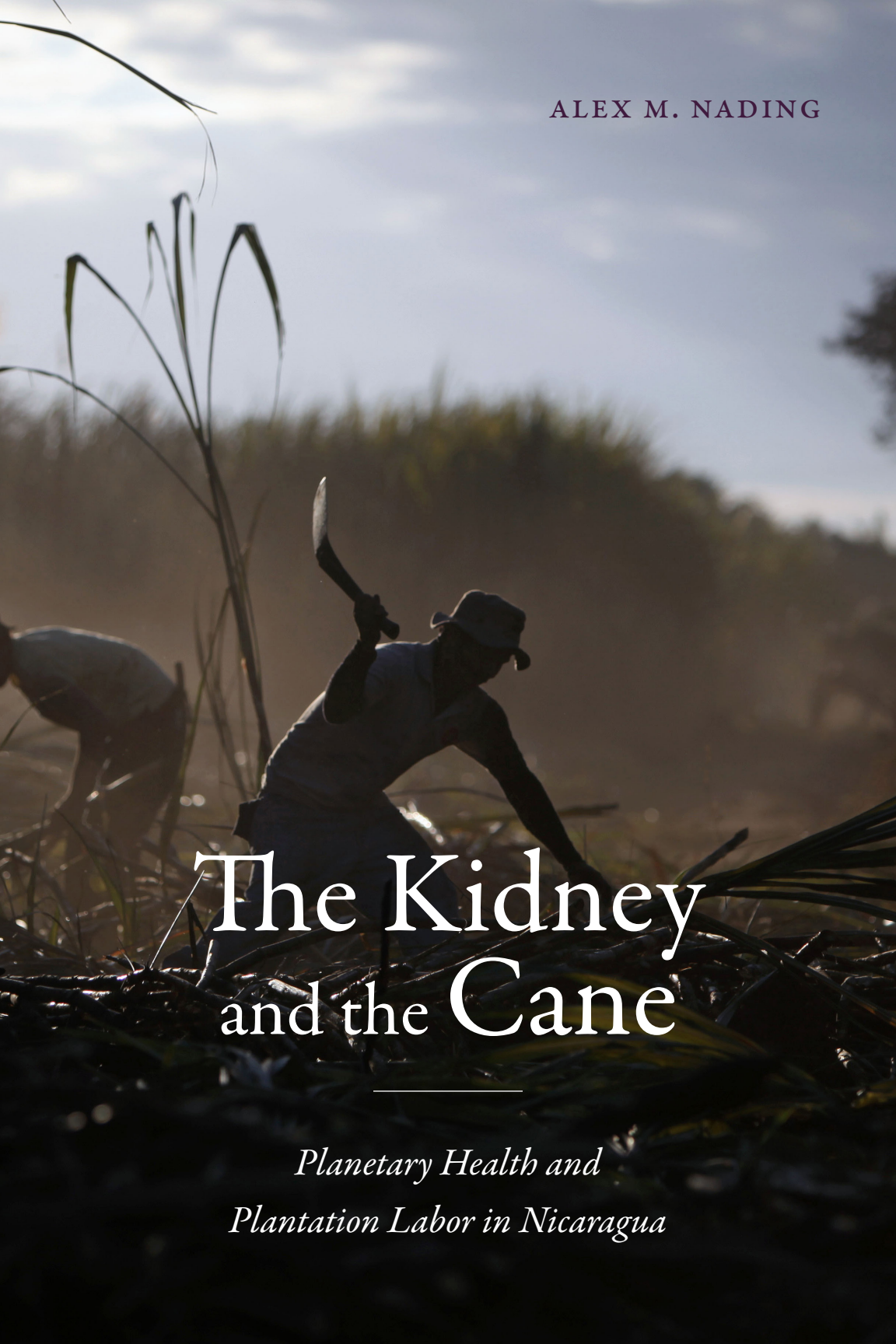

ALEX M. NADING

The Kidney and the Cane

Planetary Health and Plantation Labor in Nicaragua

The Kidney and the Cane

CRITICAL GLOBAL HEALTH: Evidence, Efficacy, Ethnography
A series edited by Vincanne Adams and João Biehl

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ALEX M. NADING

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Contents

Note on Words, Names, and Places

This book, like all ethnographic works, is about real people and places, and events that happened not too long ago. One common convention in such works is to give pseudonyms to the people, and sometimes the places, described. Some of the reasons for this are ethical. Almost no one ever asks to be the subject of an anthropological study; the issues at play remain politically fraught; and revealing precise identities and locations could put innocent people at unnecessary risk. Other reasons are intellectual. In anthropological scholarship, as opposed to journalism or historiography, what matters are the things that can be generalized from specific contexts, which means that often, the specifics can be less important than the big takeaways.

With the exception of public officeholders or scientists who are regularly quoted or publicly profiled in the press, I have chosen to provide pseudonyms or otherwise obscure the identities of the individuals whose stories constitute this book. And although the names I give to villages and communities in the book are drawn from those of actual places in Nicaragua and within the environs of the Montelimar plantation, I have altered them to protect the identities of the people I describe. The majority of the direct quotations drawn from interviews or conversations were either recorded with participants' informed oral consent or reproduced from written notes I took at the time, also with the oral consent of those present. When I attended public events, I recorded when permission was granted by the organizers but otherwise took handwritten notes. Since nearly all these events, conversations, and interviews were originally in Spanish, and since I was the only person with access to the notes and recordings, any errors in translation or transcription are mine.

The names of Nicaraguan sugarcane plantations, and of the community organizations that raised questions about environmental and labor conditions

on them, are real. One reason for this is that when it comes to the social movements I describe in the book, many of the facts, names, and even points of dispute were already part of publicly accessible records, news accounts, or peer-reviewed scientific articles before I began my research. Another is that the corporations themselves have, since the start of my research, embraced an industry-wide move toward transparency in addressing the uncertain health effects of sugarcane production. In the case of the Montelimar Corporation, whose workers and former workers are the main subjects of this book, managers were informed of my presence on company land and in meetings of community organizations about the conditions there. I am grateful for the corporation's willingness to be so accommodating, and even though I know that some readers may not agree with every conclusion I make, I have tried to represent both the company and the people in the surrounding community fairly and accurately in these pages. Again, any factual errors are my own.

From the beginning of this project, I felt I had no choice but to position myself alongside rural Nicaraguans living in the sugarcane zone as an engaged observer, rather than as a detached or neutral one. The stories I tell in this book, then, come with a definite point of view. Even though this is primarily a book about the community that surrounds a sugarcane operation and not any particular sugar corporation's managerial or organizational structure, I believe there are lessons in what follows not just for anthropologists or health scholars but also for those, including the corporations named herein, who are interested in ensuring the welfare of those who continue to make a living in and through the sugarcane industry.

Prologue

LIVES WORTH SUPPORTING

In 2015, two statements were published about environmental health crises. One was written by a group of twenty-two experts from global power centers including London, New York, New Delhi, and Beijing. The other was written by the representatives of a fledgling grassroots community movement in rural Nicaragua. One uses the crisp technical languages of economics, public health, and ecology. The other oscillates between the stilted prose of international law and the morally charged poetry of social suffering. One contains page after page, footnote after footnote, and graph after graph, illustrating the planetary-scale dangers posed by climate change. The other contains modest testimony to environmental and bodily harm in one particular place. Both statements contain lots of bullet points. One list of bullet points outlines a comprehensive strategy for sustaining life on a planet soon to be home to nine billion people. Another list outlines a set of politely worded suggestions about how those in corporate and political power might begin to consider the lives of a few hundred people.

The first of these statements was a blockbuster, at least in global public health terms. Published in November 2015, "Safeguarding Human Health in the Anthropocene Epoch," the report of the Rockefeller Foundation–*Lancet* Commission on Planetary Health, has been cited more than two thousand times. The Rockefeller-*Lancet* report is the result of a painstaking meta-analysis of environmental and epidemiological research. Among other things, it blames unchecked agricultural intensification for the loss of human and animal habitats, the erosion of soils, toxic chemical exposure, and (even though agricultural

intensification was meant to produce more food) a rise in food insecurity worldwide.[1] Action must be taken, the report's coauthors suggest, to reimagine global health as *planetary health*, an approach premised on "the understanding that human health and human civilization depend on flourishing natural systems and the wise stewardship of those systems." Though it is written in the sober and apolitical language of sustainability and economics, the Rockefeller-*Lancet* report acknowledges that poverty and inequality remain serious impediments to both human and environmental flourishing. It advocates policies that create a "safe and just operating space for humanity."[2]

The other statement is decidedly more obscure. Its title, "Complaint of CFI Project 32253," doesn't help. It was published in August 2015, just three months prior to the release of the Rockefeller-*Lancet* report, on the website of a little-known office of the World Bank called the Compliance Advisor Ombudsman (CAO). The complaint was filed in the name of a group of around seven hundred rural Nicaraguan people who identified as "workers, former works [*sic*], residents and members of the communities belonging to the Montelimar Sugar Mill." Project 32253 was the title of a loan given to the Montelimar Corporation by the International Finance Corporation (IFC), the private lending arm of the World Bank Group.[3]

The Montelimar complaint is not a sprawling document. It runs to just seven pages, but it specifies how the unchecked push for agriculturally fueled economic growth damages lives and landscapes, causing a loss of water and forest resources, deterioration of soils, and chronic exposure to toxic chemical pesticides. For the Nicaraguan people who filed the complaint, the most distressing consequence of sugarcane production was the onset of an epidemic of chronic kidney disease. While chronic kidney disease is normally associated with diabetes or hypertension, by 2015, thousands of workers and residents living around the Montelimar sugar mill had become sick or died of what became known as chronic kidney disease of nontraditional causes (CKDnt). They were neither diabetic nor hypertensive. They suspected that the CKDnt epidemic was a result of their proximity to the industrial sugarcane industry. Based on this suspicion, residents formed a community association "to respond to the crisis of health and environment, and to develop viable measures to restrict it." "All of us," the complaint states, "have the right to a dignified life in a healthy environment."[4]

To me, that last turn of phrase is more satisfying than the Rockefeller-*Lancet* report's call for "a safe and just operating space for humanity," but whichever you prefer, I hope you can see the overlap in sentiments. Divergent as they are in length, audience, and style, the Rockefeller-*Lancet* report and the Montelimar

complaint each ask their audiences to consider which lives are worthy of economic, political, legal, and technical support.

On Nicaragua's Pacific coast, one particular form of life has been supremely well supported over the past twenty-five years: industrial sugarcane. Nicaragua is a small country, and while its sugar production accounts for just a fraction of global supply, the country's sugar businesses began expanding at an unprecedented rate around the turn of the twenty-first century. According to an estimate by the Nicaraguan Investment Promotion Agency, by 2013–14, sugarcane exports were growing faster than those of any other agricultural product. Those in political power during the first two decades of the twenty-first century, whether they hailed from the left or the right of the political spectrum, had come to view supporting the life of sugarcane as a means of supporting human life. And, significantly, climate crisis was on their minds. For the Nicaraguan government and its supporters at the IFC and the World Bank, more investment in sugarcane might not only perpetuate the country's gains in food export but also develop its capacity to produce biofuels, including ethanol and energy generated from sugarcane pulp, or bagasse. This alternative energy strategy has been a key policy tenet of Nicaragua's current government, which, since the 2007 accession of Daniel Ortega and the left-leaning Sandinista National Liberation Front to power, has touted its commitment to reducing fossil fuel consumption.[5]

Since 2005, the country's two largest sugarcane firms, Nicaragua Sugar Estates Limited, a privately held Nicaraguan company, and Monte Rosa, a subsidiary of Central America's largest sugar producer, the Guatemalan corporation Pantaleon, have received over US$100 million in loans from the IFC to develop cogeneration facilities that burn bagasse to power sugar mills and the national electrical grid, and to expand ethanol production. The IFC's $15 million loan to Montelimar, the country's smallest sugarcane firm, would help the company launch a third biofuel plant. The Montelimar project also promised to increase the company's annual sugar production from thirty-three kilotons to sixty-seven kilotons, to increase its landholdings by some 25 percent, and to divert more water toward irrigation.[6]

Though the spike in investment in industrial sugarcane in places like Nicaragua is somewhat recent, it is best understood as part of a longer history. Efforts to make improvements in commercial agriculture that would simultaneously improve human well-being are the calling card of what Raj Patel calls "The Long Green Revolution."[7] During the Green Revolution's first phase in the 1960s, its proponents—including the Rockefeller Foundation—justified the consolidation of smallholdings for commercial crop production with an appeal to

global health. They argued that increased agro-export capacity was the only way to provide abundant food and thus stave off famine.[8] The World Bank's more recent turn to investment in energy indicates a continued belief in the linkage between agro-industrial growth and human health. One argument in favor of biofuel, in fact, is that a reduction of dependence on fossil fuels could lower fuel prices and thus reduce overall food costs.[9]

What transpired after the IFC made its loans to Nicaraguan sugarcane plantations highlights the weakness of such arguments. For a start, the expansion of sugarcane has intensified an already steady deterioration of Nicaraguan forests. Starting in the 1950s, the World Bank, the US government, and a variety of agricultural corporations, including US-based pesticide firms, supported the conversion of Nicaragua's Pacific region into a cotton-producing belt. The result was the destruction of thousands of hectares of old-growth forest.[10] Even after the cotton boom faded, the damage continued. According to the environmental watchdog World Rainforests, between 1990 and 2010, Nicaragua lost 31 percent of its remaining forest cover, as sugarcane operations started to expand, alongside peanut farming and cattle ranching.[11] There is now nearly no forest left on the country's Pacific coast. Loss of forests means increased carbon in the atmosphere and increased annual temperatures. Instead of creating more salubrious environments, investments by private capital, states, and supranational organizations in cotton and sugarcane monoculture in Nicaragua and elsewhere have created even more extreme environments, marked by decreased biodiversity, increased presence of toxic agrochemicals in air and water, and more intense heat. These points are all highlighted in the 2015 report of the Rockefeller-*Lancet* Commission on Planetary Health, and they are echoed in climate modeling studies that place Central America among the regions at highest risk for catastrophic heat waves.[12]

Though the stories to come all take place in the context of the Long Green Revolution, this book is not an indictment of the IFC's policy regarding Nicaraguan sugarcane. The IFC's repeated investment in Nicaragua's sugarcane zone did not, by itself, cause deforestation, the overuse of agrochemicals, or steadily increasing mean annual temperatures. Nor did the IFC's investment cause the CKDnt epidemic that was the primary concern of the group that filed the 2015 complaint to the CAO. What the conversion of the sugarcane zone into an investment hot spot did do was make an ecological and medical disaster more visible.[13] The recent wave of investor interest in Nicaraguan sugar underscores how the global drive for agro-export-driven growth has reached what one group of CKDnt researchers calls "a physiological limit . . . at which

acclimatization and behavioral modifications can no longer overcome the biologic stressors of unsafe working conditions and environmental exposures."[14]

What happens socially and politically when bodies and places reach these kinds of limits? This is the central question for the anthropology of planetary health, and late industrial disaster more broadly. As this abbreviated history of Nicaragua's sugarcane boom shows, supporting the life of sugarcane requires extreme measures, and it requires sacrificing the viability of some species and some ecological systems for the viability of others. Supporting compromised bodies (like, say, supporting the bodies of people with kidney failure through dialysis) and supporting artificial monocultures (like, say, maintaining hundreds of thousands of hectares of sugarcane) is a matter of working along the edges of life and death.[15]

For all its bullet-pointed policy recommendations, the Rockefeller-*Lancet* report is not particularly inspirational reading. My favorite part is panel 14, on page 2014, an inset box titled "Why the grassroots matter." It tells the story of how the movement for HIV treatment access led by African, Asian, and Latin American HIV patients and allies took on pharmaceutical corporations and governments to demand lifesaving drugs. In doing so, panel 14 tells us, these grassroots activists turned the tide of the AIDS pandemic. This is a story I tell my medical anthropology undergraduates every year. It is a story that finds a group of disenfranchised and marginalized people, many of them very sick, asking those with more power and influence if their lives were worth supporting.

As much as I was heartened as a medical anthropologist that panel 14 made it into the Rockefeller-*Lancet* report, it remains troubling that a scholarly paper with 432 references and twenty-two named authors contains no example of a grassroots effort to actually address what the report's executive summary calls "the degradation of nature's life support systems."[16] Instead, panel 14 says, "Better evidence is needed for the importance of planetary health than exists at present." There are plenty of possible ways to provide such evidence, but none of them, including the one in this book, has the satisfying narrative arc of the HIV treatment access story.[17] Attempting to foreground such stories in the context of an emerging epidemic remains risky, since so much of contemporary science, including climate change science, agricultural sustainability science, and global health science, depends not on the telling of relatable, human stories but on the collection of replicable, hard data.[18]

While the term *planetary health* is never used in the Montelimar complaint, that obscure document opens a window onto what planetary health might look like in practice, and why it is important. This book approaches the question

of planetary health—for planetary health is still a question, rather than a paradigm—from the vantage point of a particular group of people in a specific place, over a relatively short time. Like many stories told by anthropologists, it works from the edges. It recounts lives lived and lost not just on the margins of the global health industry represented by the Rockefeller Foundation and top-flight journals like the *Lancet*, but on the margins of the global sugarcane industry.

To take a cue from the wording of the Rockefeller-*Lancet* report, the stories in this book are about "life support systems." In colloquial medical English, the term *life support* indexes a technological achievement (think of respirators and breathing tubes). Used more broadly, the term reminds us that to be alive is to be in relation to things and beings that cooperate with us, like technologies and drugs and foods and caregivers, and even to things that do not do such a good job cooperating, such as sugarcane and the tools large companies use to cultivate it, from water to harvesting equipment to toxic pesticides. But the thing about life support is that it is always temporary. In every individual case, life support will eventually fail. At some point, agrochemicals stop helping produce crops and start damaging soil and water to such a degree that industries are no longer viable (just google "Nicaraguan cotton" and find out). At some point, hemodialysis stops keeping end-stage kidney disease patients alive. Life support is what happens when the possibility of a full resolution is no longer available. An appropriate term to describe a variety of projects aimed at addressing the crisis of the Anthropocene, life support is the project of ensuring collective endurance amid the certainty of individual loss.[19]

This book is about how people grapple with life support systems, from legal frameworks like the CAO, to irrigation works, to pesticide application regimes, to state-sponsored social security programs, to occupational health measures, to dialysis treatment itself. It explores how these systems are stabilized and destabilized by one another. It suggests that a close look at what happens along the unstable edges where life support systems meet might provide insights into the possibilities and limitations of planetary health.

Introduction

Saúl Bermudez was around thirty-five years old and just about to start his third year of law school when he was diagnosed with type 2 diabetes. He took his law courses at night and on Saturdays so he could keep his paying job, driving a taxi in his hometown of León, Nicaragua. One day, about a year after his diagnosis, Saúl helped organize a wake for his uncle, who had died from complications related to diabetes. Wakes in Nicaragua are big events, and in the León neighborhood where Saúl grew up, it sometimes seemed like everyone was related to everyone else in some way. There were so many people coming to pay their respects that the family had rented a plastic tent and pitched it over the sidewalk and curb, with plastic chairs set up underneath. As Saúl sat in the shade wiping the July afternoon sweat from his face, he was accosted by a mildly drunk distant cousin.

"Your aunt tells me you're working in the sugar mill," the cousin said, with a slap of Saúl's back.

Saúl was startled. Even though León was surrounded by thousands of hectares of sugarcane fields, Saúl hadn't ever worked in them. But the phrase "working in the sugar mill" (*trabajando en el ingenio*) had another, more metaphorical meaning. It meant "diabetic." In Nicaragua, as in other parts of the Americas, diabetes is often euphemized as "sugar" (*azúcar*). "Working in the sugar mill" is gallows humor. Keeping track of your blood sugar in a place where glucometers are prohibitively expensive, and trying to eat well in a place where the cheapest available food is high in sugar, high in carbs, and high in fat, is a lot of work.

So is cutting sugarcane, Saúl thought to himself. Though he had never actually worked in a sugarcane plantation, he knew what they were like. In fact, his recent interest in studying the law was directly connected to his work as a taxi driver, which had been how he had come to know more than most people about the sugarcane industry. Around 2005, Saúl was hired as a driver for a team of international lawyers who came to Nicaragua to assist a group of people that had been diagnosed with a previously unknown condition: chronic kidney disease of nontraditional causes (CKDnt).[1] While "traditional" chronic kidney disease is associated with diabetes, CKDnt is not. As its name indicates, there is no scientific consensus about what triggers it. In Nicaragua, CKDnt has sickened or killed thousands of people. Unlike "traditional" chronic kidney disease, CKDnt tends to strike people at a relatively young age. Many of the Nicaraguans with CKDnt are in their thirties and forties, and diagnosis as young as twenty-five is not unheard of.

Aside from their age, most of those who became sick with kidney disease had another thing in common. They once worked as field laborers on sugarcane plantations. Most believed that the sugarcane company that had employed them bore responsibility for their illness. They were convinced that exposure to something in the plantation landscape—probably poisoned water or polluted air—was causing their kidneys to fail. This conviction led them to contact the lawyers, who hired Saúl. By the time Saúl got involved, CKDnt was already reaching epidemic levels. But people wanted to know why, after years of service, sick workers were being sent home to die. The lawyers and the ex-workers were in the midst of a tense debate with the owners of the sugar company over how (and whether) the company should help affected workers in the later stages of disease get access to dialysis, and how (and whether) research should be done on how occupational conditions in the fields might have contributed to the epidemic. First, though, they had to work out how (and whether) the company should acknowledge the epidemic's very existence.

Formal negotiations between that company, Nicaragua Sugar Estates Limited (NSEL), and the workers' organization went on for nearly six years, and the

movement that began there gave rise in 2015 to a second movement, which called itself the Asociación Montelimar Bendición de Dios (AMBED). AMBED was composed of former workers at the Montelimar sugar plantation, located about one hundred kilometers to the south of the NSEL plantation. By the time of AMBED's founding, Saúl had decided to enter law school. As AMBED was forming, he again acted as driver and fixer for the international lawyers on the case, but he also took on an advisory role. He organized meetings and an executive board, and he helped communicate AMBED's concerns to the Montelimar Corporation. As at NSEL, the work with AMBED was stressful and sometimes dangerous. In the early days of the movements at both plantations, Saúl, his international counterparts, and the former sugarcane workers who had organized themselves were alternately physically threatened and tempted with bribes and gifts in exchange for their silence. The Nicaraguan police either jailed those who spoke out about the epidemic or threatened to do so. Money for running meetings and filing legal papers was in chronically short supply, and the sugar industry, one of Nicaragua's oldest and most powerful, mounted a sustained legal and public relations counteroffensive to deflect blame and sow uncertainty.

Saúl's diabetes diagnosis came during AMBED's early days. If the cause of CKDnt remained a mystery, the cause of his diabetes seemed anything but. Saúl's family, like many in Nicaragua, was full of diabetics, and he was not eating well. He had spent hundreds of hours in a car driving across the Montelimar plantation and back and forth from León. When he was diagnosed, Saúl's older brother, a doctor, told him that to protect his kidneys, he needed to change his diet, keep his stress level low, and try to get some exercise. Knowing how quickly diabetes could progress, Saúl's brother counseled him either to take a leave of absence from the work at Montelimar or to quit law school. His brother figured that Saúl would choose to stay in law school. After all, a qualified lawyer could make good money doing lots of uncontroversial, low-stress, safe tasks: notarizing documents, handling divorces, settling property claims. Instead, Saúl chose to continue at Montelimar, where I joined him and began following his work with AMBED in 2017.

The Work of Planetary Health

Within the corridors of global policy and science, a call to reimagine global health as "planetary health" was sounded in the middle of the 2010s. Planetary health has its roots in the ecological and land health movements of the mid-twentieth century, but at its core is the alarming idea that the contemporary

medical and public health sciences are simply not equipped to address the health consequences of climate change, from increasing heat to air pollution to water scarcity to land degradation.[2] One reason is that the health sciences have historically been put in the service of furthering the very economic projects that caused climate change in the first place: aggressive resource extraction, fossil fuel–driven development, and the expansion of pesticide-driven industrial monocrop agriculture, including that of sugarcane. For too long, planetary health advocates claim, care for the environment and care for human health have been treated as separate domains. The challenge is to think of care for what they call "Earth's life support systems" not just as environmental work but as work for human health.[3]

But planetary health is work in another sense. Many of the health problems now associated with climate change, including respiratory disease, reproductive abnormalities, metabolic diseases, and CKDnt, can also be understood as consequences of inequitable labor relations. It is safe to say that those whose working lives are the least valued, in terms of pay and on-the-job treatment, are most at risk of climate change–induced illnesses. There is a growing recognition that climate change is a major contributor to health inequities worldwide. To date, however, relatively little attention has been given to the role that might be played in addressing those inequities by the people most directly affected by global warming, the saturation of ecosystems with toxic substances, the loss of forest cover, the extinction of species, and the depletion of water resources—that is to say, the role played by the people for whom planetary health is at root a question of working conditions. One problem is that even those interventions designed to protect workers from climate-related diseases ignore the simple fact that workers are also people—people for whom the question of health in the workplace is inseparable from the question of health at home.[4] This book, then, treats the category of "plantation labor" broadly, giving analysis of the work of making and maintaining houses, gardens, and communities an equal footing with analysis of the work of growing sugarcane.

To do so, I draw on ethnographic research conducted between 2017 and 2020 with AMBED and others living in the environs of the Montelimar sugar plantation. I adopt a critical approach to planetary health. By "critical," I do not mean "dismissive." Rather, following an approach taken to health and disease in the context of sugarcane plantation production by other anthropologists, I explore how actions taken in small, seemingly out-of-the-way places, such as the villages that dot the Nicaraguan sugarcane zone, reverberate across the globally dispersed spaces of capitalism and global health. The literary scholar Elizabeth DeLoughrey defines climate change as a "world-changing rupture

in a social and ecological system."[5] For people in the sugarcane zone, the mass onset of a novel kidney disease was just such a rupture. My interest is in what planetary health might look like if their understanding of that rupture were treated as just as valuable as the knowledge produced by ecologists, epidemiologists, and medical doctors.[6] Doing so, I offer a glimpse of what the goings-on in individual bodies might tell us about planetary-scale change.[7]

Put another way, this book takes planetary health's central conceit—that Earth's life support systems are human systems—to its logical conclusion. It considers what happens when we think of human bodies not as existing *in* a planetary environment but, through work, as constitutive elements *of* that environment.[8] The book's six chapters explore how people living in the sugarcane zone worked across six systems designed to support life—both human life and that of the sugarcane crop. These included legal systems like the ones that brought Saúl into the story of CKDnt; occupational health systems; agricultural systems of irrigation and pesticide application that may have contributed to environmental and bodily harm; state and corporate social security systems; and systems of biomedical care. Making sense of CKDnt, and of the limits and possibilities of planetary health, entails understanding how such life support systems "are animated and interrelate."[9]

Planetary health is relatively new. Plantation labor is not. But the relationship between the two is far from incidental. The formation of sugar plantations in the Caribbean, and later in Central America, began with a violent clearing of forests, which led to extensive soil erosion and the choking of essential waterways. Across the Americas, this landscape transformation depended on the forcible conscription of human labor through enslavement and, later, through the seasonal coercion of poor and disenfranchised rural peasant populations with promises of food, money, or medicine.[10] Over more than four centuries, deforestation, water contamination, and mass displacement at the hands of the plantation complex became key contributors to what we now call "climate change." Thanks to sugarcane cultivation, landscapes like that of Nicaragua's Pacific coast were permanently, irrevocably altered well before any of the principal figures in this book drew their first breath. The change in the landscape continues. Some of the elements have been subtracted or added. Enslaved people no longer predominate in the sugarcane industry, but that is still a relatively new development. In addition to radical deforestation and rerouting of waterways, agrochemicals are now central to sugarcane cultivation.

This centuries-long effort to support the life of one crop, sugarcane, has caused what the geographer Julie Guthman, drawing on the language of medical philosophy, calls "iatrogenic harm" to the plantation complex and the

people who work in it.[11] In other words, the continued effort by plantation companies to find new ways of sustaining the life of this valuable crop causes damage to human lives, and to the lives of other animals and plants. This is not to suggest that plantation agriculture is a zero-sum proposition, or some sort of trade-off between one form of life and another. Plantations that produce sugar, as well as tea, coffee, or soy, are not stable enough systems for that.[12] As Alex Blanchette has argued in his writing on industrial pig farms, industrial agriculture is best seen as an unruly, uncertain experiment in the admixture of human and nonhuman life with machinery, pesticides, fertilizers, pharmaceuticals, air, and water.[13] Industrial agriculture is not a singular thing but an "assemblage," an unstable arrangement of capital, labor, land, and technology.[14] It is this instability that causes iatrogenic harm. As monocrop production comes to economically and socially envelop the surrounding spaces of social reproduction like rural villages and towns, and as it comes to rely on more intensive and more dangerous mechanical, chemical, and human inputs, efforts to keep the agricultural system running begin to threaten the system itself. The nature of the threat ranges from antibiotic resistance to the deepening of racial, ethnic, and gendered disparities in economic and political power to novel human diseases like CKDnt.

As its name indicates, the cause of CKDnt is still debated. There is a swirl of theories about the connection of the disease to the accreted bodily burden of decades of agrochemical application, to the sheer bodily exhaustion of sugarcane labor, to genetic predisposition, and even to the overuse of over-the-counter anti-inflammatory drugs by sugarcane workers. Today, the most widely circulated theory has to do with rising temperatures. As a leading CKDnt researcher told the *Guardian* newspaper on the eve of the 2021 COP26 conference in Glasgow, Scotland, the kidneys are "the immediate interface between [humans] and the climate crisis—because when it starts getting hot, we lose a lot of water and salt through sweat."[15] People with CKDnt are now being portrayed as bellwethers for a global climate crisis.[16]

The continued uncertainty around which of the possible "nontraditional" causes is to blame for CKDnt is instructive for a critical understanding of planetary health. Many of the factors associated with CKDnt—including chemical toxicity, diminished water tables, food insecurity, and rising annual temperature—have become associated with climate change. It would be misleading, however, to claim that new diseases like CKDnt are caused by climate change. The flaw in the claim that climate change causes human disease is that it externalizes the planetary climate from the bodily one. This flies in the face of decades of historical and social research on allergies, immunity, environmental

epigenetics, the human microbiome, and chemical exposure.[17] This research shows that bodies become healthy or diseased not because chemicals, heat, microbes, or allergens invade previously sealed bodily systems but because human biologies are, as the anthropologist Margaret Lock puts it, always already "situated" within fundamentally unstable ecologies.[18] What is happening to the kidneys of sugarcane workers is not a result of climate change. It *is* climate change.[19]

This may sound hyperbolic, but it has some grounding in the history of kidney science. For some time, the kidney has been viewed by doctors as what the twentieth-century American physician and philosopher Homer William Smith, in a rather strange book called *From Fish to Philosopher*, called the "master chemists" of the body's "internal environment."[20] The kidneys absorb and break down toxins that enter the body through ingestion, respiration, and exertion, which means they are the organs that are most actively involved in adapting bodies to their surroundings. Smith believed that humanity itself was the result of a biological and evolutionary struggle to adapt to a violently changing planet. Human bodies are, he suggested, "a product of Earth's troubled history."[21] Were it not for the evolution of the kidney, with its unique capacity to filter external toxins and wastes from the body's internal environment, Smith argued, livers, lungs, and brains would not have evolved as they did. By doing this, our kidneys "constitute the major foundation of our physiological freedom," as well as freedom of thought and will. The kidneys, he wrote, "make the stuff of philosophy itself."[22]

I agree with Smith, up to a point. Where I quibble with him is on his insistence that bodies and environments are insides and outsides to one another. In recent years, thanks to the rise of planetary health, kidneys and their function have stirred a great deal of philosophizing about humanity's place in the world, but that body-environment binary tends to get reproduced in bold pronouncements such as *Time* magazine's 2023 declaration that kidney disease is "the black lung of climate change."[23] In this book, I call attention to less stark and less declarative speculations about what kidneys and their struggle to function might mean. To do so, I turn to the concerns that first emerged among ex-workers in the Nicaraguan sugarcane zone back at the start of the twenty-first century.[24]

It is thanks in large part to the willingness of those ex-workers and their allies to ask questions about what was harming them that CKDnt is now recognized as a global epidemic, affecting rural people, primarily industrial farmworkers, in Central America, Mexico, Sri Lanka, India, Egypt, and even, evidence suggests, the United States.[25] In what follows, I recount some of the controversial

and dangerous work they did in the early days of the epidemic, but my main emphasis is on the everyday task of forging collective existence in irrevocably damaged bodies, in an irrevocably damaged place. While the question of exactly what causes CKDnt has not yet been answered, my goal is neither to develop a forensic argument about why so many thousands of sugarcane workers have died nor to indict any particular sugarcane company or government agency for malfeasance. Instead, I am setting out to examine how people take meaningful action amid what I see as the central conundrum of planetary health: while the generalized damage to the Earth is undeniable, uncertainty abounds about how to think and take action in the face of that damage. Rather than search for root causes, I ask what becomes of environmental health in a world beset by what the geographer Kathryn Yusoff calls "excessive causality."[26] In this book, there is no "big reveal." No magic gene. No toxic chemical turned smoking gun. This is a story about planetary health, not as an encompassing condition but as an ongoing, messy, and paradoxically very local process.

Helicopter in the Hot Sun

The Nicaraguan sugarcane zone is haunted by helicopters. It seems odd, but most of the time we didn't really hear them overhead. Maybe this was because Saúl's Hyundai Accent sedan made such a racket as it slogged through the sometimes muddy, sometimes rocky plantation roads. The road that took us out to the village of El Zapote was actually one of the better ones. When I first visited El Zapote, an old man who lived there assured us with great confidence that that road might as well be an *autopista*, a highway, compared with the other routes in and out of the village.

I'm not sure I'd go so far as to compare it to a highway, but this road, which wound for several miles at sea level through acres of cane that formed a green-to-golden wall on either side, was certainly easier on Hyundais than some others in the zone. Lowland dirt roads like this one eventually connected to the yet-to-be-completed asphalt autopista that would take you to a string of always-under-construction beach resorts that awaited Nicaragua's always-about-to-happen tourist boom. The few motorcycle taxis and trucks that passed for public transportation in and out of El Zapote tended to take the shorter, steeper, and decidedly more treacherous road: the one that led straight up the ridge from sea level to the only paved highway in the area, which ran from the outskirts of Managua to the town of San Rafael del Sur. Men like the one who promised us a smooth highway-like ride at sea level knew that bumpy ascent well. It was the route they took, three times a week, to meet the bus that would take them

to one of the few hemodialysis clinics in Managua, about two hours away. The dialysis patients were all former sugarcane plantation workers, and they all had CKDnt. During the four days each week when they were not traveling to or from dialysis, some of them theorized together about the cause of their disease. The helicopter figured prominently in those theories.

But like I said, it sometimes took extra work to even notice the helicopter. Spotting the little black aircraft overhead was a bit like spotting a *guardabarranco* (*Eumomota superciliosa*), the stunning multicolored bird that is Nicaragua's official national ambassador to the tropical skies. One minute we would be putting along, avoiding the deep ruts made by the giant cane-collecting trucks and just trying to keep our heads still, and the next minute, a blue and red and orange flutter in the cane would snag one of our eyes and draw it back to the section of green wall we had just passed. Birds visited now and again as if to remind us that our monotone surroundings were actually alive, metabolizing the all-too-abundant sunlight, the adequate if not abundant nutrients in the Pacific coastal soil, and the precious water from the rivers and creeks that fell down from the tropical uplands, only to be sucked into the stalks of cane before they reached the sea.

The helicopter, on the other hand, reminded the men recovering from the dialysis journey that death—their own and that of the cane—was not far off. From the helicopter's belly, clouds of odorless chemicals, aimed with varying degrees of precision, would cascade in the direction of the monoculture below. If my research on the global sugarcane industry provides any guide (agricultural companies in Nicaragua are not required to disclose their precise cultivation methods), that chemical was probably the massively successful commercial herbicide glyphosate. Whatever it was, it worked. It turned the green cane to brown, bringing the oversize grass one step closer to becoming that most unavoidable, irresistible, and terrible of global commodities: refined sugar. Modern sugar production, like the production of most any modern agricultural product, really begins with mass slaughter.[27]

When you ask people with CKDnt, as I did over and over again between 2017 and 2020, what might be causing it, they still frequently gesture with their hands, or more often with that unique jerk of the chin that Nicaraguans sometimes provide in lieu of words, to the air. By the time I started doing research in the sugarcane zone, the helicopter and the chemical, which cane plantation managers and workers call a "ripener" (in Spanish, *madurante*), were relative newcomers to the local agricultural complex. Many of the former workers who depended on hemodialysis to stay alive could remember when the only way to "mature" the cane—to get rid of the unwanted leaves of grass and condense the

sugars in the hardy stalks those leaves protected—was to wait for it to ripen on its own time, and then set it on fire. Mass cane burning had not disappeared by the time I started visiting the sugarcane zone, but many could reckon the origins of the CKDnt epidemic back to when the helicopters and chemical ripeners first came on the scene, sometime around the late 1990s.

Their logic went like this: the chemicals the helicopters unleashed, whatever they were, did tend to drift past the borders of the cane fields, through the slots in the narrow curtain of trees that guarded workers' villages, into their gardens, and onto their heads. While ideas about the deadly effects of agrochemicals and the wave of human death in the sugarcane zone have made their way into some epidemiological theories, more than a decade and a half of research on the disease has not found a clear and unambiguous connection between toxic exposure and CKDnt on sugarcane plantations.[28] This is not to say there *is* no connection, or that the people who look skyward when trying to explain the thousands of deaths in their communities are deluded. When the helicopter misses its target and chemicals fall onto plantation villages, residents feel some reasonable sense of entitlement to speak out about the acute damage that chemicals do to crops, and about the less certain long-term toll they take on humans, animals, waters, and soils. In that sense, the haunting helicopter gives these residents an opening to begin questioning not just the specific harm done by the chemical but the more general fate of life in the sugarcane zone.[29]

Those residents know that what is uncertain in Nicaragua's sugarcane zone is not simply the cause of CKDnt. While it is easy to think of disease as the central source of uncertainty in the region, what is actually uncertain—indeed, deeply fragile—is the region's dominant environmental form, the sugarcane plantation itself. Journalists, food justice advocates, and even many CKDnt scientists frequently depict the sugar industry as an enormous behemoth, ruthlessly exploiting people and land for short-term profits. The truth is less stark. Sugarcane plantations are ecologically fragile in ways that are certainly different from, if not entirely unrelated to, the fragility of the bodies of those who work them.[30] It is the fragility of a plantation, rather than its strength and coherence, that makes it so destructive, but that same fragility also provides room for people to develop what Katherine McKittrick calls "creative space to challenge" the plantation system.[31]

Plantations are not the same everywhere, but one important way of separating a plantation from other kinds of industrial monocultures is that a plantation depends for its existence on the reproduction not just of crops but of racialized and gendered difference. Since its inception, the Nicaraguan sugar business has explicitly operated on a racial and class hierarchy in which

white landowners or well-connected ladinos exploited the labor of Indigenous people and campesinos whom they considered fundamentally inferior.[32] An equally important feature of plantations is that those who own and manage them consistently find ways to disavow their culpability in racial and gendered violence through paternalistic gestures to care for laborers. Such gestures—from patronage systems in which access to work comes with access to limited food, medicine, or housing, to contemporary corporate social responsibility schemes—keep workers and other plantation residents minimally alive. Plantations may promise care, but what they offer both crops and the people who do the work of planting and harvesting them is a rudimentary and time-limited form of life support, one that is premised on the continued productivity of both.[33]

Such a minimalist approach to life support was essential to the global success of sugarcane. Since cane is not native to the Americas, colonial plantation owners and field laborers experimented to find those varieties that would grow best in vast monocultures.[34] The harvest required a violent intensity of labor, and it rewarded economies of scale. The seeding, burning, and cutting process lent itself to the expansion of a chattel slavery model premised on the fungibility and interchangeability of bodies.[35] Sugarcane's potential for ecological and bodily violence was rooted in its potential for scalable expansion: more and more of the same crop system, adjusted for climate and geography. The suffering of field laborers multiplied in parallel, reverberating across time in stories and images about the inhumanity of both past colonialism and contemporary capitalism. An eighteenth- or nineteenth-century painting of cane production in Louisiana, or Haiti, or Cuba, or Brazil tends to look remarkably similar to a twenty-first-century photograph: Black and brown (mostly male) bodies, machetes in hand, skin glistening in the hot sun, swinging, killing, dying.[36] One era's imagery haunts another's.

Nicaraguan sugar complexes, though relatively new by world-historical standards, are haunted by the legacy of the system of chattel slavery that developed elsewhere in Latin America and the Caribbean. Working in Puerto Rico in the middle of the last century, the anthropologists Eric Wolf and Sidney Mintz illustrated how, as sugar production industrialized, companies discarded the "old style" obligation to provide land and housing to workers, an obligation that began when the sugar barons' ancestors were slaveholders. "New style" plantations attempted to banish the ghosts of the premodern slave plantation by severing economic operations from other aspects of rural life. For example, they replaced direct provision of land and food with indirect economic and political investments. Such investments were often couched as promoting modernity and development.[37] In places like Nicaragua, where

sugarcane operations did not begin in earnest until after the formal end of the transatlantic slave trade, the "new style" form at first seems dominant. Today, large operations like Montelimar have achieved economies of scale by controlling massive tracts of land and hiring workers on a seasonal basis, limiting their obligations to provide the care that previous generations of plantation owners might have offered.[38]

Yet even in Nicaragua, vestiges of the "old style" remain. One sign of the overlap between the old and the new appears in language. People around Montelimar rarely used terms like *plantación* or *hacienda*. In this book, *plantation* is by and large an analytical term that I adopt. Instead, Montelimar's residents interchangeably portrayed the sugar complex as an externality, *el ingenio* (literally, "the mill"), and as a murkier space of interdependency, *la zona* (the sugarcane zone). Well before the helicopters started appearing overhead, people who worked in the sugarcane zone understood their pasts and futures as inextricably entangled with the surrounding monoculture. Many of their villages were constructed on land ceded to their ancestors by large landowners (*patrones*). Access to land would have been given in exchange for labor power, but just as important, a *patrón* could, potentially at least, be a source of support in times of need. As in other parts of Latin America, a loose "moral economy" driven by senses of obligation and debt operated in parallel to an agricultural economy shaped by labor-management relations.[39]

This moral economy is another haunting presence on contemporary plantations. As Jeffrey Gould recounts in his historical study of the Ingenio San Antonio, a sugar plantation to the north of Montelimar, a myth once circulated among the workers, which said that "the company had signed a pact with the devil in order to further accumulate wealth. . . . The devil pact specifically allowed the company to convert dead laborers and their families into cattle."[40] The company would then sell these cattle to a hacienda. "The death of [a laborer] did not mean the end of his service to the company," Gould writes. "Rather . . . the worker continued to produce wealth for the company . . . either as oxen or as food for the work force."[41] Dead workers haunted the living ones. This is an old tale, a variation of stories about the devil and capitalism that recur across Latin America.[42] Those I met at Montelimar talked frequently about bodily sacrifice, and some could even remember when the patrón who controlled Montelimar's land was none other than Nicaragua's dictator, Anastasio Somoza, whose vacation home sat just down the ridge from the sugar mill, until his ouster by the popular Sandinista revolution in 1979. Former workers framed their relationship to sugarcane as one that was defined by a donation not just of time and energy but of bodily substances, particularly

sweat and blood, to the commodity crop.[43] In the moral economy, such sacrifices were supposed to be rewarded by patrones with a modicum of care and concern, but as we will see in this book, that sense of mutual obligation was as much a haunting collective memory as a reality.

Haunting matters to this narrative in one final way. Plantations are not just systems for producing crops and keeping workers minimally alive and healthy. They are also, fundamentally, systems for sustaining the transfer of wealth and power through channels of white, elite privilege. This is true in Nicaragua, as it was in the American South, where my own ancestors were slaveholders. My great-great-great grandfather Benjamin Rush Jones was the brother of Eliza Theresa Jones Sims, the wife of J. Marion Sims. Sims was a Montgomery, Alabama, doctor whose research on vaginal fistula involved exploitative experimentation on the bodies of at least sixteen enslaved Black women, including painful repeated surgeries and involuntary administration of opium.[44] Sims's niece, my great-great grandmother Susie Theresa Jones Waller, lived at a plantation located near Mt. Meigs, where Sims had his first clinic. I am thus a descendant of the very same slaveholders who enabled Sims's work in Montgomery during that period, and I am related to Sims by marriage.[45] In a fairly direct way, I am an economic and social beneficiary of the medical exploitation Sims enacted through the Alabama plantation economy. My grandfather, Susie Theresa Jones Waller's grandson, helped pay for my education with wealth accrued from a plantation. For me, this connection is an example of how antiblackness haunts the field of medicine but also the field of medical anthropology.[46] There is no redemptive way for me to write about the plantation ethnographically, because I too am haunted by it.

Six Life Support Systems

AMBED was one of several advocacy organizations that sprang up in Nicaragua's sugarcane zone after CKDnt became a recognized problem there. It was neither the largest nor the most well-known. Its most enthusiastic participants over the years included a part-time taxi driver with two-thirds of a law degree, a couple of American lawyers, three former sugarcane cutters, and a former sugarcane company clerical secretary. As an anthropologist, I was an adjunct of sorts to AMBED's activities between 2017 and 2020.

For AMBED, the terms and tactics of environmental advocacy that might have been borrowed from other environmental or health activist groups were never sufficient for maintaining momentum. Over the past two decades, anxieties about CKDnt and its possible relationship to sugarcane plantation production

have drastically rearranged social and political relationships among former workers, their families, international aid workers, university scientists, doctors, and sugarcane companies in Pacific coastal Nicaragua. These individuals and institutional players do not constitute a collection of "stakeholders." Instead, they meet one another in an ongoing process of trying to give name and form to a bundled set of economic, medical, environmental, and political problems.[47] During the time we worked together, AMBED struggled to maintain a steady base of members who fit the conventional definition of "active." The dozens of general assembly meetings I observed were often sparsely attended. Many of AMBED's international supporters (including me) drifted in and out of the picture due to funding constraints, family obligations, changes in employment, and communication breakdowns. Saúl Bermudez himself would eventually leave AMBED under a cloud of suspicion about his loyalties, but this book is not a story about the messy intrigue of a struggling social movement.

Even if it included almost no public protests, boycotts, or voting drives, the group's work was political, if politics means, as Tania Murray Li puts it, "the expression, in word or deed, of a critical situation."[48] Yet AMBED's story reflects a version of politics that is at odds with the one that tends to dominate both liberal political theory and many studies of environmental health. This dominant version of politics imagines what the Chilean scholar Manuel Tironi has described as "well-organized, outspoken and articulated individuals . . . mobilizing cognitive (and economic) resources in the face of an externality."[49] Polluting industries make easily objectifiable externalities, yet even when groups of people are deeply affected by industrial actions, ethnographic work reveals again and again that those groups frequently choose not to externalize industry in an agonistic or directly confrontational way, but to work with and against it in a more creative, heterogeneous, and open-ended way. One reason they do this is that histories of labor—in factories, in plantations, in mines—put them in a double bind. These histories give them a sense of connection to the very polluters that harm them.[50] The people whose stories make up this book worked to trouble the sharp distinction between field and village, worker and caregiver. They refused to operate within the fixed categorical slots of medicine, environment, or labor. The effect of this refusal was to keep the questions surrounding CKDnt open to scrutiny and, by extension, to establish what many saw as the central fact of life in the sugarcane zone: that people who resided there, even if they did not work directly in the cane, were entangled with the industry—biologically, economically, and ethically. Thus, AMBED is less a subject of this book than an example of how contemporary environmental advocacy traps its

participants in multiple double binds: both calling on them to join together with corporate, state, and supranational organizations to repair the world, and to acknowledge that that very process of joining is a reductive one that can drive people apart. As Kim Fortun puts it, advocacy is not the antidote to disaster; it is part of disaster itself.[51]

Each of the six chapters of this book explores how people grappled with a system designed to support plantation life—both the human life of laborers and residents in the zone and the life of the sugarcane monoculture itself. These are all "open" systems, and they all traverse scales from the bodily to the regional to the global. Each has imperfections and gaps, which means, as Fortun has argued, that no person's role in them is ever fixed. Furthermore, each system has pressure points where they are subject to change.[52] As each chapter shows, it was at such pressure points that problems like CKDnt, toxicity, the economic and social rights of workers, and planetary health itself became workable and thinkable, but also where the scope of the slow-moving disaster of plantation capitalism became apparent.

In chapter 1, the system in question is a quasi-legal transnational corporate grievance mechanism underwritten by the World Bank's Compliance Advisor Ombudsman (CAO). When the lawyers who hired Saúl first came to Nicaragua, they were preparing to file a petition to the CAO on behalf of sugarcane workers at NSEL affected by CKDnt. Later, AMBED filed its own CAO grievance, in hopes of convincing the Montelimar Corporation to address community concerns about environmental health. It is easy to be cynical about the capacity of an unwieldy supranational body like the CAO to effectively deliver social and environmental justice, but chapter 1 describes how AMBED cautiously embraced the CAO's logic of grievance-making. The CAO grievance mechanism encourages mediation over litigation. It invites companies to meet community members in a dialogue about specific, tangible demands, and to seek trade-offs between the needs of both parties, as if they were equals. The chapter shows how AMBED creatively blended the equalizing, universalizing logic of the legal grievance with place-based knowledge, or "knowledge of the ground." Along the way, it elaborates on the group's ethical orientation. As the group's name ("Blessing from God Association") implies, AMBED took a nonsecular approach to collective organizing and accountability, one that offers a counterpoint to the dominant liberal, technocratic approach to climate justice emblemized by the CAO.

One of the most visible outcomes of the CAO mediation process was the onset of occupational studies of CKDnt in Nicaragua and elsewhere.

Chapter 2 thus turns from legal systems to systems of occupational health. The leader of one of the first groups of international scientists to study the CKDnt epidemic told me that when his team initially came to the Nicaraguan cane fields in 2008, sick workers approached them demanding that they test the soil, the water, and then their blood for the presence of the poison chemicals they were sure would be there. Such tests are notoriously difficult under the best of circumstances, and no link between toxic substances and CKDnt was found. Instead, the scientists started to notice another possible trigger. Perhaps, they hypothesized, CKDnt was the result of something as essential to the production of sugar as water, chemicals, and soil: heat. What has become known as the "heat stress nephropathy" hypothesis now appears in nearly every reputable scholarly paper on CKDnt. More than any other causal theory, the heat stress hypothesis has helped make CKDnt emblematic of the need for a new science of planetary health. A desire to test that hypothesis has drawn international occupational health researchers to the sugarcane zone. While the coming of such research offers some hope to workers, chapter 2 shows how the recent scientific and corporate focus on mitigating heat elides the fact that rising heat is enabled by national policies and transnational industry norms that permit the expanded use of agrochemicals. The systematic push to find ways of continuing to profitably produce sugarcane under conditions of extreme heat was paralleled by the efforts of nonworkers, particularly women, to make knowledge claims about the slower and more accretive changes in climate wrought by chemically driven cane production.

I delve more deeply into how those changes were embodied in chapter 3, where the life support system in question is the vast irrigation network that fed Montelimar's expanding cane fields. For AMBED, waterways were a means of both dividing and connecting plantation and nonplantation space, work and home, and human and nonhuman life. The embankments of irrigation canals, dams, and pipes, as well as beaches and riverbeds, turned out to be effective places not just for producing evidence of the impact of sugar production on bodies but also for flipping the terms on which CKDnt could be understood—from a disease of agricultural production to a disease of social reproduction. Questions about the distribution of water, as well as its quality, highlighted how the work of supporting the life of sugarcane became problematically at odds with that of supporting the lives of others who called the sugarcane zone home. Ethnographically, I show how AMBED and the communities it represented linked the kidney's primary biological function, cleansing the body of wastes, to the social acts of cleaning that took place along these embankments, conjuring a "renal environment" out of the plantation landscape.

Chapter 4 turns to the system of pesticide application and regulation. Chemical toxicity was perhaps the most pressing concern for residents of the sugarcane zone, but because toxic damage here, as in other places where chemical exposure occurs, was sometimes slow and sometimes acute, sometimes painfully obvious and other times merely possible, residents had to develop creative ways to keep attention on the problem. Rather than see toxicity as simply a question of material interactions between bodies and chemicals, the chapter illustrates how people in the sugarcane zone worked to make toxicity legible through a variety of media, including the oral sharing of stories and the exchange of videos and photographs on platforms like Facebook and WhatsApp. By rethinking toxic worlds as mediated worlds, people in the sugarcane zone found a method for questioning the premises of both pesticide regulation and toxicology. If toxicity is made in the circulation of narratives, and not just in the circulation of molecules, then the media of telecommunication, digital photography, and storytelling become essential tools in environmental politics.

Even those life support systems that appeared to be designed explicitly to provide aid to people affected by CKDnt often served in practice to support sugarcane production—to rescue the industry from itself. Chapter 5 discusses former Montelimar workers' engagements with Nicaragua's national social security system. Those affected by CKDnt had to work through the corporation to wrest benefits from the social security agency. Social security systems may seem less "open" than legal or regulatory or irrigation systems, but historical evidence about the place of sugar production in the development of the Nicaraguan welfare state shows how conditions like CKDnt challenge the structural integrity of social safety nets. Social security systems are premised on the idea that to receive insurance from the state, one must be identifiable as a productive worker. Since social security provides aid to injured workers, such systems also depend on an ability to clearly define what counts as a workplace injury. What the CKDnt epidemic has exposed is that the categories of both the worker and the working environment turn out to be fluid and contestable. The chapter uncovers the messy negotiations that go into establishing which bodily and ecological conditions count as "working conditions."

Moving from social safety nets to systems of care for the sick, chapter 6 examines what was perhaps the most significant outcome of AMBED's mediated settlement with the Montelimar Corporation: access to hemodialysis for dozens of former workers with late-stage kidney disease. The chapter charts the journeys of hemodialysis patients back and forth from the sugarcane zone to the hemodialysis wards of Nicaragua's capital, Managua. To be honest, it may be unfair to call the kidney disease treatment approach in Nicaragua

a "system." Not all those who are offered the opportunity to receive dialysis treatment accept it, and not everyone who does accept it sees it as an unambiguous good. Moreover, those who qualify for this benefit constitute a decided minority of all those affected by the epidemic. Through stories about the ambivalence of patients toward treatment, I argue that corporate social responsibility, a key element of most designs for planetary health, has the effect of reinforcing a view of labor that is as old as the plantation itself, namely, that working bodies are fungible and interchangeable.

Against Problem Closure

An impulse to identify discrete and measurable determinants of disease continues to animate many of us who are concerned about planetary health. This book is intended as a check on that impulse. Along with other critical anthropologists, I agree that it is appropriate to push back against the distributive hope that is lodged in many policy and institutional approaches to health (planetary or otherwise), namely, that with enough of the right kind of expertise, we might restore nature and normalcy.[53] Across this book, many of the actors are the same: Saúl, AMBED's leaders, the people who tended to small houses and gardens in villages dotted across Montelimar's vast sugar-growing complex. The actors are the same, but the problem, how to work at the intersection of the multiple systems that have been designed to support plantation life, is reconfigured. This makes closure a challenge. One of the lessons this reconfiguration provides for a critical approach to planetary health is that there is no way of returning to a "before," when life support systems worked better, when the drive to expand human health could be reconciled with the drive to expand economic growth.

Each chapter finds people eschewing an approach to social action that is based on the presumption that a return to a prediseased condition is possible, or even desirable. Instead, they approach CKDnt in a noninnocent register, one that over time has come to suppress the search for root causes and cures. The search for root causes, as the disability studies scholar Eli Clare writes, "requires damage, locating the harm entirely within human body-minds, operating as if each person were their own ecosystem." The notion of restorative cure, Clare continues, relies "on a belief that what existed before is superior to what exists currently." These beliefs about cause and cure, in turn, are rooted in dominant definitions of what counts as "*normal* and *natural*."[54] While the people whose work and lives I discuss in this book certainly see failing kidneys as a

form of damage, they refuse to locate that damage solely within their bodies. Furthermore—and this is not surprising if you think about it—they refuse to believe that what existed before the CKDnt epidemic began, a destructive plantation system that thrived on the exploitation of poor and marginalized rural people, is either superior to what exists today, or is normal, or is natural. While CKDnt has been devastating, it has also created an opening for multiple ways of imagining health.[55]

There is a temptation, perhaps especially among critically minded medical anthropologists, to approach stories about contested or neglected diseases with a particular kind of cause in mind: cause as end point or goal. Think social justice or human rights. We anthropologists tell ourselves that through in-depth, long-term, place-based research, we can arrive at a previously hidden empirical vantage point that will unlock the mystery. This makes sense. Scholars committed to the marginal, the disempowered, the unfree, or the afflicted have a stake in the clinical project of alleviating suffering. But such scholars (and I include myself here) might do well to hold in abeyance that temptation to unlock, to solve, to provide problem closure.

What if instead we worked toward a way of knowing that, in the words of John Jackson, refused to "simply treat mystery as its mortal enemy, as nothing more than a land to be conquered"?[56] That is a good summary of what many of the Nicaraguan CKDnt patients and their allies have tried to do. Today, they still point anxiously to the helicopter, but they don't all agree that the helicopter is some sort of smoking gun. They acknowledge the heat, and they even buy into the narratives that link CKDnt to global warming. But—and I admit this has been frustrating—people in Nicaragua's sugarcane zone experiencing the CKDnt epidemic have never galvanized around a single cause. Instead, they find themselves on edge.

For that reason, the chapters that follow take place not in the sugarcane fields themselves but in the rivers, villages, and roadways that run along their edges. It is along these edges, I suggest, that we might come to a more convincing understanding of how the unraveling of planetary ecology manifests in local biology. The villages in which sugarcane zone residents live and die are physically located on the ecological and economic edges of monocrop production systems. Residents' day-to-day lives entail work (only some of it remunerated and recognized as such) in the forest edges and irrigation embankments that separate homes from cane. As the sugarcane zone heats up, and as the chemical regimes of crop management become more intense, they find themselves enveloped in the anxieties of corporations and states navigating uncertain profit margins and varying

degrees of financial solvency. All the while, they find themselves on the edge of inclusion in economic and political orders, as they struggle to extend the reach of private and public systems of medical care.[57] As a global reconfiguration of the norms and practices of medical and environmental science, planetary health still remains something of an aspiration. But as a grassroots project, it has already begun, in an unlikely place: on the edge of the sugarcane zone.

Notes

PROLOGUE. LIVES WORTH SUPPORTING

Portions of this prologue were published in Nading, "The Plantation as Hotspot."

1. Whitmee et al., "Safeguarding Human Health," 1997. "Anthropocene" is the name that scientists have given to the geological epoch brought on by irreversible, human-induced change to the Earth's geological and atmospheric systems. See Crutzen, "Effects of Industrial and Agricultural Practices"; Steffen et al., "Anthropocene." The Rockefeller-*Lancet* report is implicitly critical of the twentieth-century development ethos that saw the improvement of human health as naturally compatible with the steady growth of economies, measured through gross domestic product (GDP) indicators. See Murphy, *Economization of Life*; Farman and Rottenburg, "Measures of Future Health"; and Livingston, *Self-Devouring Growth*.

2. Whitmee et al., "Safeguarding Human Health," 2008. The rise of planetary health follows on from the roughly twenty-year period in which states, universities, and supranational organizations organized around the notion of "global health." In some ways, planetary health represents a pivot to a more explicitly environmental posture, and in its emphasis on measuring and mitigating the effects of climate change, it is also distinct from the One Health and Eco Health movements, which have tended to focus on the pathways of zoonotic disease transmission and, to a lesser extent, overlaps between the health of key ecosystems like forests and farms and the health of humans. See Dunk and Anderson, "Assembling Planetary Health"; Brown and Nading, "Human Animal Health"; Brown, Cueto, and Fee, "World Health Organization"; Packard, *History of Global Health*; Craddock and Hinchliffe, "One World, One Health?"; Chabrol and Gaudillère, *Introduction à la santé globale*.

3. CAO, "Complaint of CFI Project 32253." The International Finance Corporation goes by the English abbreviation IFC. In Spanish, its name, Corporación Financiera Internacional, shortens to CFI.

4. CAO, "Complaint of CFI Project 32253," 1.

5. Nading, "Ethnography in a Grievance"; Johnson, "Nicaragua's Latest Revolution."

6. International Finance Corporation, "Disclosure—Ingenio Montelimar."

7. Patel, "Long Green Revolution." Hetherington, in *Government of Beans*, builds on this idea to suggest that the Long Green Revolution ushered in an age of "agribiopolitics," in which the regulation of human life, through the idiom of health, became entangled with the regulation of the lives of commodity crops.

8. Laveaga, "Beyond Borlaug's Shadow."

9. Zubrin, "In Defense of Biofuels."

10. Faber, "Sea of Poison"; Faber, "Imperialism, Revolution, and the Ecological Crisis."

11. Butler, "Nicaragua Forest Information"; Mayer, "Conceptualizing Settler Colonialism in Nicaragua."

12. Thompson et al., "Most At-Risk Regions."

13. As the medical anthropologists Hannah Brown and Ann Kelly have argued, "Disease risk is not . . . 'located,' in the sense of being a feature of a particular kind of place. . . . Rather, it is locational . . . arising from particular configurations of social, biotic, and material conditions" (Brown and Kelly, "Material Proximities and Hotspots," 287).

14. Sorensen and Garcia-Trabanino, "New Era of Climate Medicine," 694.

15. Solomon, "Life Support"; Kaufman, *Ordinary Medicine*; Biehl and Adams, *Arc of Interference*.

16. Whitmee et al., "Safeguarding Human Health," 1973. For an alternative reading of this point, see Hinchliffe, Manderson, and Moore, "Planetary Health Publics."

17. As critical global health scholars (and maybe my students!) will recognize, panel 14 vastly oversimplifies the AIDS story. Despite widespread availability of HIV drugs, it is not clear that the movement for treatment access has fundamentally addressed political or racial inequality, partly because the provision of therapy is so narrowly implemented, and partly because other basic aspects of public health still receive too little attention (see Kalofonos, *All I Eat Is Medicine*; Yi Dionne, *Doomed Interventions*; Biehl, *Will to Live*).

18. Adams, *Metrics*.

19. Carse, "Ecobiopolitics of Environmental Mitigation."

INTRODUCTION

1. The disease that forms the backdrop to this book has been known by several names over the past twenty years, including Mesoamerican nephropathy (MeN) and, more commonly, chronic kidney disease of unknown causes (CKDu). Using the term *chronic kidney disease of nontraditional causes*, I join other researchers and advocates who hold that emphasizing the "unknown" in discussions of the epidemic risks deferring investigation and critique of the likely sources of harm to workers and communities, namely, the drastic ecological transformations that have come along with the making of monocrop landscapes in Nicaragua and elsewhere.

2. Anderson and Dunk, "Planetary Health Histories," 769.

3. Whitmee et al., "Safeguarding Human Health."

4. Horton, *They Leave Their Kidneys in the Fields*; Holmes, *Fresh Fruit, Broken Bodies*; Besky, "Exhaustion and Endurance."

5. DeLoughrey, *Allegories of the Anthropocene*, 7.

6. Hecht, *Residual Governance*.

7. Agard-Jones, "Bodies in the System"; Trouillot, "Making Sense"; Scheper-Hughes, *Death without Weeping*.

8. Besky and Blanchette, *How Nature Works*; Farmer, *AIDS and Accusation*; Farman and Rottenburg, "Measures of Future Health"; Livingston, *Self-Devouring Growth*. White reminds us that "labor rather than 'conquering' nature involves human beings with the world so thoroughly that they can never be disentangled" (*Organic Machine*, 7).

9. Fortun, "Poststructuralism, Technoscience," 314.

10. Moore, *Anthropocene or Capitalocene?*; Mintz, *Sweetness and Power*; Mintz, *Worker in the Cane*; Moran-Thomas, *Traveling with Sugar*.

11. Guthman, *Wilted*, 10.

12. Besky, *Darjeeling Distinction*; Hetherington, "Beans before the Law."

13. Blanchette, *Porkopolis*.

14. Guthman, *Wilted*; Hetherington, *Government of Beans*.

15. Grover, "Too Hot to Handle."

16. Whitington, "Fingerprint, Bellwether, Model Event."

17. Mitman, *Breathing Space*; Lorimer, *Probiotic Planet*; Lamoreaux, *Infertile Environments*; Murphy, *Sick Building Syndrome*; Kenner, *Breathtaking*.

18. Lock, "Recovering the Body."

19. Here, I am paraphrasing an observation made by the anthropologist and writer Amitav Ghosh, who has argued that mass migration out of vulnerable areas such as the Sundarbans of the Bengal Delta should not be viewed as consequences of climate change but as a manifestation of climate change itself (Ghosh, "Embattled Earth").

20. Smith, *From Fish to Philosopher*, 3.

21. Smith, *From Fish to Philosopher*, 10.

22. Smith, *From Fish to Philosopher*, 3.

23. Baker, "Chronic Kidney Disease."

24. Like other medical anthropologists who have studied chronic kidney disease (e.g., Hamdy, *Our Bodies Belong to God*; Crowley-Matoka, *Domesticating Organ Transplant*; Kierans, *Chronic Failures*), I aim to use ethnographic storytelling to highlight a "conviction on the part of people who face some of the worst health conditions on the planet," namely, as Charles Briggs and Clara Mantini-Briggs write, "that their ideas could play a crucial role in making a healthier and more just world" (Briggs and Mantini-Briggs, *Tell Me Why My Children Died*, 1). Briggs and Mantini-Briggs wrote these words in the context of another medical mystery—a rabies epidemic that devastated an Indigenous Warao community in Venezuela. As in the stories I will tell in this book about the Nicaraguan sugarcane workers and others affected by CKDnt, the search by the Warao for answers was at the same time a quest to be seen and heard not merely as "victims" but as active producers of knowledge. Elizabeth Povinelli, following William James, puts it another way: "The poor 'who live and feel' the regions of existence sucked dry of value 'know truth' as an actuality. They are always, even if immanently, opposing the dominant (if ultimately sterile) ideas of bourgeois philosophers and statesmen" (Povinelli, *Between Gaia and Ground*, 5).

25. Horton, *They Leave Their Kidneys in the Fields*; de Silva, "Drinking Water"; Senanayake, "Towards a Feminist Political Ecology"; Kierans, *Chronic Failures*.

26. Yusoff, "Indeterminate Subjects," 92.

27. Hetherington, "Concentration of Killing."

28. Gunatilake, Seneff, and Orlando, "Glyphosate's Synergistic Toxicity"; Seneff and Orlando, "Is Glyphosate a Key Factor?"

29. Haunting in this (metaphoric) sense is the feeling of being repeatedly visited by a troubling presence, of both a troubling past and an uncertain future. Such a presence may provide openings for imagining and enacting justice. See Good, Chiovenda, and Rahimi, "Anthropology of Being Haunted"; Derrida, *Specters of Marx*.

30. Guthman, *Wilted*.

31. McKittrick, "Plantation Futures," 10; Li and Semedi, *Plantation Life*.

32. Walker and Wade, *Nicaragua*; Quesada, "Brief History of Violence"; Gobat, *Confronting the American Dream*. This formulation emerges from Black feminist frameworks, as well as from the work of anthropologists of the plantation who attend to the specific ways in which racial and gendered violence manifests itself across different monocultured spaces (Besky, *Darjeeling Distinction*; Jegathesan, "Black Feminist Plots"; Wynter, "Novel and History"; Davis et al., "Anthropocene, Capitalocene").

33. Trouillot, "North Atlantic Universals."

34. Tsing, "On Nonscalability"; Mintz, *Sweetness and Power*.

35. Tsing, "On Nonscalability," 512; Spillers, "Mama's Baby, Papa's Maybe"; Marshall, "Political Life of Fungibility."

36. Medical anthropology and critical food studies have gained a notable amount of traction in global health—at least at the level of college curricula—in part because of the allure of the "suffering stranger" (Butt, "Suffering Stranger"; Biruk, "Ebola and Emergency Anthropology"). Elsewhere, Anna Tsing writes of the need in global capitalist supply chains for suitable, transposable "figures." Figures like the injured male farmworker are as essential for food justice and labor advocacy as they are for fair trade certifiers and corporate social responsibility consultants (see, e.g., Holmes, *Fresh Fruit, Broken Bodies*). These human figures form a fractal dyad with recognizable commodity crops like cane, packaging a story about runaway capitalist growth, its consequences, and its solutions. As Tsing puts it, "Businessmen, policy makers, voters, trade unions, and activists . . . use concrete figurations to imagine which projects might succeed" (Tsing, "Supply Chains," 152).

37. Wolf, "Specific Aspects of Plantation Systems"; Mintz, *Worker in the Cane*.

38. Gould, *To Lead as Equals*.

39. As Elizabeth Ferry defines it, a "'moral economy' entails a parallel, often unwritten set of moral prescriptions over economic activities and their proceeds that contrast with official often elite or managerial prescriptions" (Ferry, "Geologies of Power," 424; see also Scott, *Moral Economy of the Peasant*; Thompson, "Moral Economy of the English Crowd"; Rueda Estrada, "Campesinado Migrante").

40. Gould, *To Lead as Equals*, 29.

41. Gould, *To Lead as Equals*, 30.

42. Nash, "Devil in Bolivia's Nationalized Tin Mines"; Taussig, *Devil and Commodity Fetishism*.

43. This narrative arc tracks with the ones in perhaps the two most famous anthropological accounts of sugarcane in Latin America, Sidney Mintz's *Worker in the Cane*

and Nancy Scheper-Hughes's *Death without Weeping*. In those books, the authors recount how by the 1960s, mechanization and industrialization in Puerto Rico and Brazil led to a loss of jobs and an onset of a sense of abandonment, not to mention a renewed contemplation among workers about the role of God in their lives. Nicaraguan workers' descriptions of exertion followed by abandonment reflected what Maya Mayblin, writing about Northeast Brazil's sugarcane zone, calls "the drama of work . . . as a form of sacrifice, a veritable spillage of bodily service to others" (Mayblin, "The Way Blood Flows," S47).

44. Cooper Owens, *Medical Bondage*.

45. I was able to piece together this genealogical relationship with a few clicks of a mouse, while thirteen of the sixteen women who suffered under Sims remain unnamed. No one needs to fight to build public statues of my ancestors, as many are doing now to celebrate those women's memory, because my ancestors' names and faces are preserved on the internet. I can think of few better examples of the banality of white supremacy.

46. I wish to express my gratitude to the historian Rachel Dudley for (albeit unwittingly) provoking me to do some genealogical digging. I imagine that many of us in academia who descend from white plantation slaveholders know intuitively that we are still reaping the benefits of that institution, but at the risk of distraction, I feel compelled to state what I know in concrete terms.

47. Fortun, in *Advocacy after Bhopal*, calls this kind of meeting-in-process an "enunciatory community."

48. Li, *Will to Improve*, 12.

49. Tironi, "Hypo-interventions," 443.

50. Graeter, "Infrastructural Incorporations"; Auyero and Swistun, *Flammable*; Lora-Wainwright, *Resigned Activism*. Other plantation scholars have pointed to the ethical, economic, and political compromises that are emblematic of plantation life. "Weapons of the weak" tend to be wielded alongside a host of creative strategies for ensuring social reproduction, accessing resources, and otherwise sustaining everyday existence. For contemporary workers, tactics can entail sabotage not just of industrial farm machinery or plants, as in classic renderings of weapons of the weak, but of fellow plantation workers and satellite residents (Scott, *Weapons of the Weak*; Li and Semedi, *Plantation Life*; Scheper-Hughes, *Death without Weeping*). The work of enduring and reproducing life, then, becomes integrated into the work of reproducing the plantation itself (Besky, "Exhaustion and Endurance"; Jegathesan, *Tea and Solidarity*).

51. Fortun, *Advocacy after Bhopal*, 16.

52. Actors' roles in open systems are "continually being reconstituted through the interaction of many scales, variables, and forces" (Fortun, "Poststructuralism, Technoscience," 296). Ethnography in the mode of "open system analysis conjures and temporalizes its 'object,' both synchronically and diachronically, recognizing diverse forces of change and diverse ways change happens" (Fortun, "Figuring Out Ethnography," 169–70).

53. Hecht, *Residual Governance*, 8; Livingston, *Self-Devouring Growth*; Marya and Patel, *Inflamed*.

54. Clare, *Brilliant Imperfection*, 15 (emphasis in original). See also Shotwell, *Against Purity*; Wool, "in-Durable Sociality."

55. In their critique of the concept of planetary health, Farman and Rottenburg make clear that unlike global health, planetary health cannot be one single thing—though the name implies a deep interconnection and a singular planet (Farman and Rottenburg, "Measures of Future Health," 3).

56. Jackson, *Thin Description*, 94.

57. "Identity," as Wendy Brown notes, is created on edges, where borders and oppositions are established (Brown, *Edgework*, 60).

CHAPTER 1. GRIEVANCE, GROUND, AND GRACE

Portions of this chapter were published in Nading, "Ethnography in a Grievance."

1. CAO, "Agreement," 2.

2. Neely and Ponshunmugam, "Qualitative Approach to Examining Health Care."

3. Guevara, *Guerrilla Warfare*, 56.

4. Gobat, *Confronting the American Dream*; Quesada, "Brief History of Violence"; Walker and Wade, *Nicaragua*; Grossman, "The Nation Is Our Mother."

5. As Allewaert writes, "The entanglements that proliferated in the plantation zone disabled taxonomies distinguishing the human from the animal from the vegetable from the atmospheric, revealing an assemblage of interpenetrating forces . . . an ecology. This ecological orientation departs from an eighteenth-century political and aesthetic tradition distinguishing persons, in particular, white colonial subjects from the objects and terrains they surveyed" (Allewaert, "Swamp Sublime," 341). Her observation is resonant with Sylvia Wynter's much earlier argument that the life lived by Afro-Caribbeans, enslaved and free, on the "plot" was a political and conceptual foil to the stories told about them from the linear perspective of the plantation (Wynter, "Novel and History"; see also chapter 4).

6. Allewaert, "Swamp Sublime," 343.

7. Spillers, "Mama's Baby, Papa's Maybe"; King, "Labor of (Re)reading Plantation Landscapes"; Povinelli, *Economies of Abandonment*, 108.

8. I did not explicitly set out to do an engaged anthropological project, but collaboration, which included the sharing not only of data but also of the costs of food and fuel, became the defining feature of my research with AMBED. While the Montelimar Corporation was always aware of my presence, and I never felt threatened, there is certainly a degree of risk in this methodological choice. As Scott Knowles has pointed out, whether they are acute or slow, disasters tend to summon calls for documentary investigation, usually by various kinds of elite scientific experts. Precisely what such investigations will yield is always uncertain. They might be politically co-opted by corporations or states, they might "pave the way for legal proceedings," or they might simply "channel the anger of interest groups" (Knowles, "Learning from Disaster?," 78). The ethnographic challenge is in part to resist the urge to turn complex associations like AMBED into ciphers for fixed categories of political or social action. AMBED's willingness to independently navigate the zona was part of a set of pragmatic and ethical commitments to place. This work was also a form of what Wendy Brown, drawing on Michel Foucault, calls "local criticism," which "articulates potency and humility vis-à-vis both the complex powers producing the present and the difficult task of apprehending this present" (Brown, *Edgework*, viii).