# RESIDUAL GOVERNANCE

## HOW SOUTH AFRICA FORETELLS PLANETARY FUTURES

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FOR
NOLIZWI

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# ABBREVIATIONS

| | |
|---|---|
| **AEB** | Atomic Energy Board |
| **ALARA** | as low as reasonably achievable |
| **AMD** | acid mine drainage |
| **ANC** | African National Congress |
| **CSIR** | Council for Scientific and Industrial Research |
| **CWP** | Community Work Program |
| **DA** | Democratic Alliance |
| **DEA** | Department of Environmental Affairs |
| **DMR** | Department of Mineral Resources |
| **DRD** | Durban Roodeport Deep |
| **EIA** | environmental impact assessment |
| **EMF** | Environmental Management Framework |
| **ERGO** | East Rand Gold and Uranium Company |
| **FSE** | Federation for a Sustainable Environment |
| **GCRO** | Gauteng City-Region Observatory |
| **GDARD** | Gauteng Department of Agricultural and Rural Development |
| **IAEA** | International Atomic Energy Agency |
| **ICRP** | International Commission on Radiological Protection |
| **IDC** | Industrial Development Corporation |
| **IWQS** | Institute for Water Quality Studies |
| ***LTG*** | *Limits to Growth* |
| **NNR** | National Nuclear Regulator |
| **PHRAG** | Provincial Heritage Resources Authority of Gauteng |
| **RDP** | Reconstruction and Development Programme |
| **RMP** | Rand Mines Properties |
| **SAF** | Strategic Area Framework |
| **SAHRC** | South Africa Human Rights Commission |
| ***SDF 2040*** | *Spatial Development Framework 2040* |
| **SERI** | Socio-Economic Rights Institute |

| | |
|---|---|
| **STS** | science and technology studies |
| **WHO** | World Health Organization |
| **WNLA** | Witwatersrand Native Labor Association |
| **WRC** | Water Research Commission |
| **WRDM** | West Rand District Municipality |

# NOTE ON USAGE

**GOVERNMENT DEPARTMENTS** in South Africa often change names under new administrations. For example, the Department of Minerals and Energy was split into two in 2009: Mineral Resources and Energy. In 2019, these were reunited as the Department of Mineral Resources and Energy. The Department of Environmental Affairs and Tourism was similarly split in two in 2009. In 2019, the Department of Environmental Affairs merged with parts of the Department of Agriculture, Forestry, and Fisheries to become the Department of Environment, Forestry, and Fisheries. For the most part, the narrative uses the nomenclature contemporaneous to the year it discusses.


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# INTRODUCTION

## THE RACIAL CONTRACT IS TECHNOPOLITICAL

**ON JUNE 16, 1976,** Mrs. Sithole, a teacher in Soweto, watched outside her school as thousands of children marched toward Orlando stadium to protest the latest indignity proclaimed by the apartheid regime.[1] The government had revised its Bantu education policy to mandate that all secondary schools use both Afrikaans and English as their language of instruction. Outraged Black teachers—many of whom didn't speak Afrikaans—petitioned the Department of Bantu Education to reconsider. Officials wouldn't budge. "I have not consulted the African people on the language issue," retorted the deputy minister in charge, "and I'm not going to. An African might find that 'the big boss' spoke only Afrikaans or spoke only English. It would be to his advantage to know both languages."[2] Black teachers were incensed. "Why should we in the urban areas have Afrikaans—a language spoken nowhere else in the world and which is still in a raw state of development . . . —pushed down our throats?"[3]

Equally furious, the burgeoning youth and student movement saw the language mandate as the latest in a long line of insults and injuries inflicted upon their schooling since the passage of the 1953 Bantu Education Act. The state spent 42 rands per Black schoolchild, one-fifteenth of the 644 rands it spent per white schoolchild. By 1967, student-teacher ratios in Black classrooms had plummeted to 58:1. Being forced to learn mathematics in Afrikaans—a language that didn't even have a full-fledged scientific vocabulary—was the last straw. School had become untenable. Nourished by the rising Black Consciousness movement, student organizations began to coordinate protests. In May 1976, some six hundred students at Phefeni Junior Secondary School went on strike against the language mandate. More followed at other schools. Building on this momentum, the student movement organized a mass demonstration for June 16.[4]

The march began peacefully. "Yes!" Mrs. Sithole later recalled thinking, "This is now serious." She noticed policemen standing at a street corner. But surely, she thought, they wouldn't hurt the children, who streamed along by the "thousands, all in school uniform." After all, "they had nothing, they were not aggressive. They just had placards saying 'Away with Afrikaans.'" Police vans appeared. The children refused to return to school. And then "the police just opened fire. There were little children coming. . . . I remember their uniform was green and grey. . . . All hell broke loose here. And the little boy fell here, between these two houses, between my house and here."[5] That little boy was eleven-year-old Hector Pieterson, the first of hundreds injured or killed by South African police during three days of countrywide protests. The photo of eighteen-year-old Mbuyisa Makhubo carrying Hector's lifeless body as his gasping, distraught sister ran alongside splashed across newspapers around the world. For neither the first nor the last time, the UN Security Council issued a resolution condemning apartheid as "a crime against the conscience and dignity of mankind."[6] Another eighteen years of violence ensued before South Africa held its first truly democratic election in 1994.

The teenagers who rose up in June 1976 understood very well how "Bantu education" was designed to limit their abilities and ambitions. This was no spontaneous "riot." It was a well-organized insurgency, part and parcel of a long liberation struggle.[7] These teenagers had watched the foundations of systemic racism being poured, the bricks laid down day after day, not just in their schools but also in their housing, their transport, their livelihoods, and their geographies. Soweto itself had

**I.1** Peter Magubane, *The Young Lions: Soweto Uprising*, June 16, 1976. This, too, was an iconic shot of the uprising, depicting the determination of the demonstrators in the face of the despair evident in the photo of Hector Pieterson's lifeless body and his distraught sister.

been built as apartheid's flagship model township, largely financed by one of South Africa's biggest mining houses. The mere fact that schools for Black pupils were governed separately—indeed, the very appropriation of "Bantu" as a racial rather than a linguistic category—signaled the state's intention to colonize minds as well as bodies.

English had been bad enough; Afrikaans was untenable. As South African photographer Ernest Cole had explained to US audiences a decade earlier, "It has turned out that we studied the white man's language only to learn the terms of our servitude. Three hundred years of white supremacy in South Africa have placed us in bondage, stripped us of dignity, robbed us of self-esteem, and surrounded us with hate."[8] Cole penned those words with hope in his heart.[9] They prefaced his now-classic *House of Bondage*, the photo collection he could only publish, in 1967, by escaping from South Africa. America promised a more just society. He hadn't yet grasped how deeply his description would reverberate for Black Americans, for whom the 1933 words of historian Carter Godwin Woodson still applied: "So-called modern education . . . does others so much more good than it does the Negro, because it has been worked out in conformity to the needs of those who have enslaved and oppressed weaker peoples. . . . The philosophy and ethics resulting from our educational system have justified slavery, peonage, segregation, and lynching. . . . Negroes daily educated in the tenets of such a religion of the strong have accepted the status of the weak as divinely ordained."[10] In both South Africa and the United States, two nations built on settler colonial white supremacy, systemic and epistemic racism went hand in glove.[11]

The physical and knowledge infrastructures of "grand apartheid" distilled systemic and epistemic racism into their purest forms, weaving them into the fabric of everyday life. Cole's words resonated deeply in America: "It is an extraordinary experience to live as though life were a punishment for being black. . . . The protective institutions of society are not for you. Police, magistrates, courts—all the apparatus of the law reinforces the already absolute power of the white *baas* and his madam."[12] On these and other fronts, apartheid South Africa joined the US in epitomizing what philosopher Charles Mills calls the racial contract: the political, moral, and epistemological power relations that constitute global white supremacy.

Mills counterposes the racial contract to the social contract that Euro-American political theory identifies as a keystone of liberal democracies. Social contract theory, Mills argues, relies on abstraction at

the expense of reality—especially racial reality. This is how it claims universal purview, how it sustains powerful (but illusory) aspirations to a society structured around race-less Enlightenment humanism. By contrast, racial contract theory takes full account of racism as a foundational principle of social organization in liberal democracies. This approach, Mills writes, is "necessarily more openly *material* than the social contract."[13] It refers not to an otherworldly abstraction but to political and economic reality; it's based on lived experience rather than criminally colorblind ideals.

Building on these insights, I argue that the racial contract is technopolitical. I mean this in the original and strongest sense of *technopolitics:* the purposeful design of artifacts, machines, and technological systems to enact political goals.[14] Technopolitical strategies camouflage the political dimensions of contentious issues, dissolving them into arcane technical matters that only a few experts seem qualified to adjudicate. That is certainly the case for white supremacy, which is built into infrastructures that in turn reinforce and extend racial inequality. This dynamic is particularly visible in the US and South Africa, but it holds across liberal democracies. That's why, as Charles Mills argues, "all whites are *beneficiaries* of the Contract, though some whites are not *signatories*."[15]

Black South Africans who had to navigate grand apartheid—and the environments destroyed or remade by its infrastructures—experienced the racial contract in full technopolitical florescence. They encountered its cruelty in their work, their homes, their movements through time and space. They felt it with every breath they drew, with every step they took (or were unable to take). Even after apartheid ended officially, it remained embedded in infrastructures and environments, acquiring new life, causing new harms, and sparking new modes of resistance and refusal.[16] This book takes those dynamics as its starting point.

Some of the most powerful expressions of the racial contract in South Africa are the colossal wastes—social and sedimentary—created by its mining industry. In exploring their histories, this book pursues three broad questions. How do (these) waste histories illuminate the mechanisms of systemic and epistemic racism? How do they elucidate the infrastructural and environmental expressions of racial capitalism? And what do they teach about the nature and stakes of political struggle in the Anthropocene?

To gain leverage on these questions, I begin by developing the concept of *residual governance*. You'll read the full explanation in the next chapter, but here's a quick take. Residual governance is the deadly trifecta composed of

1 The governance of waste and discards
2 Minimalist governance that uses simplification, ignorance, and delay as core tactics
3 Governance that treats people and places as waste and wastelands

Not least because of its tight imbrication with the state—which persisted through colonialism, apartheid, and majority rule—mining in South Africa offers a prime example of residual governance. But it's far (very, very far) from the only one. Residual governance, I demonstrate, is every bit as significant and oppressive as (for example) the financial and legal instruments that have subjugated generations of Black Americans. I argue that residual governance is a primary instrument of modern racial capitalism and a major accelerant of the Anthropocene.

To make this case, I approach residual governance via those who called out its failings and sought to improve its terms, not via those who built and maintained its systems. There's no shortage of scholarship on regulation and its bureaucracies, much of which illuminates the origins of residual governance (without using the term). I've written such work myself after diving deeply into corporate and government archives. In this book, however, I mostly leave those archives—and the perspectives they reflect—behind. Instead, I ask how scientists, community leaders, activists, journalists, urban planners, artists, and others responded to the depredations of residual governance. They certainly said and did a lot. According to one activist, the documents produced about one particularly polluted catchment would, if printed and piled, exceed 5 meters in height. Stacks of such documents form the building blocks for this book. The mortar is made from my archival work and fieldwork in South Africa over the last two decades.[17]

How is it possible that despite decades of study, dozens of warnings, hundreds of studies, and major political upheavals, the residues of mining pose such a persistent problem? The question applies far beyond the case I examine. Just substitute "climate change" (or any number of other phenomena) for "the residues of mining." The story of mine waste in South Africa has many lessons for navigating planetary futures.

A straightforward chronological account is neither possible nor clarifying. Each chapter in this book follows its own temporal path, producing a narrative that loops and spirals through time. The result resembles a palimpsest, the past palpably present as new layers continue to accumulate. Chapter 1, "You Can See Apartheid from Space," offers the longest view, circling through early planetary history, human habitation, imperialism, apartheid, and the present. It also elaborates the concept of residual governance more fully.

The science, art, and activism through which South Africans confronted the residual governance of mine waste coalesced around distinct focal points: water pollution, contamination by dust, the experience of specific communities, and urban and regional planning. Each of the subsequent chapters dives into one of these themes. Chapter 2, "The Hollow Rand," focuses on drainage of acid mine wastes into the region's water sources, a common postmining problem that has swollen to titanic proportions in Johannesburg. Chapter 3, "The Inside-Out Rand," tracks responses to the even more colossal quantities of (often radioactive) dust and sand generated by mining.

The problems posed by these two types of volumetric violence—drainage and dust—were often formulated and addressed separately. But residents experienced them simultaneously. Chapter 4, "South Africa's Chernobyl?," zooms in on Kagiso township and the informal settlement at Tudor Shaft to explore how one community responded. Chapter 5, "Land Mines," pans back out to view the metropolitan region as a whole, examining how the scale and volumetric nature of residues has circumscribed the options for spatially just urban planning. The conclusion, "Living in a Future Way Ahead of Our Time," returns to the theme of planetary futures.

As you read, you'll spend time with people who live next to mine dumps and breathe toxic dust—people who survived apartheid only to live in its infrastructural detritus. You'll follow them as they claim their rights to health, home, and livelihood. You'll learn about the scientific, administrative, and bodily knowledge they required to advocate effectively for more just conditions. You'll trace the alliances among activists, community leaders, experts, and others who sought to make such knowledge actionable.

You'll see how knowledge alone, however necessary for establishing a predicament's parameters and delineating its complexity, never suffices to spur remediation or repair. For one thing, knowledge is always

imperfect, insufficient, and incomplete; that's a truism, one that global industries such as tobacco and petroleum shamelessly deploy to delay regulation and deflect censure. For another, expertise is typically exclusionary. Essential questions of environmental justice take on full force here. Who counts as a knowledge producer? How can embodied, local, and social knowledge find a place in remediation plans? Finally, even if by some miracle everyone's knowledge were genuinely honored, this still wouldn't, by itself, suffice to plan adequate remediation in the face of irreversible change. Adequate for whom? For how long?

Don't get me wrong. Knowledge matters. But using it effectively also requires affective commitment, emotional engagement. Publics don't just need to know about problems; they need to feel their significance. This conviction guides my analytic and storytelling approach. My narrative wears its theory and methods lightly.[18] I strive for transparency that highlights authorial affect over academic penchants for hedging and self-positioning (penchants that I myself have indulged in past writing). After all, we live in dire times. Having experienced firsthand how scientific knowledge of harm isn't enough to generate change, environmental justice scholars have begun calling for engagement with the "traumas of living with toxic chemicals."[19] So-called dispassionate analysis is a privilege of the powerful, one that contributes mightily to our planetary predicament by allowing decision makers to dehumanize their constituents by treating them as abstractions. Keeping calm is merely a way to carry on.

Images play a major role in this story, both as illustrations and as primary sources. As an instrument of power, residual governance fosters invisibility. In response, artists, activists, scientists, and journalists have elaborated extensive visual vocabularies for calling out the injustices of this instrument. Their images add a twelfth tongue to South Africa's eleven official languages, communicating ideas and emotions that words cannot capture. Like any language, of course, images incur risks. This book deals with extreme situations; the pictures are rarely uplifting. But the point is not to invite viewers to wallow in Black suffering or indulge in ruin porn. Media scholar Cajetan Iheka writes in his masterful analysis of African ecomedia that "the image of suffering makes a claim on the viewer to act responsibly." That is precisely how the photographers I include hope their audiences will respond to their work. They seek to "*problematize* anti-Black violence," not to merely illustrate it, and certainly not to wallow in it.[20]

Engaging with these artistic vocabularies made me wonder how the arguments of this book could be rendered visually. In 2016 I participated in an Anthropocene campus in Berlin. Historian Chakanetsa Mavhunga invited me to join him and two Zimbabwean compatriots—archaeologist Shadreck Chirikure and graphic designer Chaz Maviyane-Davies—in leading a unit called "Whose Anthropocene?" I was mesmerized by Maviyane-Davies's poster series *A World of Questions*, which made compelling visual arguments concerning the ecocidal themes we were all grappling with.[21] He was kind enough to accept a commission for this book. Each chapter opens with one of his montages, presented without comment. Think of them as visual epigraphs, ways of foreshadowing an aspect of the chapter they precede.

From its inception, the mining industry formed the core of South Africa's racist infrastructures. It drove the nation's economy. It pioneered the practices that later came to constitute formal apartheid. It defined the country's relationship to the rest of the world. Massive foreign investment and expertise, especially from the US and the UK, shaped the industry from its earliest days. Starting in the late nineteenth century, American mining engineers brought the technologies and experience they'd gained extracting California's gold to South Africa's Witwatersrand plateau. The corporations they built in South Africa, writes historian Keith Breckenridge, employed more people and earned more profits than the entire US gold mining industry, until then the world's largest producer. In South Africa, American engineers found ready reception not just for their geological, mechanical, and chemical knowledge, but also for their technologies of labor organization and discipline. Their veneration of efficiency led to staggeringly racist micromanagement, down to treating African workers "like battery chickens," providing just enough "food according to scientific criteria to reach the required level of production."[22]

After the National Party rose to power in 1948, the World Bank took the lead in foreign investment. It granted $200 million worth of loans to enable the new government to expand its industrial infrastructure. The World Bank's blessing consecrated South Africa as a safe place to seek profits under apartheid. Other investors followed suit, insisting that continued industrial growth would ultimately break down racial prejudice. A central clause of the racial contract, this claim stemmed

from two related delusions: (1) that racism is "a mysterious deviation from European Enlightenment humanism" rather than a constitutive component, and (2) that capitalism necessarily leads to democracy.[23]

South African Marxists coined an expression to describe the system that emerged: racial capitalism.[24] Racism, they argued, was not a side effect of capitalism. More intense capitalism couldn't eradicate racism for the simple reason that in South Africa, racism was utterly essential to capitalism. "Apartheid," wrote linguist Neville Alexander, "is simply a particular socio-political expression of [racial capitalism]."[25] Writing from exile in Britain just three months after the Soweto uprising, historians Martin Legassick and David Hemson explained that "segregation was the *means* whereby the economic interests of the mining industry were constituted as state policy."[26] They hoped their analysis would shame British firms into ameliorating conditions for African workers in their factories. Alexander, who'd spent a decade imprisoned on Robben Island with Nelson Mandela (followed by five years of house arrest), had far loftier ambitions. He imagined a future nation, Azania, which would reject the very concept of race. "'Race' as a biological entity doesn't exist," wrote Alexander, though its "social reality" was not in doubt. Mindful that rejecting race's biological reality could cut both ways, he emphasized that his vision of nonracialism was explicitly antiracist, involving not only "the denial of 'race' but also opposition to the capitalist structures for the perpetuation of which the ideology and theory of race exist."[27] In South Africa at least, capitalism was always already racial capitalism.

Such arguments resonated strongly with Black intellectuals elsewhere. Revisiting Marx's oeuvre, American political theorist Cedric Robinson concluded in 1983 that all capitalism was racial capitalism. All of it rested on racialized divisions between the free and the unfree, between valuable humans and disposable humans. As geographer Ruth Wilson Gilmore puts it, "Capitalism requires inequality, and racism enshrines it."[28] In the last two decades, she and others have reinvigorated the concept of racial capitalism, emphasizing its sedimentary structures and effects. From the seventeenth to the nineteenth centuries, these scholars argue, the kidnapping, enslavement, and murder of Africans—along with the theft of indigenous land—powered capital accumulation for white plantation owners in the Americas. Black and indigenous female bodies, writes postcolonial theorist Françoise Vergès, were "the humus of capitalism."[29] To which philosopher Achille

Mbembe adds, "Racial capitalism is the equivalent of a giant necropolis. It rests on the traffic of the dead and human bones."[30]

Starting in the late nineteenth century, North American bankers supported US military occupation and subsequent dictatorial regimes in the Caribbean, Latin America, and Asia. Historian Peter Hudson argues that they used their accumulated capital to float public debt and finance infrastructure projects, imposing "usurious rates and suffocating fiscal conditions" on supposedly sovereign nations. In the US, historian Destin Jenkins and others detail, white supremacy was baked into urban planning, real estate, and financial instruments that made it extraordinarily difficult for African Americans to build and keep generational wealth.[31] Propagated by infrastructures from plantations to prisons, racial capitalism normalized Black and indigenous dispossession in the Americas as well as in Africa. This book brings this more expansive understanding of racial capitalism to bear on contemporary South Africa.

The infrastructural violence of racial capitalism ravaged environments as well as humans. Engineer–turned–political theorist Malcom Ferdinand identifies these twinned modes of violence as a "double fracture" in planetary history, simultaneously ecological and colonial. Any serious analysis of the planet's present-day geological epoch, increasingly known as the Anthropocene, must account for systemic racism and ecocide in tandem, as processes tightly bound to each other rather than merely synchronous. Hammered in the holds of slave ships, then on plantations, then everywhere, the ecological fracture now called the Anthropocene was always also colonial and racial.[32] Black intellectuals and political leaders have long seen imperialism as "the pyromaniac of our forests and savannahs."[33] Invoking Martiniquais poet Aimé Césaire, Ferdinand argues that any environmentalism that ignores those "without whom the Earth would not be the Earth" is simply absurd.[34]

Sensitive to such arguments, some writers propose alternative appellations for the present geological epoch, designations intended to highlight the power dynamics at play in planetary change. They use terms such as *Plantationocene* or *Capitalocene* to counter the implication (which they insist is embedded in the *Anthropo-* prefix) that all humans contribute equally to the current crisis.[35] For me, however, implications of human uniformity inhere not in the term but in its deployment. Earth-systems scientists use *Anthropocene* as a capacious, multidisciplinary frame for analyzing the scale and irreversibility of

human-driven planetary change. I see their term not as a declaration of war but as an invitation to dialogue, to think about the complexities of the present predicament across epistemological and disciplinary divides.[36] Why cede the term to so-called ecomodernists who proffer planetary-scale solutions like geo-engineering?[37] The word itself in no way precludes an analysis of how racism and ecocide accelerated together, feeding and shaping each other to the point that, as Vergès writes, "race became a code for designating people and landscapes that could be wasted."[38] Scholars in the emerging interdisciplinary field of discard studies have further elaborated the mutual constitution of race and waste, both as categories and as forms of violence.[39]

Long after the end of legalized racism, the proliferating residues of racial capitalism continue to sediment in financial tools, urban spaces, and health systems. Not to mention water, land, and air. These residues are rarely reducible to their molecular composition. Politics shape not only their selection, placement, and treatment, but their very chemistry; acid mine drainage is a prime example, as you'll see in chapter 2. When societies fail to design infrastructures and governance for equity and livability, then mine sulfates and their kin become the molecules of racial capitalism. By no means the only such molecules, to be sure. But significant constituents nevertheless.

Analytically and epistemologically, it makes no sense to separate racial capitalism from the Anthropocene. The residual molecules of racial capitalism drive Anthropocene accelerations. They're building blocks of Anthropocene epistemology; measuring them is what has led scientists to declare the arrival of a new geological epoch. Precisely because they materialize in infrastructures and environments, they do not require individual racists to continue their damage (though if they did, there would be no shortage of volunteers). Politically, however, policy makers and corporations have found compartmentalization extremely useful: social things like race in one bucket, physical things like molecules in another. They deploy the simplifications of modernity in order to circumscribe questions of political economy as a dichotomy between jobs and environment.

Development discourse pits employment against ecosystems the world over. Society, we are told, faces inescapable choices between jobs and environment. But there's nothing natural about this opposition. Rather, it's actively created and maintained. Neutral-sounding (dispassionate)

instruments of global racial capitalism—themselves built on layers of racialized inequalities—propagate and activate the jobs/environment dichotomy. Starting with regulatory arbitrage: the corporate practice of siting polluting activities in places with weak regulatory infrastructures (weakness that itself results from the drain on human and natural resources performed by decades of rapacious colonialism and racial capitalism). In many such places, economic disparities are so extreme that jobs seem like manna, and environmental consequences beside the point. Regulatory arbitrage may not be ethical, but it's almost always legal.

By actively nurturing an alleged opposition between jobs and environment, regulatory arbitrage and related mechanisms serve as instruments of "self-devouring growth." Historian and anthropologist Julie Livingston writes that the political appeal of *GROWTH!* has turned it into a "mantra so powerful that it obscures the destruction it portends."[40] Critics who point out the physical impossibility of endless growth on a finite planet are laughed off as naive, sourpusses, party poopers who lack faith in technology's ability to fix all problems. Growth = jobs = livelihoods = justice. End of discussion.

Naturalizing a jobs/environment opposition has made it easy for many wealthy white environmentalists to imagine that poor people don't care about pollution. Or (among the more well-meaning types) that poor people have "more pressing problems" than environmental protection.[41] This may even seem like common sense. Of course people are more focused on gaining reliable access to housing, food, and basic services than on large-scale environmental threats. But what counts as large-scale? What counts as environment? Whose needs count as urgent?

Environmental justice advocates pose such questions all over the world.[42] Indeed, the movement itself emerged in response to the inadequacy of conservation-oriented environmental movements dominated by middle-class whites. Once again, Charles Mills nails it:

> Conservation cannot have the same resonance for the racially disadvantaged, since they are at the ass end of the body politic and want their space upgraded. For blacks, the "environment" is the (in part) white-created environment, where the waste products of white space are dumped and the costs of white industry externalized. Insofar as the mainstream environmentalist framing of issues rests on the raceless body of the colorless social contract, it will continue to mystify and obfuscate these racial re-

alities. "Environmentalism" for blacks has to mean not merely challenging the patterns of waste disposal, but also, in effect, their *own status* as the racialized refuse, the black trash of the white body politic.[43]

The point applies well beyond the United States. In South Africa, argues anthropologist Lesley Green, a relentless focus on species extinction long prevented many white "greenies" from recognizing Black environmental concerns as not only adjacent to their own efforts, but part of the same struggle.[44] Historian Jacob Dlamini explores the roots of this misrecognition by detailing the history of Black visitors and workers in Kruger National Park, people unseen by previous scholars who focused on Black exclusion and white conservationism.[45] In a related vein, Chakanetsa Mavhunga details the complex knowledge systems elaborated by southern Africans, arguing that their cognitive categories should be treated with the same epistemic respect as those of institutionalized science.[46] In southern Africa, as in America, simply showing that Black people have political, material, epistemic, and recreational relationships to nature is a radical move.[47]

Just as in the United States, however, Black South African environmental politics go well beyond white conservationist conventions. In 2002, scholars writing about South Africa's nascent environmental justice movement observed that access to clean water, sewer systems, and sanitation were among the most pressing environmental issues faced by Black citizens.[48] That observation still holds two decades later. Protests over lack of basic services have become more common and more intense. Some commentators dismiss service delivery protests as a minor form of politics because these focus on what appear—from the perspective of a well-plumbed bathroom—to be mundane concerns. Or because of their poop-hurling tactics, which smell far worse than your typical *toyi-toyi* (a dancing walk featured in many political demonstrations). Yet there's nothing mundane about running water for those who lack sanitation. Shit is political.

Service delivery protests are environmental (techno)politics.[49] South Africa's constitution, heralded for its progressiveness, guarantees its citizens the right to a healthy environment. Legal scholar Tracy-Lynn Humby notes, however, that the nation's constitution formulates this right separately from rights to housing and basic services, thereby entrenching old distinctions.[50] On the ground, poor South Africans (and others) don't slot their lives and struggles into environmental and socioeconomic boxes. Lived experience tells them that these are inseparable.

Residents of informal settlements, the so-called poorest of the poor, are no exception. They might not be able to detail every chemical and element making them sick. (Can you? I sure can't.) But whatever their formal education—and some have quite a lot, education alone not sufficing to prevent poverty—they possess a deeply embodied knowledge of pollution. All too often, however, that knowledge is dismissed as anecdotal evidence. Where's the method? What about the control group? Embodied experience doesn't fit neatly into the scientific protocols that underpin the process of setting regulatory limits molecule by molecule (protocols whose inadequacies are further demonstrated by the perpetual bureaucratic failure to keep up with the promiscuous production of new chemicals).[51]

What's the recourse for people without resources? Skepticism about objective scientific solutions seems warranted (and certainly easy to understand), given the long history of how racial ontologies and racist machines have shaped South African research.[52] The scale of environmental harm, coupled with huge differences in wealth and power, makes many problems seem too vast for individuals to tackle. Barring collective action, responses to individual complaints typically perform some version of the employment/environment dichotomy. "If you don't like it, just move!"[53] Yet moving is rarely a realistic option. Employees need to keep their jobs. Residents of informal settlements have nowhere else to go. Deep despair prevails, a sense that the government—in which so many invested hope in 1994—isn't on their side.

Drawing on the work of postcolonial scholars, Charles Mills argues that the racial contract both prescribes and performs epistemologies of ignorance. Consciously or not, its white adherents agree to "*mis*interpret the world," to see the world through the lens of "color blindness," which for them has the added virtue of seeming nondiscriminatory and therefore morally superior. They "learn to see the world wrongly," Mills writes, "but with the assurance that this set of mistaken perceptions will be validated by white epistemic authority." Ironically, this global "cognitive dysfunction" means that "whites will in general be unable to understand the world they themselves have made." Hence the appeal of abstract ideals and seemingly nonracial concepts, like the social contract, over material realities. White misunderstanding and self-deception, Mills insists, is not an unintended consequence; rather, it's written into the terms of the contract, "which requires a certain schedule of structured blindnesses and opacities in order to establish and maintain the white polity."[54]

Although Mills frames his analysis as a critique of white Western philosophy, its implications, as many have shown, extend much further. I find particularly strong resonance with critiques of knowledge emanating from science and technology studies (STS). That field has its own version of epistemologies of ignorance, which some call *agnotology*. This scholarship primarily engages questions of health and environment. It identifies two forms of manufactured ignorance: the malevolent kind (tobacco and fossil fuel companies actively hiding research results that are bad for business) and the systemic kind (researchers passively failing to ask questions that would, if answered, reveal extensive harm).[55] "Evasion and self-deception thus become the epistemic norm": Mills wrote those words, but they apply just as well to malevolent agnotology ("evasion") and its systemic cousin ("self-deception").[56] When these varied modes of ignorance operate simultaneously, they exacerbate environmental racism and health inequality.

Recent STS writing on ignorance urges researchers to avoid fetishizing pollution and toxicity.[57] Scholars caution that damage-centered research can exacerbate the very harms it seeks to address; focusing on toxicants without accounting for the full range of community concerns inevitably leads to false solutions. Avoiding this trap requires attending not only to molecules but also to the deeply racialized infrastructures that produce them, as well as to the ways that communities navigate these infrastructures in all aspects of their lives. One approach—which I initially intended to adopt—is to conduct research in partnership with communities. I quickly realized, however, that a great many activists and scientists in Gauteng already do this in a far more fine-grained way than I ever could. Instead, I've chosen to showcase some of their partnerships. *Residual Governance* explores their work, placing it in broader context and highlighting its intersections and dialogues with the vast body of art and journalism on mine residues.

In examining how communities and their allies have challenged residual governance, this book resists the temptations of simplification and solutionism. Instead, as Donna Haraway would say, it stays with the trouble.[58] I can only hope that my narrative enables readers to sit with the intense discomfort generated by the hard, never-ending work of repair required to survive in Anthropocenic times.

Fundamentally, the Anthropocene framework expresses trepidation about the future. What will it take for that future to be livable for humans? In these first decades of the twenty-first century, Achille Mbembe observes, many have begun to understand that "to a large ex-

tent our planet's destiny might be played out in Africa." South Africa certainly offers a dramatic demonstration of the depths and difficulty of community and planetary healing. "There is no better laboratory," writes Mbembe, "to gauge the limits of our epistemological imagination or to pose new questions about how we know what we know and what that knowledge is grounded in."[59] That's because in South Africa, the future is already here.

# NOTES

## INTRODUCTION

1 *Sithole* is pronounced "See-TOH-lay." This story is adapted from Nieftagodien and Gaule, *Orlando West, Soweto*.

2 Quoted in "The June 16 Soweto Youth Uprising."

3 Editorial by the African Teachers Association of South Africa (Atasa) in *The World*, January 6, 1975, quoted in Nieftagodien and Gaule, *Orlando West, Soweto*, 69–70.

4 For introductions to the history of the Soweto uprising and subsequent political and historiographical debates about that history, see Ndlovu, *The Soweto Uprisings*; Nieftagodien, *The Soweto Uprising*.

5 Mrs. Sithole's account quoted in Nieftagodien and Gaule, *Orlando West, Soweto*, 75.

6 United Nations Security Council Resolution 392 (1976) on killings and violence by the South African apartheid regime in Soweto and other areas, adopted by the Security Council at its 1930th meeting, June 19, 1976, https://digitallibrary.un.org/record/93718?ln=en.

7 The historiography on the Soweto uprising has long argued that "riot" was a racist characterization by the apartheid government. Elizabeth Hinton makes a similar point about so-called race riots in the United States, showing how the idea of a riot was used to justify militarized police response to Black insurgency. See Hinton, *America on Fire*.

8 Cole, *House of Bondage*, 20.

9 Knape, "Notes on the Life of Ernest Cole," 22–23.

10 Woodson, *The Mis-education of the Negro*, 4.

11 Bhimull et al., "Systemic and Epistemic Racism."

12 Cole, *House of Bondage*, 21.

13 Mills, *The Racial Contract*, 43.

14 I first developed this meaning of technopolitics in Hecht, *The Radiance of France*. For a deeper discussion of technopolitics in apartheid South Africa, see Edwards and Hecht, "History and the Technopolitics of Identity"; von Schnitzler, *Democracy's Infrastructure*.

15 Mills, *The Racial Contract*, 43, 11.

16 Edwards and Hecht, "History and the Technopolitics of Identity"; Edwards, "The Mechanics of Invisibility."

17 Hecht, *Being Nuclear*, appendix.

18 My analysis of the evidence is influenced by a wide range of scholarly fields, including STS (science and technology studies, my field of origin), African studies, history, anthropology, environmental humanities, Anthropocene studies, visual culture, scholarship on racial capitalism and extractivism, critical race theory, and more. Readers will find some of this in the notes, but I have not tried to capture the full influence of all fields on my thinking.

19 Kojola and Pellow, "New Directions in Environmental Justice Studies."

20 Iheka, *African Ecomedia*.

21 Maviyane-Davies, *A World of Questions*.

22 Legassick and Hemson, "Foreign Investment."

23 Quote from Mills, *The Racial Contract*, 26–27.

24 N. Alexander, *One Azania, One Nation*; Legassick and Hemson, "Foreign Investment"; N. Alexander, *An Ordinary Country*.

25 Neville Alexander, "Nation and Ethnicity in South Africa," quoted in "Racial Capitalism, Black Liberation, and South Africa," *Black Agenda Review*, December 16, 2020, https://www.blackagendareport.com/racial-capitalism-black-liberation-and-south-africa.

26 Legassick and Hemson, "Foreign Investment."

27 N. Alexander, "Nation and Ethnicity in South Africa."

28 Gilmore, *Golden Gulag*.

29 Vergès, "Capitalocene, Waste, Race, and Gender."

30 Mbembe, *Critique of Black Reason*, 136–37.

31 Hudson, *Bankers and Empire*; Jenkins, *The Bonds of Inequality*; Jenkins and Leroy, *Histories of Racial Capitalism*.

32 Ferdinand, *Une écologie décoloniale*; Ebron, "Slave Ships Were Incubators for Infectious Diseases."

33 Thomas Sankara quoted in Ferdinand, *Une écologie décoloniale*, 35.

34 Ferdinand, *Une écologie décoloniale*, 16, 54–55, 253.

35 Haraway, *Staying with the Trouble*; J. W. Moore, *Capitalism in the Web of Life*; Tsing et al., *Feral Atlas*.

36 Hecht, "Interscalar Vehicles."

37 Asafu-Adjaye et al., "An Ecomodernist Manifesto."

38 Vergès, "Capitalocene, Waste, Race, and Gender."

39 Zimring, *Clean and White*; Pulido, "Flint"; Millar, "Garbage as Racialization"; Reno and Halvorson, "Waste and Whiteness"; Krupar, "Brownfields as Waste"; Dillon, "Race, Waste, and Space."

40 Livingston, *Self-Devouring Growth*.

41 Winde, "Uranium Pollution of Water," 44.

42 Among many others: Bullard, *Unequal Protection*; Bullard and Wright, *The Wrong Complexion for Protection*; Pellow, *Resisting Global Toxics*; Pellow

and Brulle, *Power, Justice, and the Environment*; Taylor, *The Environment and the People*.

43 Mills, "Black Trash," 89. This quote preserves the capitalization practice of the original.

44 Green, *Rock/Water/Life*, 206.

45 Dlamini, *Safari Nation*.

46 Mavhunga, *The Mobile Workshop*; Mavhunga, *What Do Science, Technology, and Innovation Mean from Africa?*; Mavhunga, *Transient Workspaces*.

47 Finney, *Black Faces, White Spaces*; Taylor, *The Rise of the American Conservation Movement*.

48 McDonald, *Environmental Justice in South Africa*.

49 Von Schnitzler, *Democracy's Infrastructure*; Redfield and Robins, "An Index of Waste."

50 Humby, "The Spectre of Perpetuity," 108.

51 Hepler-Smith, "Molecular Bureaucracy."

52 Green, *Rock/Water/Life*; Dubow, *Scientific Racism*; Dubow, *A Commonwealth of Knowledge*; Beinart and Dubow, *The Scientific Imagination in South Africa*; Hecht, *Being Nuclear*; McCulloch, *South Africa's Gold Mines*; McCulloch, *Asbestos Blues*; McCulloch, "Asbestos, Lies and the State"; Packard, *White Plague, Black Labor*; Braun, *Breathing Race into the Machine*.

53 Dugard and Alcaro, "A Rights-Based Examination."

54 Mills, *The Racial Contract*, 18–19. Black intellectuals working in other scholarly traditions have reached compatible conclusions, of course, including Fanon, *Wretched of the Earth*; Mbembe, *Critique of Black Reason*.

55 Proctor and Schiebinger, *Agnotology*; Oreskes and Conway, *Merchants of Doubt*; Hecht, *Being Nuclear*.

56 Mills, *The Racial Contract*, 97.

57 Liboiron, Tironi, and Calvillo, "Toxic Politics," 333.

58 Haraway, *Staying with the Trouble*.

59 Mbembe, *Out of the Black Night*, 10–12. I'm taking a slight liberty here: Mbembe doesn't confine himself to South Africa, writing "that there's no better laboratory than *Africa* to gauge" those limits (emphasis mine).

## ONE YOU CAN SEE APARTHEID FROM SPACE

1 Bobbins and Trangoš, *Mining Landscapes of the Gauteng City-Region*; Trangos and Bobbins, "Gold Mining Exploits."

2 The description of *zama zama* experience is based on a growing body of literature about them, including Thornton, "Zamazama"; Lewis and Zack, *Undercity*; Morris, "Shadow and Impress."

3 Morris, "Death and the Miner."

4 Rittel and Webber, "Dilemmas in a General Theory of Planning," 156.