences* 11 (2): 199–213.

BondGraham, Darwin. 2012. "From Brown to Green." *East Bay Express*, January 25, 2012. https://eastbayexpress.com/from-brown-to-green-1/.

———. 2016. "Real Estate Company Stores Toxic Soil in Richmond Neighborhood." *Richmond Confidential*, October 4, 2016, sec. Featured. https://richmondconfidential.org/2016/10/04/real-estate-company-stores-toxic-soil-in-richmond-neighborhood/.

Bourdieu, Pierre. 1977. *Outline of a Theory of Practice*. Cambridge Studies in Social Anthropology; No. 16. Cambridge; New York: Cambridge University Press.

Bowker, Geoffrey C., and Susan Leigh Star. 1999. *Sorting Things out: Classification and Its Consequences*. Inside Technology. Cambridge; London: MIT Press.

Bowles, Nellie. 2020. “God Is Dead. So Is the Office. These People Want to Save Both.” *The New York Times*, August 28, 2020. Business. http://www.nytimes.com/2020/08/28/business/remote-work-spiritual-consultants.html.

Bradshaw, Ted K., and Edward J. Blakely. 1979. *Rural Communities in Advanced Industrial Society: Development and Developers*. Praeger Special Studies. New York: Praeger.

Brinklow, Adam. 2019. “SF City Hall Fed up with Twitter Tax Break.” Curbed SF. June 7, 2019. https://sf.curbed.com/2019/6/7/18657092/twitter-tax-break-mid-market-hearing-haney.

Bullis, Kevin. 2012. “Amyris Gives Up Making Biofuels: Update.” *MIT Technology Review*, February 10, 2012. https://www.technologyreview.com/2012/02/10/20483/amyris-gives-up-making-biofuels-update/.

Butler, Judith. 1990. *Gender Trouble*. Thinking Gender. New York, NY: Routledge.

Bynum, Caroline Walker. 2011. *Christian Materiality: An Essay on Religion in Late Medieval Europe*. New York: Cambridge, Mass.: Zone Books; Distributed by the MIT Press.

Cadena, Marisol de la. 2015. *Earth Beings: Ecologies of Practice Across Andean Worlds*. Lewis Henry Morgan Lectures; 2011. Durham: Duke University Press.

Calvert, Jane, Emma Frow, Pablo Schyfter, Deborah Scott, Rob Smith, and Erika Szymanski. 2017. “The Decline and Death of Synthetic Biology.” In Beus Center for Law and Society, Phoenix, Arizona, Arizona State University.

Calvert, Jane, and Pablo Schyfter. 2017. “What Can Science and Technology Studies Learn from Art and Design? Reflections on ‘Synthetic Aesthetics.’” *Social Studies of Science* 47 (2): 195–215. https://doi.org/10.1177/0306312716678488.

Cannell, Fenella. 2010. “The Anthropology of Secularism.” *Annual Review of Anthropology* 39 (1): 85–100. https://doi.org/10.1146/annurev.anthro.012809.105039.

Casanova, José. 1994. *Public Religions in the Modern World*. Chicago: University of Chicago Press.

Castillo, Michelle. 2016. “Chan Zuckerberg Donate $3 Billion toward Curing All Disease by next 100 Years.” CNBC. September 21, 2016. https://www.cnbc.com/2016/09/21/chan-zuckerberg-initiative-dedicates-3-billion-towards-disease-research.html.

Castro, Eduardo Viveiros de. 2014. *Cannibal Metaphysics*. Translated by Peter Skafish. 1st edition. Univocal. Minneapolis, Minnesota: Univocal.

Cediel, Andrés. 2005. *Shellmound*. UC Berkeley Graduate School of Journalism. "Center for Disease Control - Gentrification." 2017. June 8, 2017.

https://www.cdc.gov/healthyplaces/healthtopics/gentrification.htm. Chakrabarty, Dipesh. 2000. "Postcoloniality and the Artifice of History." In

Provincializing Europe. Princeton, N.J.: Princeton University Press.
Chamberlin, J. 2004. "Survey Says: More Americans Are Seeking Mental Health Treatment." *Https://Www.Apa.Org*, July 2004.

Chasin, Alexandra. 1995. "Class and Its Close Relations: Identities Among Women, Servants and Machines." In *Posthuman Bodies*, edited by Judith Halberstam and Ira Livingston. Unnatural Acts. Bloomington: Indiana University Press.

Chatsko, Maxx. 2019a. "Here's Why Amyris Collapsed Today." The Motley Fool. March 20, 2019. https://www.fool.com/investing/2019/03/20/heres-why-amyris-collapsed-today.aspx.

———. 2019b. "Twist Bioscience Grows Q3 Revenue 108%, but Losses Pile Up." The Motley Fool. August 19, 2019. https://www.fool.com/investing/2019/08/19/twist-bioscience-grows-q3-revenue-108-but-losses-p.aspx.

Cheah, Joseph. 2011. *Race and Religion in American Buddhism: White Supremacy and Immigrant Adaptation*. AAR ACADEMY SER. Oxford University Press.

Clifford, James, and George Marcus, eds. 1986. *Writing Culture: The Poetics and Politics of Ethnography*. Berkeley, Calif.: University of California Press.

Clifford, James, and George E. Marcus, eds. 2010. *Writing Culture: The Poetics and Politics of Ethnography, 25th Anniversary Edition*. 2nd ed.

Collier, Stephen J., Andrew Lakoff, and Paul Rabinow. 2004. "Biosecurity: Towards an Anthropology of the Contemporary." *Anthropology Today* 20 (5): 3–7. https://doi.org/10.1111/j.0268-540X.2004.00292.x.

Collins, Harry. 1985. *Changing Order*. Chicago: University of Chicago Press.
———. 2012. *Tacit and Explicit Knowledge*. Chicago: University of Chicago Press.

Comaroff, Jean, and John L. Comaroff. 2008. *Of Revelation and Revolution, Volume 1 Christianity, Colonialism, and Consciousness in South Africa*. Chicago, IL: University of Chicago Press.

Cooper, Melinda. 2008. *Life as Surplus: Biotechnology and Capitalism in the Neoliberal Era*. Seattle: University of Washington Press.

Cowan, Ruth Schwartz. 1976. "The 'Industrial Revolution' in the Home: Household Technology and Social Change in the 20th Century." *Technology and Culture* 17 (1): 1. https://doi.org/10.2307/3103251.

Cruikshank, Barbara. 1999. *The Will to Empower: Democratic Citizens and Other Subjects*. Ithaca; London: Cornell University Press.

Davis, Mike. 2006. *City of Quartz: Excavating the Future in Los Angeles*. London: V erso.

Dayrit, I, R Arulanantham, and L Feldman. 2002. "Successful Redevelopment and Risk Management in Emeryville, California." In *Brownfield Sites*, edited by CA Brebbia, D Almorza, and H Klapperich, 10. Southampton: WIT Press.

Deleuze, Gilles, and Felix Guattari. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Translated by Brian Massumi. Minnesota University Press.

Deming, W. Edwards. 2012. *The Essential Deming: Leadership Principles from the Father of Quality*. Edited by Joyce Orsini and Diana Deming Cahill. 1st edition. New York: McGraw Hill.

Didion, Joan. 1967. "Slouching Towards Bethlehem." *The Saturday Evening Post*, September 23, 1967. https://www.saturdayeveningpost.com/2017/06/didion/.

Doezema, Tess, and J. Benjamin Hurlbut. 2017. "Technologies of Governance: Science, State and Citizen in Visions of the Bioeconomy." In *Bioeconomies: Life, Technology, and Capital in the 21st Century*, edited by Vincenzo Pavone and Joanna Goven, 49–71. Cham: Springer International Publishing.

Donahue, Brian. 2020. "The Emeryville Tattler: Whistleblower Accusations at Sherwin Williams Toxics Cleanup Site." *The Emeryville Tattler* (blog). February 22, 2020. https://emeryvilletattler.blogspot.com/2020/02/whistleblower-accusations-at-sherwin.html.

———. 2021. "The Emeryville Tattler: Public Meeting Called About Controversial Sherwin Williams Toxic Waste Cleanup." *The Emeryville Tattler* (blog). June 13, 2021. http://emeryvilletattler.blogspot.com/2021/06/public-meeting-called-about.html.

Dowland, Seth. 2015. *Family Values and the Rise of the Christian Right*. Politics and Culture in Modern America. Philadelphia: University of Pennsylvania Press.

Drescher, Jack. 2015. “Out of DSM: Depathologizing Homosexuality.” *Behavioral Sciences* 5 (4): 565–75. https://doi.org/10.3390/bs5040565.

Dreyfus, H. L. 1987. “Foucault’s Critique of Psychiatric Medicine.” *The Journal of Medicine and Philosophy* 12 (4): 311–33. https://doi.org/10.1093/jmp/12.4.311.

Dreyfus, Hubert L., and Paul Rabinow. 1983. *Michel Foucault, beyond Structuralism and Hermeneutics*. 2nd ed.. Chicago: University of Chicago Press.

Dumit, Joseph. 2012. *Drugs for Life How Pharmaceutical Companies Define Our Health*. Experimental Futures. Durham: Duke University Press.

Egelko, Bob. 2021. “State Supreme Court Allows Housing-Retail Development on Berkeley Shellmound to Proceed.” *San Francisco Chronicle*, July 30, 2021. https://www.sfchronicle.com/bayarea/article/State-Supreme-Court-allows-housing-retail-16347476.php.

Eisen, Joel B. 2007. “Brownfields at 20: A Critical Reevaluation.” *Fordham Urban Law Journal* 34 (2): 721–56.

“Emeryville.” 2014. Oakland - LocalWiki. October 7, 2014. https://localwiki.org/oakland/Emeryville.

“Emeryville: A Former California Brownfield Recycled.” 2007. Environmental Protection Agency - National Service Center for Environmental Publications.

Endy, Drew. 2005. “Foundations for Engineering Biology.” *Nature* 438 (7067): 449–53. https://doi.org/10.1038/nature04342.

———. 2014a. *Synthetic Biology - What Should We Be Vibrating About?* TEDxStanford. https://www.youtube.com/watch?v=rf5tTe_i7aA.

———. 2014b. *Drew Endy: The IGEM Revolution - The Long Now*. Long Now Seminars. http://longnow.org/seminars/02014/sep/16/igem-revolution/.

Enos, Joey. 2016. “Origins: First of a Three-Part Series on the History of the Emeryville Mudflat Sculptures.” *The E’ville Eye Community News* (blog). May 20, 2016. https://evilleeye.com/history/origins-first-three-part-series-history-emeryville-mudflat-sculptures/.

Examiner Staff. 2013. “Twitter IPO Highlights Big Money Friction in San Francisco.” *The San Francisco Examiner*, November 8, 2013. https://www.sfexaminer.com/news/twitter-ipo-highlights-big-money-friction-in-san-francisco/.

"Failure to Launch." 2013. *Nature Biotechnology* 31 (1): 1–1. https://doi.org/10.1038/nbt.2482.

Farley, Amy. 2021. "How Twist Bioscience Founder Emily Leproust Created a Synthetic Biolog." *Fast Company*, August 9, 2021. https://www.fastcompany.com/90659387/investors-poured-nearly-8-billion-dollars-into-synthetic-biology-last-year-this-company-is-leading-the-field.

"Fast Forward: Radical Empiricism As the Root of Innovation at Zymergen." 2017. *Zymergen* (blog). September 22, 2017. https://www.zymergen.com/blog/company/fast-forward-radical-empiricism-as-the-root-of-innovation-at-zymergen/.

Favret-Saada, Jeanne. 1980. *Deadly Words: Witchcraft in the Bocage*. Cambridge [Eng.]: New York : Cambridge University Press.

Fernandez, Lisa, and Bob Redell. 2013. "#ThrownOutByTwitter Protests on Twitter IPO Opening." *NBC Bay Area*, November 7, 2013. https://www.nbcbayarea.com/news/local/thrownoutbytwitter-protests-on-twitter-ipo-opening/2072740/.

Fields, Rick. 1992. *How the Swans Came to the Lake: A Narrative History of Buddhism in America*. 3rd ed. Boston: Shambhala Publications.

Forsythe, Diana. 2001. *Studying Those Who Study Us: An Anthropologist in the World of Artificial Intelligence*. Writing Science. Stanford, Calif.: Stanford University Press.

Fortun, Kim, Mike Fortun, Erik Bigras, Tahereh Saheb, Brandon Costelloe-Kuehn, Jerome Crowder, Daniel Price, and Alison Kenner. 2014. "Experimental Ethnography Online: The Asthma Files." *Cultural Studies* 28 (4): 632–42. https://doi.org/10.1080/09502386.2014.888923.

Fortun, Michael. 2001. "Mediated Speculations in the Genomics Futures Markets." *New Genetics and Society* 20 (2): 139–56. https://doi.org/10.1080/14636770124557.

———. 2008. *Promising Genomics: Iceland and DeCODE Genetics in a World of Speculation*. Berkeley, CA: University of California Press.

Foucault, Michel. 1965. *Madness and Civilization; a History of Insanity in the Age of Reason.* New York: Pantheon Books.

———. 1980. *Power/Knowledge: Selected Interviews and Other Writings, 1972-1977*. Edited by Colin Gordon. 1st American ed.. New York, N.Y.: Pantheon Books.

———. 1984. "What Is Enlightenment?" In *The Foucault Reader*, edited by Paul Rabinow, 32–50. New York: Pantheon Books.

———. 2005. *The Hermeneutics of the Subject: Lectures at the Collège de France, 1981-1982*. Edited by Frederic Gros, François Ewald, and Alessandro Fontana. Springer.

Frank, Thomas. 1997. *The Conquest of Cool: Business Culture, Counterculture, and the Rise of Hip Consumerism*. Chicago: University of Chicago Press.

Franklin, Sarah. 2007. *Dolly Mixtures: The Remaking of Genealogy*. Durham: Duke University Press.

Freud, Sigmund. 1955. "The 'Uncanny.'" In *An Infantile Neurosis and Other Works*, translated by James Strachey, XVII (1917-1919):219–52. The Standard Edition of the Complete Psychological Works of Sigmund Freud. London: The Hogarth Press and the Institute of Psychoanalysis.

Frow, Emma. 2013. "Making Big Promises Come True? Articulating and Realizing Value in Synthetic Biology." *BioSocieties* 8 (4): 432–48. https://doi.org/10.1057/biosoc.2013.28.

Frow, Emma, and Jane Calvert. 2013. "Opening up the Future(s) of Synthetic Biology." *Futures* 48: 32–43.

Fry, Richard, Jeffrey S. Passel, and D'vera Cohn. 2020. "A Majority of Young Adults in the U.S. Live with Their Parents for the First Time since the Great Depression." Pew Research Center. https://www.pewresearch.org/fact-tank/2020/09/04/a-majority-of-young-adults-in-the-u-s-live-with-their-parents-for-the-first-time-since-the-great-depression/.

Gardner, Timothy S, and Kristy Hawkins. 2013. "Synthetic Biology: Evolution or Revolution? A Co-Founder's Perspective." *Current Opinion in Chemical Biology*, Synthetic biology • Synthetic biomolecules, 17 (6): 871–77. https://doi.org/10.1016/j.cbpa.2013.09.013.

Garret, Olivier. 2020. "Why Bill Gates Is Betting Millions On Synthetic Biology." *Forbes*, September 10, 2020. https://www.forbes.com/sites/oliviergarret/2020/09/10/why-bill-gates-is-betting-millions-on-synthetic-biology/.

Geertz, Clifford. 1973. "Thick Description: Toward an Interpretive Theory of Culture." In *The Interpretation of Cultures: Selected Essays*, 3–30. New York: Basic Books.

Glasser, Irene, and Rae Bridgman. 1999. *Braving the Street: The Anthropology of Homelessness*. 1st ed. Berghahn Books. https://www.jstor.org/stable/j.ctt9qcqrk. Golder, Ben. 2015. *Foucault and the Politics of Rights*. Stanford, California: Stanford University Press.

Gomez, Abel. n.d. *Sacred Sites, Ceremony, and Belonging in Ohlone Territory: A Case Study of Indigenous Survival*. Doctoral dissertation, manuscript in progress.

Gowan, Teresa. 2010. *Hobos, Hustlers, and Backsliders: Homeless in San Francisco*. Minnesota University Press.

Graeber, David. 2004. *Fragments of an Anarchist Anthropology*. Paradigm 14. Chicago: Prickly Paradigm Press.

———. 2016. *The Utopia of Rules: On Technology, Stupidity, and the Secret Joys of Bureaucracy*. Reprint edition. Melville House.

Gray-Garcia, Lisa Tiny. 2014. "The Rich Ride for Free; the Po' Get Po'liced." *48 Hills*, January 27, 2014. https://48hills.org/2014/01/the-rich-ride-for-free-the-po-get-policed/.

———. 2019. "An Open Letter to Marc Benioff about Homelessness." *48 Hills*, September 25, 2019. https://48hills.org/2019/09/an-open-letter-to-the-marc-benioff-about-homelessness/.

Gray-Garcia, Lisa Tiny, and The Poor Magazine Family. 2019. *Poverty Scholarship: Poor People-Led Theory, Art, Words & Tears Across Mama Earth*. Oakland: AK Press.

Greenwich, Howard, and Elizabeth Hinckle. 2003. "Behind the Boomtown: Growth and Urban Redevelopment in Emeryville." California Partnership for Working Families. Oakland: East Bay Alliance for a Sustainable Economy, Center for Labor Research and Education, University of California Berkeley.

Grushkin, Daniel. 2012. "The Rise And Fall Of The Company That Was Going To Have Us All Using Biofuels." Fast Company. August 8, 2012. https://www.fastcompany.com/3000040/rise-and-fall-company-was-going-have-us-all-using-biofuels.

Gumbel, Andrew. 2014. "San Francisco's Guerrilla Protest at Google Buses Swells into Revolt." *The Observer*, January 25, 2014, sec. US news. https://www.theguardian.com/world/2014/jan/25/google-bus-protest-swells-to-revolt-san-francisco.

Haan, Tiu De. 2016. *Why We Still Need Ritual*. Heythrop College: TEDx Talks. https://www.youtube.com/watch?v=umdZIyriW-U.

Hall, Peter. 1988. "The City of Enterprise." In *Cities of Tomorrow : An Intellectual History of Urban Planning and Design since 1880*, First Edition, 343–61. Oxford: Basil Blackwell.

Hammang, Annie, and Emma Frow. 2020. “Mapping Synthetic Biology Workflows: An Experimental Workshop.” Engineering Life Workshop Report. Arizona State University. https://blogs.sps.ed.ac.uk/engineering-life/files/2020/02/Hammang-Frow-2019-Mapping-Synthetic-Biology-Workflows-circulated-report.pdf.

Harding, Sandra. 1987. “Is There a Feminist Method?” In *Feminism and Methodology: Social Science Issues*. Bloomington: Indiana Press University.

Harries-Jones, Peter. 1995. *A Recursive Vision: Ecological Understanding and Gregory Bateson*. 2nd edition. Toronto: University of Toronto Press.

Harvey, David. 2007. *A Brief History of Neoliberalism*. Oxford: Oxford University Press.

Hayden, Cori. 2003. *When Nature Goes Public: The Making and Unmaking of Bioprospecting in Mexico*. In-Formation Series. Princeton: Princeton University Press.

Hayles, Katherine. 1999. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago, Ill.: University of Chicago Press.

Heelas, Paul. 1996. *The New Age Movement: The Celebration of the Self and the Sacralization of Modernity*. Oxford: Blackwell.

Helmreich, Stefan. 2000. *Silicon Second Nature: Culturing Artificial Life in a Digital World*. Berkeley: University of California Press.

———. 2009. *Alien Ocean: Anthropological Voyages in Microbial Seas*. Berkeley: University of California Press.

Hemsley, Paul. 2016. “Emeryville: One of California’s Boldest Urban Fixes.” *GovNews* (blog). September 28, 2016. https://www.govnews.com.au/emeryville-one-californias-boldest-urban-fixes/.

Herper, Matthew. 2017. “Craig Venter Mapped The Genome. Now He’s Trying To Decode Death.” Forbes. February 28, 2017. https://www.forbes.com/sites/matthewherper/2017/02/21/can-craig-venter-cheat-death/#6d4de3841645.

Hill Collins, Patricia. 2000. *Black Feminist Thought: Knowledge, Consciousness, and the Politics of Empowerment*. 2nd ed.. New York ; London: Routledge.

Hirschkind, Charles. 2006. *The Ethical Soundscape : Cassette Sermons and Islamic Counterpublics*. New York: Columbia University Press.

———. 2020. *The Feeling of History: Islam, Romanticism, and Andalusia*. Chicago, IL: University of Chicago Press.

Hopper, Kim. 2003. *Reckoning with Homelessness*. Cornell University Press.

Hurlbut, J Benjamin. 2017a. “A Science That Knows No Country: Pandemic Preparedness, Global Risk, Sovereign Science.” *Big Data & Society* 4 (2). https://doi.org/10.1177/2053951717742417.

———. 2017b. *Experiments in Democracy: Human Embryo Research and the Politics of Bioethics*. Columbia University Press.

Ioannidis, John P. A. 2005. “Why Most Published Research Findings Are False.” *PLoS Medicine* 2 (8): e124. https://doi.org/10.1371/journal.pmed.0020124.

Irani, Lilly. 2015. “The Cultural Work of Microwork.” *New Media & Society* 17 (5): 720–39. https://doi.org/10.1177/1461444813511926.

Jabr, Ferris. 2013. “Why Life Does Not Really Exist.” *Scientific American Blog Network*, December 2, 2013. https://blogs.scientificamerican.com/brainwaves/why-life-does-not-really-exist/.

James, William. 1976. *Essays in Radical Empiricism*. The Works of William James. Cambridge: Harvard University Press.

Jasanoff, Sheila. 1998. “The Eye of Everyman: Witnessing DNA in the Simpson Trial.” *Social Studies of Science* 28 (5–6): 713–40. https://doi.org/10.1177/030631298028005003.

———. 2004. *States of Knowledge the Co-Production of Science and Social Order*. International Library of Sociology. London; New York: Routledge.

———. 2005. *Designs on Nature: Science and Democracy in Europe and the United States*. Princeton, N.J.: Princeton University Press.

Jasanoff, Sheila, and J. Benjamin Hurlbut. 2018. “A Global Observatory for Gene Editing.” *Nature* 555 (7697): 435. https://doi.org/10.1038/d41586-018-03270-w.

Jasanoff, Sheila, and Sang-Hyun Kim. 2015. *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power: Sociotechnical Imaginaries and the Fabrication of Power*. University Of Chicago Press.

Johnson, Michael. 2014. “The It Gets Better Project: A Study in (and of) Whiteness.” In *LGBT Youth and Media Cultures*, edited by Christopher Pullen, 278–91. London: Palgrave Macmillan.

Josephson-Storm, Jason. 2017. *The Myth of Disenchantment*. Chicago: University of Chicago Press.

Jung, C. G. 2009. *The Red Book*. Edited by Sonu Shamdasani. Translated by Mark Kyburz and John Peck. 1st edition. New York: W. W. Norton & Company.

Kamiya, Gary. 2013. *Cool Gray City of Love: 49 Views of San Francisco*. 1st edition. New York: Bloomsbury USA.

Kasinitz, Philip. 2012. "Gentrification and Homelessness: The Single Room Occupant And the Inner City Revival." In *Housing The Homeless*. Routledge.

Keating, Peter, and Alberto Cambrosio. 2003. *Biomedical Platforms: Realigning the Normal and the Pathological in Late-Twentieth-Century Medicine*. Inside Technology. Cambridge, Mass.: MIT Press.

Kelty, Christopher M. 2008. *Two Bits: The Cultural Significance of Free Software*. Experimental Futures. Durham: Duke University Press.

Kline, Milton V. 1958. *Freud and Hypnosis*. 1st edition. The Julian Press.

Knight, Thomas. 2003. "Idempotent Vector Design for Standard Assembly of Biobricks." *MIT Synthetic Biology Working Group Technical Reports*. http://dspace.mit.edu/handle/1721.1/21168.

Knorr-Cetina, K. 1999. *Epistemic Cultures: How the Sciences Make Knowledge*. Cambridge; London: Harvard University Press.

Kofman, Ava. 2018. "Bruno Latour, the Post-Truth Philosopher, Mounts a Defense of Science - The New York Times." *The New York Times*, October 25. https://www-nytimes-com.ezproxy1.lib.asu.edu/2018/10/25/magazine/bruno-latour-post-truth-philosopher-science.html.

Kohn, Eduardo. 2013. *How Forests Think Toward an Anthropology Beyond the Human*. Berkeley: University of California Press.

———. 2015. "Anthropology of Ontologies." *Annual Review of Anthropology* 44: 311–311.

Landecker, Hannah. 2007. *Culturing Life: How Cells Became Technologies*. ACLS Fellows' Publications. Cambridge: Harvard University Press.

Latour, Bruno. 1986. "Visualisation and Cognition: Drawing Things Together." *Knowledge and Society Studies in the Sociology of Culture Past and Present* 6: 1–40.

———. 1987. *Science in Action: How to Follow Scientists and Engineers through Society*. Milton Keynes, Cambridge, Mass.: Open University Press, Harvard University Press.

———. 1993. *We Have Never Been Modern*. Cambridge, Mass.: Harvard University Press.

———. 2013. *Rejoicing: Or the Torments of Religious Speech*. Translated by Julie Rose. Cambridge: Polity Press. http://www.bruno-latour.fr/node/496.

———. 2017. *Facing Gaia: Eight Lectures on the New Climatic Regime*. Oxford: Polity Press.

Latour, Bruno, and Steve Woolgar. 1979. *Laboratory Life: The Social Construction of Scientific Facts*. Sage Library of Social Research; v. 80. Beverly Hills: Sage Publications.

Law, Jacky. 2006. *Big Pharma: Exposing the Global Healthcare Agenda*. 1st edition. New York: Carroll & Graf.

Leach, Mike. 2019. *Mike Leach: The Healing Power of Rituals and Routines | Michael Leach | TEDxHieronymusPark*. Hieronymus Park: TEDx Talks. https://www.youtube.com/watch?v=C5uW97de7Nc.

Leigh, Nancey G., and Edward J. Blakely. 2016. *Planning Local Economic Development: Theory and Practice*. 6th Edition. Thousand Oaks: SAGE Publications, Inc.

Lévi-Strauss, Claude. 1966. *The Savage Mind*. Chicago: University of Chicago Press.

Li, Roland. 2019. "How the 'Twitter Tax Break' Has Changed San Francisco's Mid-Market." *The San Francisco Chronicle*, May 9, 2019. https://projects.sfchronicle.com/2019/mid-market/business/.

Luhrmann, T. M. 2011. "Hallucinations and Sensory Overrides." *Annual Review of Anthropology* 40 (1): 71–85. https://doi.org/10.1146/annurev-anthro-081309-145819.

Lyon-Callo, Vincent. 2008. *Inequality, Poverty, and Neoliberal Governance: Activist Ethnography in the Homeless Sheltering Industry*. 2nd ed. University of Toronto Press..

Madan, T.N. 1998. *Modern Myths, Locked Minds: Secularism and Fundamentalism in India*. 1998: Oxford University Press.

Mahajan, G. 2003. "Secularism." In *The Oxford India Companion to Sociology and Social Anthropology*, edited by Veena Das. New Delhi: Oxford University Press.

Mahmood, Saba. 2004. *Politics of Piety: The Islamic Revival and the Feminist Subject*. Princeton: Princeton University Press.

———. 2016. *Religious Difference in a Secular Age: A Minority Report*. Princeton, NJ: Princeton University Press.

Marcus, George E. 1995. “Ethnography in/of the World System: The Emergence of Multi-Sited Ethnography.” *Annual Review of Anthropology* 24 (1): 95–117.

Mark, Julian. 2020. “Trove of Text Messages Reveals Mayor London Breed Ordered Homeless Sweeps Directly — despite Frequent Denials.” *Mission Local*, May 26, 2020. http://missionlocal.org/2020/05/trove-of-text-messages-reveals-mayor-breed-ordered-sweeps-directly-despite-frequent-denials/.

Markoff, John. 2006. *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry*. New York: Penguin Books.

———. 2019. “Elon Musk’s Neuralink Wants ‘Sewing Machine-Like’ Robots to Wire Brains to the Internet.” *The New York Times*, July 17, 2019, sec. Technology. https://www.nytimes.com/2019/07/16/technology/neuralink-elon-musk.html.

Mars, Roman. 2018. “It’s Chinatown.” *99 Percent Invisible*. Oakland. https://99percentinvisible.org/episode/its-chinatown/.

McKinnon, Susan, and Fenella Cannell, eds. 2013. *Vital Relations: Modernity and the Persistent Life of Kinship*. First edition. Santa Fe: School for Advanced Research Press.

McMahan, David L. 2008. *The Making of Buddhist Modernism*. Oxford ; New York: Oxford University Press.

Mezzadra, Sandro. 2013. *Border as Method, or, the Multiplication of Labor*. Durham: Duke University Press.

Mittermaier, Amira. 2011. *Dreams That Matter: Egyptian Landscapes of the Imagination*. Berkeley: University of California Press.

Moos, Markus. 2016. “From Gentrification to Youthification? The Increasing Importance of Young Age in Delineating High-Density Living.” *Urban Studies* 53 (14): 2903–20.

Morton, Timothy. 2013. *Realist Magic*. Open Humanities Press.
Mullis, Kary. 1998. *Dancing Naked in the Mind Field*. 1st ed. New York: Pantheon Books.

Muwekma Ohlone Tribe. n.d. “Publications.” Accessed March 28, 2022. http://www.muwekma.org/tribal-publications.html.

Nader, Laura. 1972. *Up the Anthropologist Perspectives Gained From Studying Up*. ERIC Clearinghouse.

Nelson, Alondra. 2016. *The Social Life of DNA: Race, Reparations, and Reconciliation after the Genome*. Boston: Beacon Press.

Neuman, Scott. 2021. “Scientists Say They Could Bring Back Woolly Mammoths. But Maybe They Shouldn’t.” *NPR*, September 15, 2021, sec. Science. https://www.npr.org/2021/09/14/1036884561/dna-resurrection-jurassic-park-woolly-mammoth.

Noble, Safiya. 2016. “A Future for Intersectional Black Feminist Technology Studies.” *S&F Online*, no. 13.3-14.1. http://sfonline.barnard.edu/traversing-technologies/safiya-umoja-noble-a-future-for-intersectional-black-feminist-technology-studies/.

O’Neill, Bruce. 2017. *The Space of Boredom: Homelessness in the Slowing Global Order*. Duke University Press. https://www.dukeupress.edu/the-space-of-boredom.

Ong, Aihwa. 2006. *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty*. Durham: Duke University Press.

Oreskovic, Alexei. 2013. “Protesters Block Apple, Google Buses in San Francisco Area.” *Reuters*, December 21, 2013, sec. Technology News. https://www.reuters.com/article/ctech-us-techbus-protest-sanfrancisco-idCABRE9BJ1BC20131221.

Orsi, Robert. 2018. *History and Presence*. Cambridge: Belknap Press of Harvard University Press.

Palen, J. John, and Bruce London. 1984. *Gentrification, Displacement, and Neighborhood Revitalization*. SUNY Press.

Pandolfo, Stefania. 1997. *Impasse of the Angels: Scenes from a Moroccan Space of Memory*. Chicago: University of Chicago Press.

———. 2018. *Knot of the Soul: Madness, Psychoanalysis, Islam*.

Parthasarathy, Shobita. 2005. “Architectures of Genetic Medicine: Comparing Genetic Testing for Breast Cancer in the USA and the UK.” *Social Studies of Science* 35 (1): 5–40. https://doi.org/10.1177/0306312705047172.

“Payroll Expense Tax Exclusion in Central Market Street and Tenderloin Area: Economic Impact Report.” 2011. 101155. San Francisco: City and County of San Francisco, Office of the Controller - Office of Economic Analysis.

Peletz, Michael G. 1995. “Kinship Studies in Late Twentieth-Century Anthropology.” *Annual Review of Anthropology* 24: 343–72.

Pemberton, Nathan Taylor. 2020. “John Wilson Reveals the Absurd Poetry of New York.” *The New York Times*, October 23, 2020. Arts. http://www.nytimes.com/2020/10/23/arts/television/how-to-with-john-wilson.html.

Perrigan, Dana. 2009. “Emeryville’s Transformation.” *San Francisco Chronicle*, June 21, 2009. https://www.sfgate.com/realestate/article/Emeryville-s-transformation-3228026.php.

Perrow, Charles. 1984. *Normal Accidents: Living with High-Risk Technologies*. New York: Basic Books.

Peters, Alan, and Peter Fisher. 2002. “State Enterprise Zone Programs: Have They Worked?” *Upjohn Press*, January. https://doi.org/10.17848/9781417524433.

Petryna, Adriana. 2017. *Life Exposed Biological Citizens after Chernobyl*. Princeton: Princeton University Press.

Pfotenhauer, Sebastian, and Sheila Jasanoff. 2017. “Panacea or Diagnosis? Imaginaries of Innovation and the ‘MIT Model’ in Three Political Cultures.” *Social Studies of Science* 47 (6). https://journals-sagepub-com.ezproxy1.lib.asu.edu/doi/full/10.1177/0306312717706110.

Phinney, David. 1983. *Million Dollar Mudfats*. KQED. https://www.youtube.com/watch?v=Ar7wRt7_nVI.

Pickering, Andrew. 1995. *The Mangle of Practice: Time, Agency, and Science*. Chicago: University of Chicago Press. https://press.uchicago.edu/ucp/books/book/chicago/M/bo3642386.html.

———. 2010. *The Cybernetic Brain: Sketches of Another Future*. Chicago: University Of Chicago Press.

Piketty, Thomas. 2014. *Capital in the Twenty-First Century*. Cambridge Massachusetts: The Belknap Press of Harvard University Press.

Pisano, Gary P. 2006. *Science Business: The Promise, the Reality, and the Future of Biotech*. 1st edition. Boston, Mass: Harvard Business School Press.

“Poor Magazine - About Us.” n.d. Accessed March 26, 2022. https://poormagazine.org/About%20Us.

Puar, Jasbir K. 2007. *Terrorist Assemblages: Homonationalism in Queer Times*. Next Wave. Durham: Duke University Press.

Rabinow, Paul. 1977. *Reflections on Fieldwork in Morocco*. Berkeley, Calif.: Univ of California Press. https://www.ucpress.edu/book/9780520251779/reflections-on-fieldwork-in-morocco.

———. 1996a. *Making PCR: A Story of Biotechnology*. Chicago: University of Chicago Press.

———. 1996b. *Making PCR: A Story of Biotechnology*. Chicago: University of Chicago Press.

———. 2017. *Unconsolable Contemporary: Observing Gerhard Richter*. Durham: Duke University Press.

Rabinow, Paul, and Gaymon Bennett. 2012. *Designing Human Practices: An Experiment with Synthetic Biology*. University Of Chicago Press.

Reader, Ruth. 2020. "Combining AI and Biology Could Solve Drug Discovery's Biggest Problems." Fast Company. June 14, 2020. https://www.fastcompany.com/90516257/combining-ai-and-biology-could-solve-drug-discoverys-biggest-problems.

Regalado, Antonio. 2021. "Meet Altos Labs, Silicon Valley's Latest Wild Bet on Living Forever." *MIT Technology Review* (blog). September 4, 2021. https://www.technologyreview.com/2021/09/04/1034364/altos-labs-silicon-valleys-jeff-bezos-milner-bet-living-forever/.

Reynolds, Ric. 1980. *Mudflat*. https://www.youtube.com/watch?v=C1V5-V2LGSo.
"Ritual Design Lab." n.d. Ritual Design Lab. Accessed October 18, 2021. https://www.ritualdesignlab.org/.

"Ritual Design Toolkit." n.d. Ritual Design Toolkit. Accessed March 19, 2021. https://www.ritualdesign.net/.

Rizzo-Martinez, Martin, and Daniel Stonebloom. n.d. "The Matter of Shellmounds." Challenging Colonialism. https://www.indybay.org/newsitems/2021/11/14/18846283.php.

Roosblad, Serginho. 2019. *The Maze*. KQED. https://www.kqed.org/trulyca/2992/the-maze.

Roosth, Sophia. 2017. *Synthetic: How Life Got Made*. University of Chicago Press.

Rose, Nikolas. 2007. *Politics of Life Itself: Biomedicine, Power and Subjectivity in the Twenty-First Century*. In-Formation Series. Princeton: Princeton University Press.

Rothman, Joshua. 2015. "Knausgaard or Ferrante?" *The New Yorker*, March 25, 2015. https://www.newyorker.com/culture/cultural-comment/knausgaard-or- ferrante.

Sahlins, Marshall. 2013. *What Kinship Is - and Is Not*. Chicago: The University of Chicago Press.

Samuel, Sigal. 2018. “A Design Lab Is Making Rituals for Secular People.” The Atlantic. May 7, 2018. https://www.theatlantic.com/technology/archive/2018/05/ritual-design-lab-secular-atheist/559535/.

Scott, James. 1998. *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed*. The Yale ISPS Series. New Haven: Yale University Press.

Sharpe, Christina Elizabeth. 2016. *In the Wake: On Blackness and Being*. Durham: Duke University Press.

Shaw, Randy. 2020. *Generation Priced Out: Who Gets to Live in the New Urban America, with a New Preface*. Berkeley: University of California Press.

Si, Tong, and Huimin Zhao. 2016. “A Brief Overview of Synthetic Biology Research Programs and Roadmap Studies in the United States.” *Synthetic and Systems Biotechnology* 1 (4): 258–64. https://doi.org/10.1016/j.synbio.2016.08.003.

Skelton, George. 2011. “California’s Budget Crisis a Chance to Rethink Redevelopment Funds.” *Los Angeles Times*, February 21, 2011. https://www.latimes.com/local/la-xpm-2011-feb-21-la-me-cap-redevelopment-20110221- story.html.

Smith, Sherry. 2020. *Bohemians West: Free Love, Family, and Radicals in Twentieth Century America*. San Francisco: Heyday Books.

Solnit, Rebecca. 2002. *Hollow City: The Siege of San Francisco and the Crisis of American Urbanism*. Brooklyn: Verso.

———. 2010. *Infinite City: A San Francisco Atlas*. First edition. Berkeley: University of California Press.

Stevens, Hallam. 2013. *Life Out of Sequence: A Data-Driven History of Bioinformatics: Hallam Stevens: 9780226080208: Amazon.Com: Books*. University Of Chicago Press.

Stinson, Liz. 2015. “Move Over, Jony Ive—Biologists Are the Next Rock Star Designers.” *Wired*, November 18, 2015. https://www.wired.com/2015/11/move-over-jony-ivebiologists-are-the-next-rock-star-designers/.

Storm, Jason Ananda Josephson. 2021. *Metamodernism: The Future of Theory*. Chicago: University of Chicago Press.

Strathern, Marilyn. 2018. “Friendship and Kinship: Comparatism and Its Theoretical Possibilities in Anthropology.” In *Regimes of Comparatism*, edited by Renaud Gagne, Simon Goldhill, and Geoffrey Lloyd, 418–46. Leiden: Brill Publishers.

Suchman, Lucille. 2007. *Human-Machine Reconfigurations: Plans and Situated Actions*. 2nd ed.. Cambridge; New York: Cambridge University Press.

Sunder Rajan, Kaushik. 2006. *Biocapital: The Constitution of Postgenomic Life*. Durham: Duke University Press.

———, ed. 2012. *Lively Capital: Biotechnologies, Ethics, and Governance in Global Markets*. Experimental Futures. Duke University Press.

TallBear, Kim. 2013. *Native American DNA: Tribal Belonging and the False Promise of Genetic Science*. U of Minnesota Press.

———. 2017. “Beyond the Life/Not-Life Binary: A Feminist-Indigenous Reading of Cryopreservation, Interspecies Thinking, and the New Materialisms.” In *Cryopolitics: Frozen Life in a Melting World*, edited by Joanna Radin and Emma Kowal. MIT Press.

Taylor, Charles. 2007. *A Secular Age*. Cambridge, Mass.: Belknap Press of Harvard University Press.

Taylor, Diana. 2003. *The Archive and the Repertoire*. Durham: Duke University Press.

“The Promise of Molecular Technology.” 2018. Emeryville: Zymergen. https://www.zymergen.com/wp-content/uploads/2018/12/Zymergen_Whitepaper_Dec-2018.pdf.

“The Relationship between Religion, Science and Technology.” n.d. *Templeton Religion Trust News* (blog). Accessed March 29, 2022. https://templetonreligiontrust.org/explore/the-relationship-between-religion-science-and-technology/.

Tompkins, Kyla Wazana. 2016. “On the Limits and Promise of New Materialist Philosophy.” *Lateral* 5 (1). https://doi.org/10.25158/L5.1.8.

Traweek, Sharon. 1988. *Beamtimes and Lifetimes the World of High Energy Physicists*. Cambridge, MA, Cambridge, Mass.: Harvard University Press.

Tsing, Anna. 2004. *Friction: An Ethnography of Global Connection*. Princeton: Princeton University Press.

———. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton, New Jersey: Princeton University Press.

Tucker, Miriam E. 2015. “Biohackers Aim To Make Homebrew Insulin, But Don’t Try It Yet.” *NPR*, July 15, 2015, sec. Treatments. https://www.npr.org/sections/health-shots/2015/07/15/422935288/biohackers-aim-to-make-homebrew-insulin-but-dont-try-it-yet.

Turner, Fred. 2006. *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Chicago: University of Chicago Press.

Turner, Victor. 1973. “Symbols in African Ritual.” *Science* 179 (4078): 1000–1005. https://doi.org/10.1126/science.179.4078.1100.

Venkataramani, Arvind. 2020. “Ritual Design at Burning Man 2019.” Medium. July 16, 2020. https://medium.com/ritual-design-toolkit/ritual-design-at-burning-man-2019-aa1e76d7dfe.

Vettel, Eric J. 2013. *Biotech: The Countercultural Origins of an Industry*. University of Pennsylvania Press.

Wajcman, Judy. 2010. “Feminist Theories of Technology.” *Cambridge Journal of Economics* 34 (1): 143–52. https://doi.org/10.1093/cje/ben057.

Walker, Richard. 2018. *Pictures of a Gone City: Tech and the Dark Side of Prosperity in the San Francisco Bay Area*. PM Press.

Wasserman, Jim. 2001. “Emeryville’s Transformation a Model for California.” *The Oakland Tribune*, August 19, 2001. Oakland History Archive.

Weber, Max. 1963. *The Sociology of Religion*. Boston: Beacon Press.
———. 2013. *The Protestant Ethic and the Spirit of Capitalism*. Abridged Edition. Merchant Books.

Weinberger, Jillian. 2015. “Foreign Investment Drives Housing Booms in San Fran, NYC.” *WNYC Studios, The Takeaway*, February 1, 2015. https://www.wnycstudios.org/podcasts/takeaway/segments/how-foreign-investment-driving-housing-boom-sf-and-nyc.

Wheeler, Donald J., and David S. Chambers. 1992. *Understanding Statistical Process Control*. Second Edition. Knoxville, Tenn: SPC PRESS.

Wiener, Anna. 2018. “The Complicated Legacy of Stewart Brand’s ‘Whole Earth Catalog.’” *The New Yorker*, November 16, 2018. https://www.newyorker.com/news/letter-from-silicon-valley/the-complicated-legacy-of-stewart-brands-whole-earth-catalog.

Wieners, Brad. 2012. “An Oral History of Burning Man.” *Outside Online* (blog). August 24, 2012. https://www.outsideonline.com/adventure-travel/destinations/hot-mess/.

Wilbanks, Rebecca. 2017. “Real Vegan Cheese and the Artistic Critique of Biotechnology.” *Engaging Science, Technology, and Society* 3: 180–205. https://doi.org/10.17351/ests2017.53.

Xygalatas, Dimitris. 2016. *The Power of Ritual*. TEDx Talks. Athens: YouTube. https://www.youtube.com/watch?v=IrjCLvSQ_cw&ab_channel=TEDxTalks.

Yardley, William. 2014. “Peter Hall, Who Devised the Enterprise Zone, Dies at 82.” *The New York Times*, August 7, 2014, sec. Business. https://www.nytimes.com/2014/08/07/business/peter-hall-city-planner-who-devised-the-enterprise-zone-dies-at-82.html.

Yates, Ronald. 1993. “Deming, Guru of Quality Management, Dies at 93.” Chicago Tribune. December 20, 1993. https://www.chicagotribune.com/news/ct-xpm-1993-12-21-9312210128-story.html.

Yesley, Michael S. 2008. “What’s ELSI Got to Do with It? Bioethics and the Human Genome Project.” *New Genetics and Society* 27 (1): 1–6. https://doi.org/10.1080/14636770701843527.

Zigon, Jarrett. 2018. *A War on People: Drug User Politics and a New Ethics of Community*. Univ of California Press.