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GATHERING THE KALAHARI: TRACKING LANDSCAPES IN MOTION

A dissertation submitted in partial satisfaction
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

ANTHROPOLOGY

by

Pierre L. du Plessis

June 2018

The Dissertation of Pierre du Plessis is
approved:

Professor Anna Tsing, chair

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Professor Mayanthi Fernando

Tyrus Miller
Vice Provost and Dean of Graduate Studies

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Abstract

Gathering the Kalahari: Tracking Landscapes in Motion

Pierre du Plessis

At a time when human environmental disturbance is challenging livability on the planet—for humans and nonhumans alike—it is important to find better methods for engaging with the liveliness of landscapes, the relations with which they hang together, and the various ways they are interrupted. This dissertation explores the practices of tracking and gathering as methods for studying such issues facing Kalahari Desert landscapes in Botswana. These ecologically important landscapes are increasingly encroached upon and fragmented by the growing cattle economy and the proliferation of extractive industries into the desert. These trends have led to dramatic declines in wildlife populations and growing desertification of the already arid region. The Kalahari is home to small communities of people, many of whom are former hunter-gatherers whose rights to land and access to wildlife are increasingly inhibited. The government has banned hunting, largely in response to conservationists' concerns about wildlife. In addition, gathering is increasingly regulated, and cattle colonize areas that are significant for wildlife and San communities. In this context, rather than treating tracking and gathering as objects of study, I take these practices seriously as methods for noticing and theorizing more-than-human landscapes, their transformations, and contingent histories to address challenges facing people and their environments in the Kalahari and beyond.

By focusing on the relational forms of noticing landscapes with San trackers and gatherers, I describe landscapes as always in motion, emergent more-than-human places where assemblages gather, histories are made, and politics enacted. This is in direct contrast to theoretical moves that treat landscapes as background on which histories and politics occur. My dissertation enacts tracking and gathering as a methodology. Beginning with an extension of the concept of tracks and following their movements out to their relations with other landscape actors in each chapter, I emphasize that landscapes are not merely contexts for politics and histories. Rather, landscapes do histories and politics, in spite of efforts to hold these landscapes still as underutilized expanses of resources.

The dissertation itself unfolds, moving out through the landscape by tracking these emergent relations. I argue that tracking is a relational practice of becoming-familiar-with these multiple entanglements of emergent landscapes. The practice of gathering involves much of the same kinds of attention to landscape movements and their coordinations as with tracking. Here, I employ gathering in its double meaning: the practice of collecting and of coming together. The tracks of gathered truffles then lead to the worlds of grass and termites that, in turn, allow for a reflection on Kalahari rangeland ecology and the political economy of the cattle industry. Finally, the dissertation zooms out to the desert's geomorphology, tracking the movements of geological processes as they gather with the movements of humans and nonhumans to form lively landscape features over the *longue duree*. Tracking and gathering are methods that allow for an elaboration of these more-than-human landscapes-in-

motion, together with their social, political, and economic histories and speculative futures.

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encouraged me to expand my horizons and pursue a PhD at the University of California, Santa Cruz.

At UCSC I have had the privilege of being surrounded radical thinkers, attentive advisors, and amazing colleagues. From the start, Andrew Mathews, Mayanthi Fernando, Danilyn Rutherford, Don Brenneis, Nancy Chen, and Mark Anderson guided me. Andrew encouraged precision and demanded rigor, while never forgetting to ask how I'm doing and if I'm getting enough sleep and exercise. Mayanthi pushed me to think more critically and ask good questions, while reminding me through her own example that we're all just people and to enjoy the ride. Mark Anderson has taught me to teach and, more than that, he has offered great friendship. My fellow PhD students at UCSC, however, have been my real strength and are too many to name. I am especially indebted to my cohort: Jeffrey Omari, Salvador "Chava" Contreras, Lizzy Hare, Suraya Jetha, and Alix Johnson. I have learned so much from Patricia Alvarez, Micha Rahder, Rosa Fisec, Brent Crosson, Sarah Kelman, Kali Rubai, Stephe McCallum, Rachel Cypher, Gillian Bogart, Joe Klein, Zahirah Suhaimi-Broder, Jessica Madison, and many others. Taylor Anslie, Fred Deakin, and Allison Ramage all helped to keep me on track.

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Introduction. “Keep on Tracking:” Finding Openings in the Kalahari Desert

Part One. Opening: An introduction in four parts

This dissertation is about tracking and gathering as methods for knowing landscapes. Landscapes are sedimentations of the movements of humans and non-humans. Tracking is a way to appreciate those movements, and gathering is a way of understanding how those movements coordinate to come together. Much of modern human history has been devoted to creating a world in which humans no longer know how to track, and even forget what they are missing. In this world, most movements count for nothing; the traveler on a landscape merely heads for a destination without regard to what is around. It is perhaps not surprising that this performed ignorance has gone together with the unprecedented destruction of environmental livability. This dissertation shows another way to know landscape, one in which humans, with their designs, are only one among a variety of world makers.

By focusing on the relational forms of noticing landscapes with San trackers and gatherers in the Kalahari Desert, Botswana, I describe landscapes as always in motion, emergent more-than-human places where assemblages gather, histories are made, and politics are enacted. This is in direct contrast to theoretical moves that treat landscapes as background. My dissertation enacts a tracking and gathering methodology, beginning with an extension of the concept of tracks and following

their movements out to their relations with other landscape actors in each chapter. In this sense, there are then three iterations, or stages, of tracking that I engage with throughout the dissertation. The first, forming the basis and inspiration for developing tracking as an analytic, centers on the practice itself and how my interlocutors and other trackers in the Kalahari do it. The second involves the way in which I came to learn to track from my interlocutors and my own practice of tracking and noticing during fieldwork. Lastly, in developing tracking into a method and analytic in this dissertation, tracking too becomes an extension of my previous training, experience, and knowledge about landscapes and ecologies as a means for noticing and theorizing more-than-human landscapes.

In doing so, this dissertation takes up a narrative style in which my own situated learning features rather prominently in the unfolding descriptions it presents. This emerges out of the experience of moving through Kalahari landscapes with my interlocutors, following other movements, being pulled in a variety of unexpected directions, and speculating along the way. In many ways, the narration attempts to mimic the actual practice of tracking. This approach is not meant to present an authoritative account of my human interlocutors' skill as trackers and gatherers. Rather, with them, it is an attempt to present Kalahari landscapes, gatherings, and transformations by noticing various configurations of material relations through the practices of tracking and gathering. The trackers were my teachers and collaborators as I moved away from tracking as an object of study and towards it as a method and analytic.

The chapters of this dissertation unfold as if reading a landscape through tracking. Chapter One begins with an elaboration of tracking to argue that it is an ongoing, immersive practice that, though associated with hunting animals, is better understood as engaging with the shifting material traces of landscapes rather than a singular animal being pursued. These shifting tracks and traces are read more through the movements of sand, vegetation, wind, and the passing of time than through direct observation of animals and their doings. Or, rather, the distinction between traces and direct observation does not matter so much in tracking. Through the gathering of signs, tracking emerges as a speculative practice about the ongoingness of dwelling in landscapes that, while mobilized as a tool for wildlife monitoring in a migratory corridor, also affords an exploration of how things come together and gather in Kalahari landscape ecologies. This is increasingly necessary for understanding and engaging with landscapes like those in the corridor where this study takes place between two protected areas that are being encroached upon.

Chapter Two then puts this to the test to explore what it would mean to track nonanimal lifeways through the landscapes by gathering the Kalahari Desert truffle (*Kalaharituber pfeilii*), a delicious mycorrhizal fungus that my interlocutors describe as “meat that lives in the sand” or “meat of the sand.” These symbiotic, mutualist fungi are tracked, found, and gathered through an attention to the ecological assemblages, seasonalities, and temporal coordinations with which they come into being. I employ the word gathering with a double meaning—how things come together and how they are collected—to describe relational processes of landscape

emergence together with the open-endedness of noticing that emergence. In doing so, I draw from Ursula Le Guin's short essay "The Carrier Bag Theory of Fiction" to propose a carrier bag theory of landscape that attends to the unfolding, open-ended relations of landscapes that sometimes go unnoticed.

Chapter Three follows open-ended truffle relations to see where they will lead once their fruiting bodies are no longer present, by attending to one of this fungi's landscape companions, a kind of grass (*Stiptagrosis uniplumis*). This attention to grass points to the challenges of following such open-ended relations, while stressing that one cannot know moving landscapes by fixing them. Grass tells many stories about Kalahari landscapes that can be partially understood through conventional ecology or capitalist private ownership and production, but this leads to contradictions. Grass illuminates, obscures, and betrays its truffle relations, but, like the wind, it has an unseen force: an ability to lead people and animals with it. Here my own tracing of relations replays the tracing of others—anthropologists, ecologists, cattle farmers, and trackers—and, in doing so, calls forward stories about the landscape that only emerged from that effort to trace, to track, and to find. Knowing landscapes then emerges in part through actual biographical encounters with it, human and nonhuman. This helps to move towards understanding landscapes as material semiotic configurations in motion that, I then argue in the final chapter, include abiotic, geological movements over time.

Building on the discussions of tracking and gathering, Chapter Four moves towards a more-than-human theory of wayfinding for understanding landscapes, how

they are made, and how they are continually remade. It shows wayfinding to be a more-than-human process in which various things, people, plants, animals, wind, and geological processes make trails that find their way towards each other in making landscapes and making their way through landscapes. I move towards a theory of wayfinding as emergent, mutually constitutive of, or folded into, the geology of the landscape and its histories. That is, not only is human wayfinding lively, dynamic, and risky but also so too are the landscapes and processes through which certain places are made and unmade; they are entangled and relational in a non-deterministic way. By attending to more-than-human movements together with human navigational practices, wayfinding gets reconfigured in light of the reworking of tracking through, in, and with gatherings. Thus, rather than giving primacy to wayfinding as a human endeavor, whether cognitive or phenomenological, I begin with the movements that give rise to material trails and come to constitute particular kinds of landscapes gatherings. In this way, wayfinding emerges as a category that is useful to understand the relationalities of Kalahari landscapes.

As the introduction grew unwieldy, it became necessary to divide it into four parts to grant a path for readers to better track their way through. This “Opening” section has presented the main argument of my dissertation and the organization of its chapters. The next section, “Endings as Beginnings,” uses a vignette about the death of one of my interlocutors to set up the contemporary stakes and concerns for trackers and tracking as a practice in the Kalahari. The third section, “Situating the Kalahari” draws on key historical debates and figures in the anthropology of the Kalahari to

better situate my research methods and site and to highlight the importance of tracking as an analytic and as a practice in the world. The fourth section, “The Trackers,” turns its focus on key informants in order to bring their world to life and the importance of tracking within it.

Part Two. Endings as Beginnings

January 2016

I arrived too late to say goodbye. I told Njoxlau and Karoha that I would meet them on Monday or Tuesday morning, depending on how fast I was able to travel. We would then go visit !Nate who, recently diagnosed with lung cancer, was terminally ill and too weak to travel with us. Though he wanted to join us on a trip to explore salt pans in Zutshwa, we all knew he couldn't. The plan was that we would spend time with !Nate before embarking on our trip.

I first met Njoxlau, Karoha, and !Nate in Zutshwa on a tracking survey back in 2009 and now, years later, during my year of dissertation research with them, we returned to visit the area whenever the opportunity arose. Zutshwa is a small settlement situated in KD2, the name of the pan-rich Wildlife Management Area (WMA) with big, open grasslands in Kgalagadi District, Botswana. KD2 borders the Kgalagadi Transfrontier Park (KTP), which is southern Africa's first transnational “Peace Park,” straddling the boundaries between Botswana and South Africa. KD2 lies within the wildlife corridor connecting KTP to the Central Kalahari Game Reserve (CKGR), the world's second largest game reserve. Though the corridor is an important wildlife dispersal area, it is only semi-protected as a WMA, and parts of it

are steadily being gobbled up by the expansion of cattle posts and cattle ranches into the Kalahari. !Nate, Njoxlau, and Karoha often expressed that they found KD2 to have one of the most beautiful landscapes in the Kalahari because of its open grasslands and numerous pans, and it also appealed to them simply because it is different from the more bushy shrublands in Ghanzi District where they live and spend most of their time. As a key part of this wildlife corridor, we often saw large herds of springbok, eland, and gemsbok in KD2 that Njoxlau said they hadn't seen in such large numbers in years: "The animals there are many!"

On my way to meet Karoha and Njoxlau, however, I received a call from another researcher and friend, Derek Keeping, that would delay my travels. He had learned that a team of contractors lugging heavy machinery and deep drilling equipment had arrived in Zutshwa. Since we were going there already, he asked if I would find out what the drilling team was looking for. Hearing that they had arrived in the area was alarming because rumors were circulating that there were plans to begin hydraulic fracturing—a technique used to open fissures deep beneath the earth's surface to extract methane or shale gas, also known as "fracking"—within this wildlife area. Concerned about these potential developments, I delayed my trip a day to plan my investigative activities. This was a politically sensitive issue, seemingly clouded in secrecy, and it seemed important to find out what was going on.

Things can happen quickly in the Kalahari, or so it seems when movements build slowly until they culminate in some kind of past tense event that presents itself as "too late" to be interrupted. Off the beaten path, drilling in KD2 could begin

without much public awareness so a visit presented an opportunity to learn about the scope of the activities before a potentially large-scale operation was underway. The production of the Kalahari as peripheral has a long history that is deeply embedded in the broader political economy of Botswana and southern Africa, particularly as it relates to the exploitation of the landscapes and the people who live in these regions (Wilmsen 1989).

It had recently been reported that the Botswana government sold the Coal Bed Methane (CBM) and shale-gas prospecting rights for large swaths of land, including a number of Wildlife Management Areas (WMAs) in the Kalahari, to a company called Nodding Donkey, later renamed Karoo Energy (Barbee 2015). These rights had been sold years earlier, but the reports about how much land this encompassed were just surfacing. Other reports came first, suggesting that hydraulic fracturing for the purpose of extracting CBM was already underway in the CKGR and KTP, claims that the government initially denied but later revised to say that only prospecting was occurring and not within the boundaries of the parks.¹

The Karoo Energy website,² however, boasting the potential economic growth that natural gas would bring to the national economy of Botswana and attempting to attract investors, briefly displayed a map showing the distribution of prospecting licenses the company had been issued.³ The map shows the prospecting licenses sold

¹And even with this revision, the government has become somewhat more transparent about hydraulic fracturing occurring within CKGR, but they now say that there is no "extraction" occurring.

²<https://karoenergyplc.co.uk/>

³This map has since been removed from the website, presumably because of public outcry after it was published in a Guardian article by Jeffrey Barbee (2015).

to this one company, Karoo Energy (Formerly Nodding Donkey), an area encompassing almost the entirety of the southwestern parts of Botswana and bleeding into the center of the country⁴. The map includes most of KTP, parts of CKGR, and much of the land in between. The areas highlighted in green in the map on the right (Figure 2 (Albertson n.d.)) shows wildlife dispersal areas throughout Botswana. The bottom half of the map encompasses CKGR, KTP, and the WMAs connecting the two parks, with the arrows indicating the dispersal areas of wildlife in the corridors. As such, it appears most of the corridors connecting the two parks have been made available for natural gas prospecting. Coinciding with a nationwide hunting ban – which was operationalized in the name of wildlife conservation – the granting of these prospecting rights that now threaten to transform these landscapes and their ecologies through resource extraction creates a tense contradiction in land-use policy.

⁴ This map of prospecting licenses can be seen at <https://karooenergyplc.co.uk/operations/>. It shows much of the area of study has been made available for prospecting.

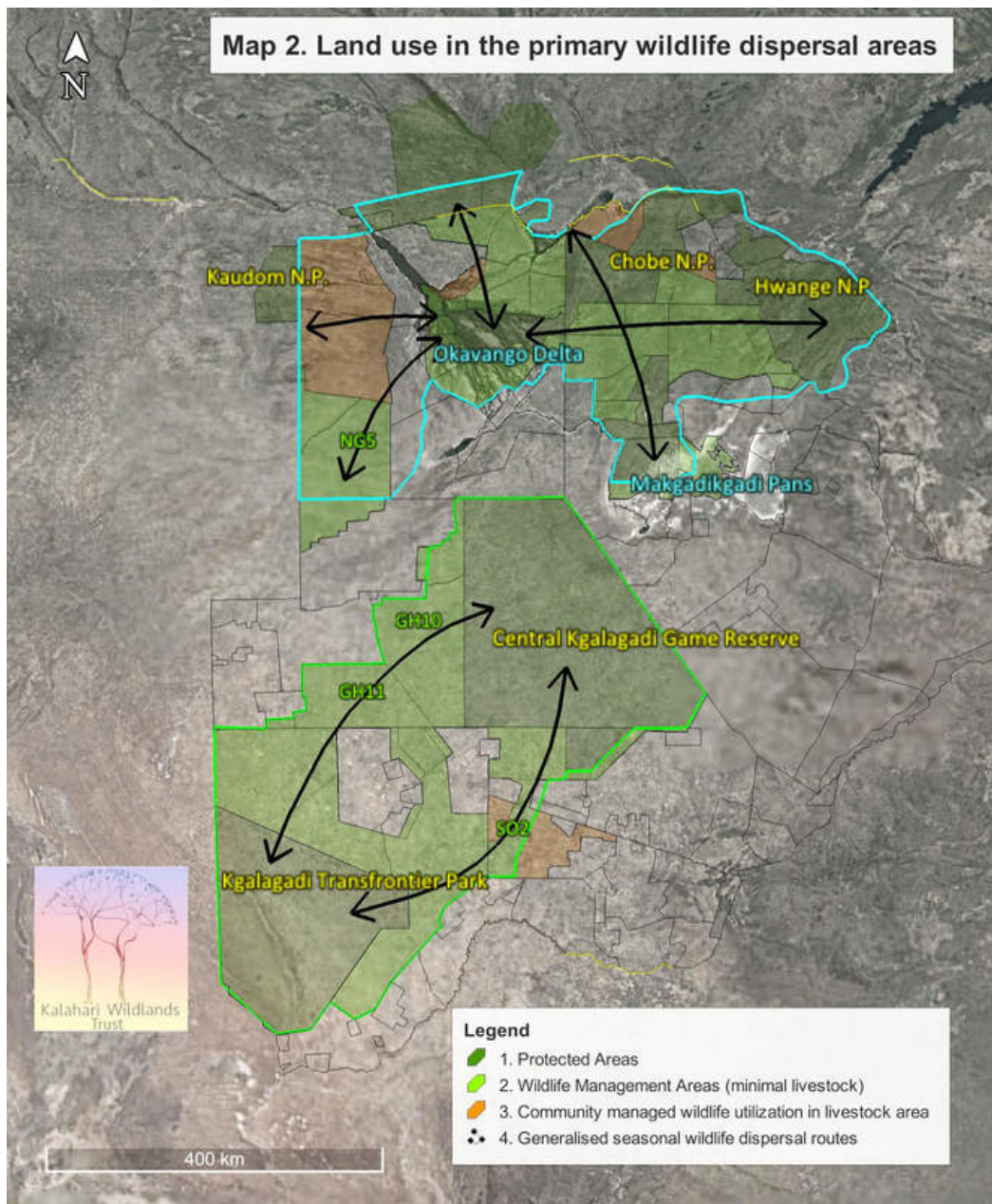


Figure 1 This map (Albertson 2017) shows wildlife dispersal areas. The bottom portion encompasses the research area with arrows indicating active wildlife corridors between CKGR and KTP. (<http://www.kalahariwildlandstrust.com/wildlife-area-maps.html>)

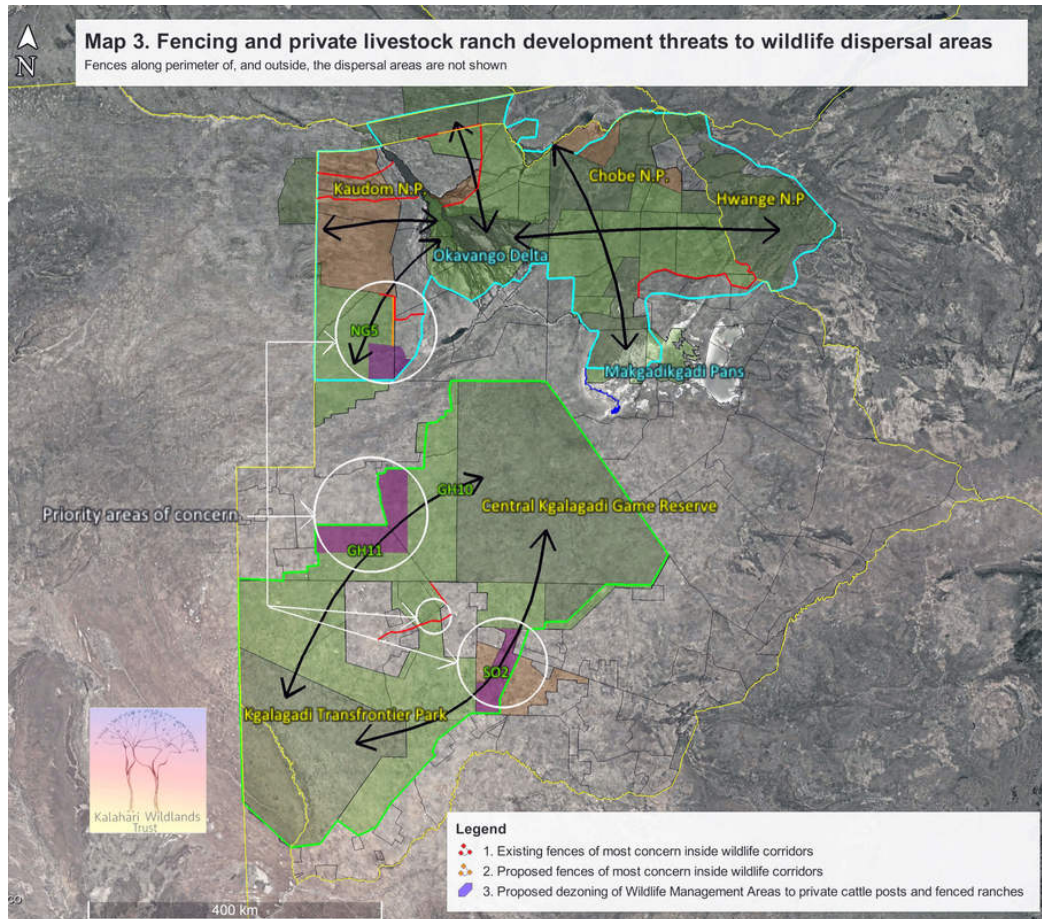


Figure 2 This map (Albertson 2017) shows the proposed expansion of fencing and livestock ranching (purple) into the corridor.

My colleague suspected that the drilling team in KD2 was indeed already prospecting for CBM. He wanted to investigate the issue himself as his own research aimed to demonstrate, based on a series of wildlife tracking surveys, that the corridors between the two parks are full of wildlife, and that these corridors are essential to the health of wildlife populations in the Kalahari. This corridor is one of longest continuous wildlife dispersal areas remaining in southern Africa (Keeping, Personal Communication), but it is increasingly being closed off and encroached upon by growing herds of cattle, the proliferation of cattle posts, and establishment of new cattle ranches. Many think that wildlife in these parts of the Kalahari have already been lost. The government of Botswana proposed land-use changes within the corridor (Figure 3) that would make large parts of the corridor available for livestock ranching, which is generally considered to be the greatest threat to the ongoing viability of this corridor. My colleague and I, along with several other researchers, with the help of !Nate, Karoha, Njoxlau and several other trackers, were already working against this enclosure of the corridor due to the expansion of cattle, cattle posts, and the growth of settlements in the corridors (in fact this is how we met), but the potential sale of this land for gas extraction doubled our challenge. If fracking was occurring in the corridor, there was reason to fear further habitat fragmentation, not to mention the implications that fracking might have on human settlements in the area.

Because my colleague is not a citizen of Botswana, however, he worried that his research permits and visas would be pulled if the government caught wind of his

snooping.⁵ The ministry issuing his permits could reasonably argue that it was an activity beyond the scope of allowances stipulated in his permits and upon which his residence visa in Botswana is based. For good reason, Botswana's constitution includes an act of parliament called the Anthropological Act, a response to exploitative research associated with the discipline that gives it the right to monitor all research, biological and social, in the country and revoke the required permits at any point. As a citizen of Botswana, I faced less risk, though I would have to be careful to not over-step the allowances of my research permit.⁶

After talking with Derek, I decided that I would check in with Karoha, Njoxlau, and then !Nate and then travel to Zutshwa alone so as not to unwittingly involve my interlocutors in what could amount to a politically, and legally, complicated situation. The government had vehemently denied accusations that they had authorized fracking in KD2, or anywhere in Botswana for that matter, despite issuing prospecting licenses, so tracking the drilling team and asking questions about their activities had the potential to arouse suspicion from local and state authorities already annoyed by the accusations.

⁵A journalist investigating fracking in the Kalahari reportedly had his visas cancelled and was deemed persona-non-grata by the state. Other conservation activists have been expelled in the past, famously including Mark and Delia Owens, whose *Cry of the Kalahari* (Owens and Owens 1984) exposed the mass die offs of antelope populations that resulted from veterinary fences cutting off migration routes. ⁶I fully understood the reach of this act, as I had received a letter from the Office of the President in 2002 stipulating that I could not publish any of my findings from my Bachelor's studies exploring issues surrounding the forced displacement of San communities from CKGR. But, as citizen of Botswana I am allowed freedom of movement and my research permits included KD2, so I faced less immediate risk.

I first stopped to tell Karoha and Njoxlau about my updated plans, before going to see !Nate. By the time I arrived at !Nate's compound in Bere mid-morning on Wednesday, it was eerily quiet and no one was in sight. After a few minutes of looking around, !Nate's daughter finally appeared from behind the recently constructed concrete house that the government had built for !Nate's wife, !Nasi.

"!Nate is dead," she said, matter-of-factly. "He died this morning in the ambulance, going to Ghanzi. He was coughing too much. They say he has died."

My heart sank. Njoxlau had sent word to !Nate that I would arrive on Monday or Tuesday, but by Wednesday morning I was just hours too late to say my final goodbye to my friend, teacher, and collaborator. I knew !Nate did not have much time left, but I was not prepared to come to terms with his passing—I suppose no one really ever is. !Nate was one of my first tracking teachers, a great friend, and had been one of my most important collaborators since the beginning of my Master's research in 2009. !Nate's lessons had inspired many, including my continued research and pursuit of a PhD about the landscapes of the Kalahari. The last time I saw !Nate before he died, he encouraged me to keep on with my work, to have Njoxlau, Karoha, and /Uasi—another interlocutor and collaborator—continue to teach me, and asked that we start teaching his son and other young people about what he called the "bush school." "Keep on tracking," he said.

!Nate's family said that his funeral would be held the following week and asked that I return at that time to help with funeral arrangements. In the meantime, the family would gather together and travel to Kagcae, the settlement where !Nate's

mother lives and where the funeral would be held, to mourn privately. I decided to continue with my plans for the week and proceed to Zutshwa to investigate the drilling activity. It was an urgent matter that couldn't wait, and I would keep doing my work. I would keep tracking.

“If I die,” I remember !Nate saying when we drove back to Bere after his terminal diagnosis, “these things, this culture, that I have been teaching you will die with me unless you and Njoxlau, and Karoha, keep doing the work. No, they won't die. It will be here, but no one will know it. You must help to teach our babies and to tell the other people that we are still here. This bush is still here, you must tell them. The animals, the footprints, the plants, the truffles, the pans, you must show them, they must know. They are here, but they will go. You and Derek and Louis, you must tell them and you must show them. *You must keep on tracking.*” !Nate was not speaking of loss and endings so much as he was of the ways that practices and landscapes in the Kalahari are overwhelmed and rendered non-visible by the hegemonic proliferation of certain economies and their politics. The tracks and trackers are still there, he insisted.

When !Nate spoke of his “culture,” he never spoke in the abstract, referring to some way in which a group of people cohered in their understanding of the world. When he used the word “culture,” he did so in English and most often spoke about his own knowledge. !Nate always referenced specific practices of noticing and engaging with the world, human and otherwise, such as tracking animals, gathering and knowing about plants and where to find them, and also ways of appreciating these

things and landscapes as places. In fact, he usually referred to his culture singularly, as his own knowledge practices even if he did acknowledge having learned from histories of interaction passed on to him by his family, friends, and the landscape itself. For !Nate, the idea that his culture would die did not refer to a kind of essentialist notion of “culture loss,” though something like this worried him too. His was more of a concern with particular ways of being able to see and engage with people, animals, plants, and landscapes of the Kalahari. He worried that the desert would only come to be seen in one way: a place for cattle. “The cattle are taking all the grass and all the pans,” he told me, more than once.

Along the way, he showed me that there are many ways to see the liveliness of the landscapes that cattle have started to overshadow. Tracking, in particular, as taught to me by !Nate and my other interlocutors, drew me into the liveliness of these landscapes, presenting me with a method that allowed me to track landscapes and their changes, as I will show in the chapters that follow. In teaching me to track landscapes, I later understood that !Nate had also given me a tool to track the potential landscape changes that the CMB prospectors presented.

I needed time to process !Nate’s death, so I decided to drive along a series of sand and gravel roads from Bere to Zutshwa, a more than 200 kilometer trek within the wildlife corridor, instead of taking the longer but faster route along mostly paved roads. I stopped in the settlements and villages of Hunhukwe, Hukuntsi, and Ngwatle on the way to Zutshwa to greet old friends I had met on past tracking surveys and told them about !Nate’s passing. !Nate was known widely throughout this part of the

Kalahari because he frequently traveled through the areas working as a tracker for conservation research projects monitoring wildlife in the corridor and with safari hunting tours operating in the WMAs before that. Not only was he well respected for his tracking skills, but he had also become famous for his witty and outgoing personality, a favored guest in these settlements when he passed through. He, Karoha, and /Uasi were also somewhat well-known from their work with Louis Liebenberg, a scholar whose tracking and work I discuss in detail in Chapter 1. With Liebenberg, they also filmed two documentaries about the “Persistence Hunt,”⁷ a practice in which they would run down an antelope on foot over several hours until it collapsed from exhaustion, that some people in the area had seen. There was sadness as news of !Nate’s passing spread, but little surprise. Death, and the passing of friends, is an all too common occurrence in these remotest parts of the Kalahari these days.

On my way into Zutshwa, on the 60 kilometer stretch of gravel road that connects the settlement to the nearest town and administrative center, Hukuntsi, I passed a slow-moving caravan of trucks and earthmovers. By the time I arrived, I found the rest of the caravan camped in the center of the settlement, adjacent to the settlement’s lone water tower, and across from the village clinic. When I made my rounds to greet community trust members, as well as friends, from whom I needed to

⁷Internationally, perhaps most well-known is BBC’s *Human Planet* short, narrated by David Attenborough, that documents this hunt. For another famous description of this practice, see the book *Born to Run* (McDougall 2011).

receive permission to camp in the settlement for the coming days, I asked if they knew what this team of drillers was doing.

“They say they are drilling for water, but it’s all salt,” one person told me.

That they were drilling for water came as a surprise, but that the water was salty did not. Zutshwa is situated on a large saltpan, and there is even a small salt-mining/processing project attached to the settlement. In fact, because ground water is so salty in Zutshwa, the settlement has to have its water supply pumped in through pipes, or delivered by truck, from boreholes and water-processing schemes elsewhere in the area. Because of the difficulty of transporting water to Zutshwa, the settlement’s approximately 500 hundred residents often spend several days each week without direct access to a water supply when the infrastructures break down. When this happens, residents who can afford it purchase drums of water from opportunistic entrepreneurs who truck it in from Hukuntsi, but many can’t afford to do this. From what I could gather, community members were happy that the government had sent in a team to once again look for potable water in Zutshwa, though they expressed their doubts that it could be found.⁸

I went to talk to the drilling team the next morning. As contractors, they seemed to have only limited knowledge of the full scope of their operation. They were just there to drill and plans were compartmentalized. They were a friendly

⁸One woman in the settlement also later mistakenly interpreted the claim that the prospectors were drilling for gas to mean that they were building a petrol and diesel filling station, which she thought would be great for residents as well as tourist traffic.

bunch of laborers who had worked in other parts of the country, mostly in the east, but had never spent much time in this part of the Kalahari. Drilling here, they told me, was difficult, and they only knew that they were looking to find a clean water source to lubricate their drill bits for when they extracted core samples and surveyed the area for suitable drilling sites. Once they had a steady supply of water, they would begin drilling for those core samples. The foreman of the group even told me he was not exactly sure what they were looking for, just that they were taking deep core samples in order to assess whether this was a potentially productive area to extract: “Maybe it’s minerals, but maybe it’s gas. You will have to ask the bosses.” Though the team camped in Zutshwa, they had already set up an exploration site less than 20 kilometers outside of the settlement, well into the WMA and on the edge of another pan.

I spent the rest of the week tracking the trails the prospecting team had cut through the bush, where they carved deep and wide tracks in the sand, bulldozed trees, and slowly moved their equipment to their prospecting site. It occurred to me while following the drillers that I was tracking their movements much in the way Nate had taught me to track the landscape, looking beyond their impressions in the sand to gather signs of the movement through their effects on their surroundings, as I elaborate in Chapter 1 of this dissertation. Before even beginning major operations, they were already making marks in the landscape. One truck got stuck trying to cross a pan after the recent rains, and others only slowly plodded their way along. I could see that their movements were threatening to cut off the kinds of landscape

movements !Nate, Karoha, and Njoxlau had been teaching me to see. The prospectors presented other kinds of movements to attend to that were making and unmaking the landscape differently.

It would not be until my next trip, however, to investigate the drilling site that I would begin to learn more about what they were doing. In the meantime, I had to get back to Bere and then Kgacae to assist with arrangements for, and attend, !Nate's funeral. By the time of the funeral, word of his death had spread and people traveled from all over the Kalahari to attend the ceremony.

The coincidence of these two events—!Nate's passing and the potential development of hydraulic fracturing activities—came towards the end of my year of dissertation field research and stopped me in my tracks. It felt like an ending. Not only had I lost a great friend, teacher, and key informant, interlocutor and collaborator, but all signs also pointed towards this part of the Kalahari, an important habitat for wildlife and small communities, potentially being lost to regimes of capitalist extraction seeking to tap into the desert's ancient geology to profit from hidden gas. But tracks never stop, and I knew to keep going. The tracking skills I learned from !Nate presented an opening, and they provided a method for seeing the movements not only of animals through their tracks but also of landscape relations, shifts, and transformations. These tracks of movement, I came to see, included the tracks of development, economic growth, and resource extraction along with lively landscape ecologies, even as they faced potential erasures.

My time with !Nate since 2009 had been spent learning about the liveliness of the biodiversity of these parts of the Kalahari through the practice of tracking. At first, !Nate's story and how this remote part of the Kalahari came to be sold off to mineral and gas prospectors seemed to mark a dramatic conclusion, not just to my research, but to a number of movements and projects fighting to show that this part of the Kalahari, the wildlife corridor between the two parks, was not lost. Instead, it came to inspire a continued attention to sets of practices taught to me by !Nate, Njoxlau, Karoha, and many other people with whom I worked in the Kalahari over the years. As such, this dissertation focuses exclusively on landscapes that fall within the wildlife corridor where I tracked and gathered with these interlocutors, primarily in GH11 (the WMA surrounding Bere, Ghanzi District) and to KD2 (the WMA surrounding Zutshwa, Kgalagadi District) to a lesser extent.

This dissertation is not about !Nate, but, inspired by his lessons, it is about Kalahari Desert landscapes, their liveliness and diversity, and their movements, and it speaks back to the ways in which these landscapes are being interrupted. It focuses on tracking and gathering as ways of exploring multispecies landscape emergence to intervene in the kinds of practices that treat deserts, as well as other landscapes, as empty, lost, dead, or exclusively under-utilized resources lying in wait. In turn, it presents landscapes as gatherings of emergent relations, always in motion. These were all things that !Nate had been showing me while teaching me to track and gather in the Kalahari. I learned to understand tracking as a practice of noticing the movements of landscapes. It is a practice that exceeds its association with hunting,

and now, as the corridor continues be cut off and encroached upon, it seems more important than ever as a way of engaging with these landscapes and their transformations. Though these events fall chronologically at the end of my field research period, they set the stage for this dissertation—as openings of sort—that mark a continued effort to show that though these landscapes are undergoing transformations, they are by no means lost.

Dissertation Framing

Throughout this dissertation, I aim to describe the movements of Kalahari Desert landscapes by employing tracking as a method, together with gathering, for both noticing and theorizing landscapes and their relations across modes of knowing, across species, and between relations of life and nonlife. Inspired by sociopolitical, economic, and ecological tensions that have played out in Kalahari landscapes, rendering particular (normative) formulations of human interests and ecological well-being incommensurable, as I will go on to describe, I have turned to a more-than-human, multispecies, approach in an attempt to bridge this gap. This approach is animated by the need to resist “human exceptionalism” (Haraway 2007), and focuses on the relations that cross the human-nonhuman distinction: in this way, multispecies (or more-than-human) ethnography attempts to highlight the complex relationalities at stake in the challenge of living together. I follow this approach by turning tracking and gathering, traditional objects of hunter-gatherer studies, into methods and analytics for engaging with more-than-human socialities, politics, and relations in these increasingly threatened landscapes.

This dissertation tracks landscape movements in Wildlife Management Areas (WMAs) in the corridor between CKGR and KTP. This corridor, as described above, is important for wildlife movements but is steadily being closed off by the encroachment of cattle, cattle farms, growing human settlements, and extractive industries. My approach emerges empirically out of my experience of tracking and gathering with a set of key interlocutors that began during my Master's research in 2009-10, continued through several months of pre-dissertation research in 2012 and 2013, and ultimately culminated in 12 months of dissertation fieldwork from April 2015 to April 2016.

Though tracking and gathering have historically been objects of study, here I take them seriously as methods for learning about landscapes and their lively relations. They were both things my interlocutors and I did in our daily activities and things that taught me to think about landscape relationalities. Tracking in the Kalahari, I argue, is more than an important way to see how things move across landscapes. It is a way of doing landscape and a mundane daily practice. These doing of landscapes and their movements are too easily ignored in static treatments of landscapes. As soon as one stops tracking, it is too easy to quickly slip into modes of inhabiting landscapes that enact them as static spaces lying in wait, resources to be extracted, utilized, or, exploited in the name of economic growth. When not tracking, that attention to movements of landscapes and their liveliness becomes subject to the violences that static treatments of space, territory and "cheap nature" allow where "the reserves of earth have been drained, burned, depleted, poisoned exterminated,

and otherwise exhausted” (Haraway 2016:100).⁹ Tracking resists such violent detachments by refusing to hold things still, not just as a human practice, but in the way that all living beings, and even abiotic elements, remain part of ecologies through their own tracking practices. They attend to the movements of others, rather than mobilizing in spite of one another as a means to generate profit for distant elites. Gathering then, is a practice, much like tracking or following the movements of more-than-humans, to collect things, to gather them, but it is also a way of describing how things come together and track each other in their ecological becomings.

Part Three. Situating the Kalahari: Kalahari Anthropology in the Politics of the Landscape

Before further laying out the approach that this dissertation seeks to develop, it is necessary to describe sets of issues and literatures that set the stage for this study, both contextually and analytically. In this section, I examine the role of Kalahari anthropology in the contemporary politics of Kalahari landscape. Building on this literature, I then examine recent literature on infrastructure that helps to elaborate some of the ways in which economic and material growth—particularly what Julie Livingston (Forthcoming) calls “Self Devouring Growth” —are central to the challenges facing livability in Botswana and the Kalahari. Finally, I draw on literatures about landscapes, mobility and movement as potential ways of attending to

⁹I borrow these descriptive words from Donna Haraway’s summary of Jason Moore’s arguments (2015a; 2016; 2015b; 2017) that insist on the central role of capital and the exploitation of “cheap nature,” rather than a unified *anthropos* as implied by the term “anthropocene,” in driving the planetary ecological crisis.

the liveliness of more-than-human landscapes in the face of, and in spite of, violent erasures that emerge out of processes of “self devouring growth.”

Kalahari ethnographies are crucial to this dissertation, not only in terms of their contributions to anthropology but also in the ways that these studies have come to play out in the political landscape of the Kalahari and Botswana. Certainly, any ethnographic study of the Kalahari must engage with the history of San, or Bushmen, hunter-gatherer inhabitants of this desert and studies of these small-scale societies. Though my dissertation takes a rather different ethnographic approach by decentering humans—or rather asking which notion of the human counts where—it is partly because of the ways that Kalahari anthropology has been taken up in state politics framing issues surrounding land rights in opposition to wildlife conservation that I return to tracking and gathering (defining practices in hunter-gatherer studies) as methods and analytics for learning about and theorizing the politics of these landscapes across species.

Ethnographies of the Kalahari are best known for their studies of San hunter-gatherer societies that both popularized the image of the Bushman in the west and played a significant role in overturning assumptions of “Man the Hunter.” At 1966 “Man the Hunter” conference (which posed the question “Why are hunter-gatherers important?”), Marshall Sahlins first presented his “The Original Affluent Society,” a paper that drew extensively from studies in the Kalahari, to argue against the widely held view that hunter-gatherer societies scraped by in an economy of scarcity (Barnard 2007). This would later become the opening chapter of his influential work,

Stone Age Economics (Sahlins 1972). Sahlins pointed to ethnographic evidence from the Kalahari to argue that hunter-gatherers exerted less time and energy securing resources than other modes of subsistence such as herding or cultivation *and* that they desired less. Rather than the endless accumulation of material goods, greater value was found in leisure time.¹⁰ Sahlins' challenged the Hobbesian view that hunter-gatherers lived difficult lives, whose livelihoods were insecure, always on the brink of starvation (Barnard 2007: 67).

The conference culminated in a *Man the Hunter* volume, edited by Kalahari anthropologists Richard Lee and Irven Devore (1969). In his chapter—the only paper on Bushmen in the volume—Richard Lee provided empirical findings that San spent less time on subsistence foraging than thought, which supported Sahlins' proposition of the “Original Affluent Society.” Importantly, Lee's other point suggested a move away from the “Man the Hunter” paradigm: despite the emphasis on hunters at the conference, gathering plant foods actually accounted for the majority staple foods amongst the San, and it was access to these plant resources that allowed for a stable subsistence economy, not hunting. Gathering is now thought to have been the primary subsistence practice across most hunter-gatherer societies, except for those in the arctic regions. Furthermore, it was women, not men, who gathered the majority of food consumed. Among the Ju/'hoansi (formerly known as !Kung)¹¹ there is a

¹⁰For an explication of the implications of the labor-leisure dichotomy in late-liberal logics of governance see Povinelli 1995.

¹¹ For ease of citation I continue to use the term “!Kung,” while fully acknowledging the problematic nature of using this term rather than Ju/'hoansi.

gendered division of labor in which men are primarily hunters and women gatherers. Though men are skilled hunters, they were not particularly successful, and hunts were much more time consuming. Thus, though men and women worked for a roughly equivalent amount of time per day, women produced as much as three times more food (by weight) than men (1969:3). Lee later came to describe this as the “Foraging Mode of Production” (Lee 1979).

A key aspect of Lee’s work is his use of this concept, the “foraging mode of production,” which has both political and economic connotations. It is used to apply to “band” societies that hunt and gather as their primary mode of subsistence, but does not include other hunter-gatherers that are organized politically around chieftainships. A distinctive character of the foraging mode of production is that, unlike agricultural modes, reproduction of subsistence plants are “left to nature,” rather than cultivated (Lee 1979: 117). The discovery about the importance of a plant food called mongongo nuts was central to this argument (Lee 1979: 182). Mongongo nuts were a staple (among the !Kung in the Dobe area of Northwest Botswana) that rivaled or surpassed staple crops among agricultural people in their abundance, nutritional value and reliability. Mongongo grew in groves, were available year round, and !Kung bands moved around the Dobe area gathering these nuts with immediate returns generated from relatively little labor (about 15 hours per week).

In asking, “How is it possible that the !Kung San of Dobe have remained to the present time foragers in a world of nonforagers?” (1979: 116), Lee uses three aspects of the “Marxist toolkit” to analyze San: production, labor, and land. Lee cites

ecological factors such as an absence of surface water, minimal rain, and soils unsuitable for other modes of production as possible reasons, but he suggests that cultural and economic factors also played a role (1979: 116). While San have attempted to participate in agricultural practices and raising livestock, he argued, most attempts failed to lead to substantial capital accumulation that would lead to a permanent transition to farming practices. Ultimately, !Kung were able to secure a stable supply of food that guaranteed immediate returns with relatively little labor, and they did so in an environment that was not sufficiently compatible with other modes of subsistence, especially agricultural production.

Though the !Kung assisted in the growing and propagation of the plants by carrying and discarding the nuts, they did not cultivate them directly. In this sense, their propagation was “left to nature,” but it was a nature that included human activity. !Kung acknowledged their role in doing so, but added that plants like the mongongo tree do not grow to maturity except in the proximity of groves (Lee 1979: 204). Famously, when Lee asked an interlocutor why he didn’t plant mongongo, he responded that you could, but you would be dead by the time they were able to bear fruit, and “why should we plant when there are so many mongongos in the world?” (1979: 204).

According to Lee, the relation between production and consumption in foraging groups is immediate. What is gathered is not accumulated, but eaten and shared, an important feature in band social organization. Furthermore, it is with the distribution and consumption of resources, usually food, where the “collective

character of the foraging mode of production clearly emerges” (Lee 1979: 118). The foraging mode of production, as distinguished from the mode of subsistence, “includes not only the ways of making a living but also the ownership of the factors of production (labor, land, tools), the way people organize around production, and the way the products of labor are allocated” (Lee 1979: 117). Gathering is done in groups, mostly women and children, and food is not consumed alone but is shared out. Gathering practices, in other words, involves gatherings of people.

Dobe, where Lee worked, receives slightly more rainfall than other parts of the Kalahari and has a few pans that hold water for extended periods of time. The Mongongo tree groves are concentrated primarily in these northern regions of the Kalahari. Thus, while band mobility was important among !Kung, moving from pan to pan and between various Mongongo groves in order to avoid over exploitation, they tended to navigate, or inhabit, a much smaller range than other San hunter-gatherers who lived in more barren parts of the Kalahari. At around the same time that Lee was conducting his research with the !Kung, two other anthropologists with very different backgrounds, George Silberbauer and Jiro Tanaka, were studying amongst the G/wi and G/anna in the central Kalahari. Unlike Dobe, there was no single staple food plant like the Mongongo nut in these parts, and as a result San groups moved about a much greater expanse of land hunting and, more importantly, gathering. This mobility was of the utmost importance to being able to survive in these harsher zones of the Kalahari environment. This is region is also closer to the area in which my research is based. As a result, while Lee’s work was foundational to

Kalahari anthropology, the ethnographies of Silberbauer and Tanaka to provide the most interesting details about human mobility in relation Kalahari ecologies and gathering practices, topics which of primary interest for my own research.

Central Kalahari: Two Different approaches to Ecological Anthropology

Mobility is an important aspect of the foraging mode of production for both gaining access to propagating plants and not overexploiting the resources. Silberbauer observed that G/wi San in the central Kalahari never exploit plant resources so intensively as to denude the area, which they do by moving from place to place. The G/wi, he wrote, “believe that N!adima [god] would be angered if there were not enough plants to ensure regeneration” (Silberbauer 1980:267). While both Silberbauer and Tanaka wrote about the importance of mobility, or semi-nomadism, they had very different approaches to hunter-gather subsistence and disagreed about the significance of the “band” as a social unit among the G/wi, and particularly with the role that band structures played in supporting the subsistence lifestyle. Silberbauer found “bands” to be the central organizational structure to G/wi social group formation that allowed them to utilize resources in their habitats most efficiently and establish territory. Tanaka took the opposite stance, arguing that social groups were fluid, and it was this fluidity that helped prevent overexploitation, a key to survival in the harsh environments of the Kalahari. They both had a keen interest in Kalahari ecologies, and perhaps because of their differences—Silberbauer coming from a background in forestry and Tanaka coming from the Kyoto School of Primatology—

together offered a diversity of useful insights about human ecological relations in the Kalahari and gathering practices.

George Silberbauer: Socioecological Systems and Patterning

George Silberbauer was a government administrator in the Bechuanland Protectorate. When the Protectorate decided to conduct a survey of Bushmen in the Kalahari that would be used to develop policy to minimize conflict between Bushmen and Tswana or Afrikaans groups, they recruited Silberbauer. In preparation, he was sent to South Africa to complete an Honours degree in Social Anthropology and Linguistics. His previous expertise, however, had been in ecology and forestry. His combined interest in ethnography and ecology led to a rich, empirical detailed Kalahari ethnography, which he wrote in completion of a PhD in anthropology. It is also important to note he became District commissioner of Ghanzi, and based upon his recommendation, the Protectorate established the CKGR as a reserve in 1961—5 years prior to Botswana independence—to not only protect wildlife but also guarantee San hunter-gatherers freedom of movement and traditional subsistence use rights, including hunting.¹²

Silberbauer, in the tradition of British social anthropology, was primarily interested in identifying social patterns. He took a rather radical approach for the time, employing systems theory as a means for analyzing G/wi social organization

¹² This is the very same reserve from which the forced displacement of San communities initiated the landrights dispute mentioned in the opening pages of this preface.

and Kalahari ecologies. Silberbauer was adamant in his refusal of environmental determinism, and he argued that social and ecological systems shaped each other through their interrelationships. He treated the two as separate analytics that in practice are connected through interrelated networks, whose parts formed a larger socioecological whole. In his rejection of determinist models, he sums up his approach:

“A further fallacy in both determinist and possibilist models is their implication of a one-way relationship between society and its habitat, that society simply responds to what its habitat confronts it with. As I see it, it is, instead, a relationship of interdependence in that, for instance, change in population will give rise to responses in both the sociocultural system and habitat. Furthermore, the habitat is, to some extent, an artifact of the population acting within its sociocultural system (i.e., an artifact of the society). I am referring not only to the concrete consequences of the society’s behavior (the huts that are made by a hunter-gatherer band or the cities that industrialized societies build) but also to the way in which society perceives and construes its habitat and the rest of the universe and, consequently, defines that part of the habitat’s resources that may be used and the manner of its use” (xiii).

Silberbauer’s dissertation (1973) was based on his work amongst the G/wi while conducting the Bushman Survey between 1958 and 1964, in the area that became CKGR. It was later published in 1980 as *Hunter and Habitat in the Central Kalahari Desert*. Silberbauer describes G/wi hunting, gathering, use of plant products, social structure, territorial mobility, habitat, and natural resources in an ethnographic present that, by the time of the publication of the book, he says is no more. What is unique about this work is that Silberbauer does not simply describe San interaction with nature as it is understood in Western science but also investigates how G/wi understand Kalahari ecology. The second chapter of the book, “The Habitat,” describes Kalahari geography, environment, landscapes, and climate in empirical ecological terms. Here, Silberbauer draws from his own ecological expertise developed while surveying the landscapes. Differences between, and

transitions from, grassvelds, woodlands, and dune fields are explained, including the types of flora and fauna these landscapes attract.

In the next chapter, however, “The G/wi Universe,” Silberbauer describes the same habitat in terms of G/wi cosmology, ontology, and social relations to nonhuman life. In doing so, he incorporates the roles of deities, the underworld, and much more as part of G/wi ecologies and even geomorphology. He provides an exhaustive discussion of G/wi knowledge of fauna and flora, among which they do distinguish between different species, but do not draw clear subject-object divisions between human and nonhuman life. Fauna are distinguished by their relationship with people—whether they are dangerous, edible, useful etc.—but not as more or less social or important. While there is some enmity towards dangerous or scavenging species (lions, hyenas, vultures, for instance), all life, like the G/wi, are considered to be the property of the god, N!adima, and are to be respected and not abused. Silberbauer writes that all animals, like people, are thought to be rational, purposive, and driven by different motives.

Flora, on the other hand, are set apart from other animal-life forms because of an “absence of mobility and volition,” but this does not render them any less significant as actors in G/wi Kalahari landscapes (1980:70). Instead of static non-actors, flora, however variable, link “the vital and dynamic aspect of the land, with its unchanging, static fabric” (1980:77). Fauna, too, are distinguished in terms of their relationships to people and animals, their uses—as food or medicine—as well as reading changes in the land, navigation and habitation for example. While very much

indebted to this work, at its core, this dissertation challenges the notion of plant immobility and “unchanging, static fabric” of landscapes.

Though Silberbauer considered the human species to have developed extrasomatic, cultural means to meet environmental pressures that exceeded “genetically transmitted ability to utilize environmental resources” more than any other species, he sometimes implied that environmental relations to be social in nature for humans and nonhumans. For example, he wrote that “the cultural adaptation of a species’ relationship with its environment can be employed and function only in a social context” (1980: ix). Furthermore, in attempting to discern G/wi social structures, he found that he could only do so in terms of ecological factors. But he only came to this realization some time into fieldwork, during which time he reflected that he had “started off at the wrong end” (1980: 30). It would have served him better to start with Kalahari ecologies and then see how social structures emerged.

But, for Silberbauer, clear social and territorial structures were apparent. He emphasized “the band” as a defined social unit among the G/wi that had subunits that converged and dispersed throughout the year as groups moved about to utilize the habitat. Similarly, through this band mobility, dispersal, and convergence, bands established defined territories in which they held gathering and hunting rights, which was the only evidence of lineage-based “ownership and territorial rights” for bands found by Silberbauer (1980:141). For all of his emphasis on socioecology and networks of interrelation, Silberbauer was determined to show that social structures

were well defined and formalized, even when they were involved in processes of transformation. Thus, habitat, for all its dynamic qualities, is treated as a resource in explaining the relationship between people and territory in rational economic terms.

Another anthropologist, Jiro Tanaka, also working with the G/wi in the Central Kalahari, contested the very concept of the band. He was more hesitant to reify the difference between groups, and considered G/wi social organization much more fluid. “In other words, for Silberbauer reality was to be found in forms of social organization attached to sociocultural entities. Tanaka and others in the Japanese tradition were suspicious of reifying such entities well before writers in the West...” (Barnard 2007: 63). As a result, we get a different reading of the relationship between people and environment.

Jiro Tanaka: Mobility and Plant diversity

Jiro Tanaka arrived in the Kalahari in 1968 as a PhD student with the Kyoto University Primatological and Anthropological Expedition for Africa. Anthropology at Kyoto grew out of primatology with Kinji Imanishi’s studies of Japanese Macaques. Imanishi and his students studied macaques as “mirrors of humanity, and as ‘nature’ living within their own societies” (Barnard 2007: 62). Junichiro Itani, Imanishi’s successor, also conducted fieldwork with Mbuti Pygmy hunter-gatherers to facilitate comparison with primate sociality and speculate about processes of hominization. Tanaka was trained in primatology under Itani at Kyoto before moving to Tokyo to pursue anthropology. The Japanese tradition of primatology weighs

heavily in Tanaka's research with the G/wi, their ecology, and their social organization.

Tanaka's goal was to build upon his contemporary primatologists' research that aimed to discover links regarding the transition from "sub-human primate society—using the chimpanzee as the main focus of study—to human society" (Tanaka 1974:i; Tanaka 1980). Tanaka, like Itani, tackled the problem from the opposite side, focusing on G/wi hunter-gatherers in an attempt "to elucidate the original configuration of human society" and "discover the relationship between sub-human primate societies and human societies" (ibid). The link between the two that allowed for comparison was food and subsistence practices, which Tanaka thought regulated hunter-gatherer societies in the "head on" confrontation with the natural environment. Ultimately, his research focused on the dietary life of G/wi hunter-gatherers with an attention to the ecologies and nutritional values of major foods, and how they influenced social formations.

Tanaka was skeptical about making generalizations about hunter-gatherers, whether contemporary or through time, because of the variety of different adaptive forms that hunting and gathering lifestyles can take. They can vary from environment to environment, as well from one social context to the next, despite having many similarities in terms of economic base or social structures. Nonetheless, while acknowledging that contemporary Bushmen are not the same people as "ancient hunter gatherers" and must have gone through much social and economic change over the course of 10,000 years, he did recognize that they may offer clues to what such an

ancient economic stage might have looked like. In this vein, and in addition to his conversation with Japanese primatologists, Tanaka also engaged directly with emerging discussions in hunter-gatherer studies challenging the “Man the Hunter” paradigm.

In many ways, Tanaka’s was speaking back to Richard Lee’s work as much, or more so than, he was responding to Silberbauer, who also worked with the G/wi. In fact, the second stage of Tanaka’s research, from 1972–4 was carried out as part of the Harvard Kalahari Research project headed by Lee. Like Lee, Tanaka found that the Bushmen consumed sufficient energy from daily food intake and concluded that “the Bushmen do not lead a standard existence on the edge of starvation as has been commonly supposed” (1974: 45). His analysis also showed that gathered plant foods far exceeded animal foods as the major source of calories. But more than Lee, Tanaka considered mobility to be key to the hunter-gatherer lifestyle, which also required an engagement with a greater diversity of plant life.

What set Central Kalahari bushmen apart from most other hunter gatherers, for the purposes of Tanaka’s analysis, was that they lived in a relatively harsh, barren environment, with no permanent surface or ground water source, and obtained most of their water, and food, from plants.¹³ This stood in contrast to the Dobe !Kung who had the mongongo nuts available year round as the major food staple. Instead, Tanaka

¹³ More than 90% of central Kalahari bushman water came from plants!

documented eleven major plant foods available at different times of the year, four of which were available for longer periods of time.

Tanaka separated plant foods into five categories: major foods, minor foods, supplementary foods, rare foods, and probably foods. The major foods are those that constitute the majority of food consumed at some time throughout the year. The primary reasons for certain plants to be considered major foods are that they are abundant, easy to gather and carry, taste good, and are nutritious (Tanaka 1974: 36). These plants were also more sparsely dispersed in the Central Kalahari, and they shifted locations more readily than the reliable mongongo groves in Dobe. As a result, Tanaka found G/wi utilized a far greater geographical range for gathering, moved from place to place more frequently, and spent twice as much time, about 32-hours a week, food-getting as the !Kung. His work aligned with Sahlins's proposal of the "Original Affluent Society" but found that even in the absence of an exceptional staple food, like the mongongo, G/wi were able to establish food security through a diversity of plants, and though this required substantially more labor, it was still less than what was demanded from agricultural work.

As the primary major foods changed with the seasons throughout the year, G/wi moved "from place to place in accordance with the distribution of these plants, [and] even if the food stays the same he will have to move if the supply becomes exhausted in a given location" (Tanaka 1974: 48). Plant distribution guided G/wi mobility, and, thusly, social formations. As a part of daily life and food procurement, Tanaka considered this movement to be "an indispensable element of their hunting

and gathering existence” (ibid). The frequency of movement and destination points were almost entirely determined by the availability and distribution of plant foods, with hunting conditions hardly figuring in at all with such decisions (Tanaka1974: 49).

This mobility also meant more fluid social dynamics among the G/wi. Contrary to Silberbauer’s emphasis on defined social groups, Tanaka argued that the concept of the “band,” which applies more to a corporate group with fixed territory, membership, and leadership, to be an entirely inappropriate characterization of the G/wi. Central Kalahari Bushman residence groups, he wrote, “have neither territory nor fixed membership and changing location every few weeks, could most fittingly be called simply “camps”” (Tanaka1974: 53). The only social unit that endures over many years is family, and Tanaka thought that even camp did not really work as a functional unit because groups are fluid, they fragment and realign very frequently. This is more than a theoretical suggestion for Tanaka, it is an empirical finding that considers to be “key to the survival of Bushman society” and their ability to maintain stable livelihoods despite scarce resources distributed over a large area of space (1974: 54).

Beginning in the 1970s and continuing into the present, state sponsored sedentarization schemes came to limit peoples’ mobility, together with the associated hunting and gathering practices. One major policy in newly independent Botswana was to initiate development schemes that would guarantee basic resources and infrastructure to all citizens. In the Kalahari, this guarantee meant establishing

sedentary settlements for the otherwise mobile populations of San speaking peoples. While settlements provided access to basic needs—including water, food rations, medical clinics and schools—sedentarization had significant ecological effects that made gathering plant foods more difficult, and hunting rights were largely restricted. Development initiatives also sought to transition San into the modern economy, discouraging hunting and gathering practices all together.

Sedentarization quickly impacted frequency and importance of gathering activities. One ecologist does note that the degree to which landscape degradation has inhibited utilization of subsistence plants deserves more attention (Darkoh 1999). The influence of sedentarization on gathering activities resulted in a decrease in the ratio of gathered good to total foods, resulting from access to well water and food rationing (Tanaka 1987). Vegetable resources around the settlement became overly exploited because of long term settlement in one location. In Xade, a sedentary settlement within CKGR that was situated around pan were Tanaka conducted his fieldwork, vegetable resources, which had accounted for 80% of caloric value during the time of Tanaka's study, had receded greatly due to overexploitation (Imamura-Hayaki 1996:47). Imamura-Hayaki found, however, that while gathering practices were declining in quantity, they were not diminishing in quality. The primary changes, he notes, can be seen in terms of seasonal and spatial distribution of plants, and therefore, the distances traveled to gathering sites (ibid).

Imamura-Hayaki focused on plant species gathered, preference, methods, and formations of people gathering (1996: 48). Certain gathered rhizomes, melons, and

firewood had been gathered so extensively around the settlement that they had become sparsely distributed around the village. Most gathering parties consisted of 1–2 people in this study period. However, group gathering still accounted for a larger amount of gathered food. Gathering party sizes correlated with distribution pattern of gathered goods. Where the concentration of plants was higher, gathering groups tended to be larger. These concentrations also tended to be farther from the settlements, and plants were only available to be gathered for short periods of time.

Thus, since sedentarization, Imamura-Hayaki argued, gathering distance had jumped from within a range of 5 kilometers to 10 kilometers. This led to an increase in gathering time and a decrease in gathering frequency. Also, the availability of corn and sorghum made gathering food less of a necessity. Firewood and building materials became more important, while gathered plants continued to be important as supplements to corn flour diets, which are low in vitamins. However, practices of and techniques for gathering had not changed much, and people still exhibited a preference for gathered food. Twenty-years after this study, I found that people continue to gather but now travel even further distances, even if gathering is more restricted by law than in the past. Sedentism, however, has had other major social effects in terms of San livelihood practices and, in particular, rights of access to land.

Kalahari Debates and Land Rights

Much attention has been given to the ways in which these small-scale societies lived off of the land, the social kinship organization of bands, egalitarianism, generalized reciprocity, mythology, division of labor amongst hunter-gatherers, and

ecological knowledge (Thomas 1959; Lee and DeVore 1969; Lee 1979; Lee 1972; Tanaka 1980; Silberbauer 1980; Shostak and Nisa 2000; Biesele 1993; Biesele, Hitchcock, and Schweitzer 2000). Grounded in cultural ecology and evolutionary theory, these studies tended to argue that San culture developed in relative isolation as it adapted, by means of hunting and gathering, to the harsh environments of the Kalahari Desert (cf. Thomas 1959; Lee and DeVore 1969; Lee 1979; Tanaka 1980). These studies, most well-known through the work of Richard Lee and the Harvard Project, came to be known as the “traditionalists.”

Within anthropology, but also beyond, these studies have generated fierce and contentious disagreements, most famously referred to as the Kalahari Debates. In the 1980s and 90s, a group that came to be known as the “revisionists” contested the legitimacy of the category “hunter-gather” as imposed on San, or bushmen, by European and American anthropologists. Instead, they argued that foragers in the Kalahari were an underclass embedded within the broader regional political economy of southern Africa, often pushed into serfdom by neighboring Tswana cattle herders who accumulated wealth and political capital by growing their herds (cf. Wilmsen 1989; Wilmsen et al. 1990; Solway et al. 1990). This emphasis on class, instead of what they argued to be imposed and essentialist categories, can be understood partly as a political response to and against the ethnic and racial categories utilized in Apartheid South Africa.¹⁴ Pushed deep into the Kalahari and/or treated as serfs by the

¹⁴ It is also a reason that Botswana adopted the Anthropological Act into its constitution.

cattle-owning Tswana *Morefe* (Chiefdoms), revisionists argued that these groups resorted to foraging and hunting practices as a means of surviving their marginalization.

Both positions make historical arguments and assumptions that have been taken up in policy and legal debates in Botswana in surprising ways. They have been deployed in conflicts framed either within the discourses of human rights or wildlife conservation, and quite often both in post-colonial, anti-apartheid, and later post-apartheid contexts. Notably, these two positions resurfaced in political debates when a land claims case was made by a group of San people who were displaced from the CKGR by the Botswana government and forcibly relocated to a settlement outside of the park.

In the late 1990s and into the early 2000s, the government began relocating San communities outside of the park in an effort (as the government explained it) to provide the social services guaranteed to all citizens of Botswana and to develop a segment of the population it deemed underserved. A major sticking point, however, was the fact that the CKGR had been established shortly before Botswana's independence in 1966, in part at least, to guarantee freedom of movement for Bushmen in this part of the Kalahari and prevent encroachment from cattle owners and herders—Tswana and also Afrikaans—into this area. The formation of CKGR was based on the recommendation of George Silberbauer following his survey of the Central Kalahari as an agent of the British Protectorate (Silberbauer 1965).

In 1997 and again in 2001, the government of Botswana began forcibly removing the San, and Bakgalagadi, from CKGR and placed them into two main settlements outside of the reserve, New !Xade and Kaudwane (Hitchcock 2002). When it was discovered that there were still 559 people living within CKGR, the administration also stopped all governmental services. Most significantly, it closed off all borehole wells, which in turn left most residents no other choice but to relocate to the large settlements outside the reserve. By March of 2002, only 67 people were still residing in CKGR (Kalahari Peoples Fund Newsletter 2002). Heads of displaced households were given five head of cattle each for their trouble.

Some of the speculated reasons for the relocation of the San are the commercial interests the government has in diamonds, other minerals, and eco-tourism in the CKGR, the largest sources of income in Botswana. While the government denies that there is any connection between the diamond business and the displacement of the San, a Survival International news release states that Kalahari Diamonds Limited secured US\$2 million from the International Finance Corporation to explore diamond operations in CKGR (Survival International Press Release 2003). There is now at least one active mine in CKGR. The government's explanation for the removal, however, is that they "simply believe that it is totally unfair to leave a portion of the population of our citizens underdeveloped under the pretext that we are allowing them to practice their culture" (Hitchcock 2002:820). In 1992, a government official also reportedly stated that "Botswana owns the Basarwa, and it will own Basarwa until it ceases to be a country: they will never be allowed to walk around in

skins again” (Hitchcock: 809, 2002).¹⁵ In 2006, the Botswana High Court ruled in favor of the displaced San, granting them access to CKGR. It has been suggested, however, that this was a largely symbolic victory and that most people were unable to return to the CKGR in practice.

Rene Sylvain (2014) summarized the politics of the “traditionalists” and “revisionists” in the Kalahari Debate to show how their arguments were mobilized by both San advocacy groups and the Botswana government on issues of identity and land rights in the CKGR case. Sylvain argues that a false choice between essentialist and deconstructionist views of identity emerged out of the politics of theorizing race in apartheid South Africa, as evidenced in the Kalahari debates. While traditionalists’ acknowledged contemporary and recent socio-political changes, they are largely considered in relation to how shifts away from the hunter-gatherer lifestyle “means the loss of identity as San” (Sylvain 2014:254). Here, foraging and notions of cultural autonomy are emphasized in ways that Sylvain points to as essentialist, but are employed as a means to claim San rights and projects that promote cultural survival. The work of Kalahari anthropologists’ accused of essentializing San became a powerful discursive strategy for San advocacy groups engaged in an indigenous politics of recognition. The claims to “authenticity” rested on the very image that has historically been at the root of their subjugation and marginalization.

¹⁵Baswarwa is plural Setswana word for San or Bushman, and though widely used, it is considered derogatory.

The revisionists, on the other hand, saw the San to be an underclass who turned to hunting and gathering only after mercantile capitalism collapsed in the Kalahari at the end of the 19th century as populations of wildlife were depleted from the fur and ivory trade. In this regard, they argued, the San could be understood as serfs, working for Tswana pastoralists, within the wider political economy of the region rather than isolated and relatively static hunter-gatherers. This approach emphasized class politics and aimed to intervene in racializing projects that notions of bounded culture groups played to. Contrary to the traditionalists, with regard to advocacy, this approach considered the claims to “authenticity” and the essentialism of the traditionalists to be dangerous in the racialized climate of apartheid South Africa. While this approach worked against the racialized politics of Botswana’s apartheid neighbors, it is the very argument that was taken up by the Botswana government to justify the displacement in its commitment to nonracial politics. Thus, the revisionists’ argument lent itself to state rhetoric of development, modernity, and progress towards class equity. They deployed the class-based and nonracial argument to justify their push for development, San resettlement programs, and reallocation of land because it allowed them to challenge the legitimacy of San land rights claims on the basis of indigeneity in a country where all citizens, regardless of race or ethnicity, are supposed to be granted equal rights. Thus, as Sylvain shows, both positions, essentialist and deconstructionist, actually shared a “racial epistemology” that viewed San as pre-political, which itself perpetuated a racialized politics of recognition.

The battle demonstrates the “cunning of recognition” (Povinelli 2002) that resonates with other indigenous land rights cases globally whereby late-liberal mechanisms of state recognition require indigenous people to make claims to the same essentialist “authenticity” that has been at the root of their historical subjugation in order for their rights to be recognized in the state in the present. Displacees and their supporters utilized the same essentialist position once employed to discriminate against and dehumanize San in order to lay claim to their rights to the land. The state, on the other hand, deployed a liberal modernist, human rights, anti-racial, and class-based discourse of citizenship and social development that resembles the Revisionists’ position to justify the displacement. All citizens of Botswana are guaranteed a basic standard of living, the argument went, and therefore it would be unjust and undemocratic to leave a portion of the population living in a Game Reserve where they would be underserved and underdeveloped. It would be equally unjust to grant a segment of the population rights not allotted to others based on the premise of “practicing their culture.” This is significant to this study for a number of reasons, not least of which is that it created a dichotomous situation that has frustrated those on both sides.

My own research in the Kalahari began in 2002 when this land rights case was at its peak, and the tensions were palpable. It created an unwinnable situation for both sides. It is partly in response to and in frustration over these events and this oppositional framing, requiring taking one position or another, that I try to reframe the issues through landscapes and landscape relationalities across species. Inspired by

this tension, this dissertation looks to develop another approach that focuses on landscapes while utilizing human practices once essentialized, like tracking and gathering, as methods and analytics for engaging with these politics, particularly as they relate to Kalahari landscapes. Of course, there is a risk in doing so, and I tread a fine line in which including humans in this more-than-human analysis should not be equated to dehumanizing people, particularly in the context where San or Bushmen have historically been treated as less than human by Europeans and neighboring Bantu groups. Rather, I aim to challenge normative humanistic assumptions and positions to instead open up the field of relationality to landscapes with which humans live together with nonhumans.

It is particularly in this light that I see a multispecies, more-than-human approach to have potential for addressing post-colonial and decolonial issues and concerns. Less constrained by a kind of humanism bound to identity politics and particular notions of what it is to be human, this approach allows for an engagement with a politics of landscapes that involves all those who live there, human and otherwise. This is but one approach amongst many. Others have developed participatory indigenous mapping projects that have done a lot to change the discourse around territorial and land use rights (cf. Albertson 2000; VanderPost 2003).¹⁶ These projects have similarly aimed to engage with human-ecological relations through mapping gathering, hunting, and movement areas in a way that

¹⁶ See also Maps and Posters | UCT Libraries Digital Collections n.d.

more immediately speaks back to bureaucrats looking for clear line through which lands are allocated and distributed. Still others have produced a range of (participatory) films that shed light on land rights issues and community mapping projects in the Kalahari in southern Africa (Brody 2012; Wicksteed 2006).

This dissertation attempts to take on the issues of people and environments together by employing two sets of the central practices attended to in Kalahari anthropology, namely tracking animals (as it has been associated with hunting) and gathering, to draw attention to ways of noticing, engaging with, and theorizing landscapes, landscapes change, and landscape movements. Thus, rather than a study of hunter-gatherers and their relations to the environment, or a study of the political economy of the Kalahari and its effects on the environment, this dissertation explicitly employs tracking and gathering as methods and as analytic, or heuristic, devices to engage with landscapes, and their enactments of particular histories and politics.

The dissertation therefore argues that the worlds of human and nonhumans are, and have always been, entangled and this can be seen through an attention to landscapes, and particularly in the way that landscapes emerge through movements. These movements can be seen through particular kinds of practices, namely tracking and gathering, in which the worlds of humans, nonhumans, and their politics are interwoven. Landscapes are not simply the contexts for politics and histories; rather, their movements are always embroiled in the doings of histories and politics themselves, which include issues of human and more-than-human livability. It's not

enough, however, to study nonhumans in a timeless space and as if they were outside of global geopolitics. In this dissertation, I watch multispecies relations and the politics of development through the same lens.

Infrastructures of “Self-Devouring Growth”: Cattle, Fences, Highways and Water

“Trade, economics personal movements, even safety and hygiene systems, *all* of these are regimes of flow, all foster mobilities, imply barriers, and all of them, their intersections and the intersections between them, play their part” (Law 2006:236).

This section engages with literature on postcolonial development, specifically engaging with economic growth in Botswana in order to address how landscapes and their ecologies are treated by the nation state at a time of focus on processes of resource extraction and cattle ranching. Botswana has been often presented as a model developing country and Africa’s most stable democracy. Botswana’s continued economic development has been largely used to justify the depiction and territorialization of the Kalahari as a space of underutilized resource potential. The Kalahari is imagined as a place of grass with which to grow cattle herds, land plentiful with extractable minerals and gas, and ancient water aquifers beneath the surface that could support both thirsty industries. Yet at the same time, it is approached as “empty” and “underutilized”. These economic and infrastructural depictions stamp out or overshadow other movements critical to Kalahari landscape ecologies and treat the landscape as static. They are not limited to Botswana and the Kalahari and are embroiled in the global economy, the circulation of commodities and, thereby, subject to series of trade regulations originating mostly in Europe. Attending to landscapes, their movements and various more-than-human

assemblages, gatherings, and ecologies that exceed but are undermined by economic rationalities, I will argue, is necessary for intervening in the kinds of logics and politics that give rise to ecological crises like the one the Kalahari is facing. I then return to tracking and gathering as important methods and analytics for developing an approach to follow the movements of landscapes, their socialities, and more-than-human livabilities.

A fence stretches east from Botswana's western border with Namibia for 286 kilometers, a straight line of wire that encompasses the northern most boundary of the Central Kalahari Game Reserve (CKGR), effectively cutting off the Kalahari Desert from the Okavango Delta and all its water (Main 1987:237–238). The fence embodies much of what Tim Ingold describes in his analysis of the relationship between straight lines and modernity: “Indeed the straight line has emerged as a virtual icon of modernity, an index of the triumph of rational, purposeful design over the vicissitudes of the natural world” (Ingold 2007:175). The fence is a boundary, but barriers seeking to control movements in the “natural world”, also necessarily imply, or rather require, movement and flow (Law 2006). It would be overstated to say that this fence and others like it are the reason that Botswana has sometimes been described by political economists as an “African Miracle,” a model developing country (cf. Samatar 1999). These fences and related infrastructures, however, are certainly embroiled in this modernist characterization, having played a significant role in the political economic development of the post-colonial state. They are infrastructures that have been put in place to facilitate economic growth in an attempt to control unruly movements

through and out of places like the Kalahari Desert. But, as much as these infrastructures have contributed to Botswana consistently having one of Africa's fastest growing economies, they have also been infrastructures of death, or more subtly, what Julie Livingston describes as technologies of "self-devouring growth" (2016; Forthcoming).

The fence above, Kuke, is a veterinary fence meant to prevent the movement of foot-and-mouth disease (FMD) from animals (domesticated and wild) in the northern "red zone" to the lucrative cattle ranches and grazing areas in the southern and eastern "green zones" of the country. Fences like this have cut off migratory routes of antelope seeking water, leading to the death of hundreds of thousands of animals (Owens and Owens 1984). The fence is entangled with a network of other infrastructures that privilege certain kinds of movements over others, seeking to control movement but also facilitate it.

From the Kuke gate—the FMD check point—travel south along the TransKalahari Highway, a major trade artery connecting Botswana to economic centers in South Africa and ports in Namibia, and you will almost immediately pass the Ghanzi cattle ranches where a major portion of Botswana's export quality beef is raised. The highway then slices through the wildlife corridor between CKGR to the Kgalagadi Transfrontier Park (KTP), another obstacle for wildlife moving through these landscapes. Travel another 200-300 km, and just before Jwaneng you will pass a neatly organized mountain that jumps out of the flat landscape. But this is not a mountain. It is Jwaneng Diamond Mine, the world's richest and most productive.

Another 150 kilometers, and the highway takes you to Lobatse, home to Botswana's national abattoir, which at the time of its construction in the 1960s was the largest and most modern animal disassembly plant in the southern hemisphere. These infrastructures are all about movement and, more specifically, are avenues and sets of controls that are meant to facilitate economic growth through international trade.

Veterinary fences like Kuke began making their way into the Kalahari in the 1950s and continue on into the present as part of Botswana's—Bechuanaland, before independence—beef export trade agreements with the United Kingdom and Europe. These trade agreements required particular hygienic standards and sought to control the flow of veterinary diseases like FMD to Europe, which required erecting fences to create disease-free zones. Following independence, the postcolonial government invested heavily in developing its commercial beef industry with the establishment of the industrial scale abattoir in Lobatse and the Botswana Meat Commission (BMC), effectively nationalizing beef production. As a result, Botswana received above-market prices for its export beef by obtaining almost exclusive rights to the British and European markets so long as the abattoir and the fences ensured the stipulated standards: “Botswana was virtually the only African country which had access to this very profitable market, with prices well beyond those of the world market level” (Gulbrandsen 2012:115). Prices continued to rise well into the 1970s, growing more than 150% from 1966 to 1975. Again, this all required preventing certain movements while privileging others that in turn yielded different responses. It was, for instance, partly the expansion of cattle ranching and herding (or at least the specter of this

expansion) that prompted George Silberbauer to recommend the establishment of CKGR as a protected area, not only for wildlife but also to guarantee freedom of movement for San Bushmen inhabitants in the region.

The maintaining of hygiene and veterinary standards played out in the landscapes of Botswana's grazing lands as the beef industry grew. Landscape commons were divided into zones and cordoned off. The state then also supported the drilling of privately owned boreholes that created privately owned watering points in places that wouldn't have otherwise supported large cattle herds within the vast expanses of communal land, essentially "dividing the commons" (Peters 1994). In addition, the *National Policy of the Tribal Grazing Lands* allowed for the private establishment of fenced private livestock ranches. The highway, though only fully tarred in the 2000s, created the means for transporting cattle from Ghanzi District nearly 700 kilometers to the abattoir in Lobaste, where beef parts could then be shipped to Europe.

This nationalized beef industry and its international trade agreements then laid the groundwork, by establishing the precedent, for the emergence of the parastatal Debswana: the diamond mining partnership between DeBeers and Botswana, which became one of the largest producers of diamonds in the world. With it, political power and wealth was consolidated and accumulated by state elites but also provided the revenue to establish the welfare state.¹⁷ As Livingston writes, today "corporate

¹⁷For a detailed discussion of how the nationalization of the beef and diamond industries consolidated power and allowed for the emergence of a wealthy elite class in Botswana, which in turn shifted some

capitalism, mineral extraction, rampant consumerism, and personal debt thrive alongside a significant welfare state and a determined politics of redistribution” (forthcoming: 2). This economic growth, the relative political stability of the state—the longest continuous democracy in Africa—and its guarantees of social services for its citizens have all contributed to Botswana’s image as a model developing country, an image that it hangs onto dearly. This has not come without devastating effects to Botswana’s landscapes and the people who live in the most remote parts of the country, a country that simultaneously prides itself in its human rights record and as a leader in wildlife conservation in southern Africa, and even the world.¹⁸ After diamonds and beef, respectively, wildlife tourism is the third biggest contributor to the nation’s economy.

Ironically, though not surprisingly however, growth has come to create some of the biggest challenges facing the country and its international image, as its development is outpacing its available resources such that its humanist and conservationist bents are now oddly and uncomfortably couched together. As Julie Livingston describes, if growth is the purpose of development, it has no planned end and will eventually “overwhelm in its insatiability.” Returning to cattle, Livingston shows how the transition from cattle familiars, once a “total social fact” amongst

political power and wealth away for dikgosi (Tswana chiefs and chiefdoms) of Botswana see (Gulbrandsen 2012)

¹⁸The President of Botswana, Ian Khama, has been a long-time member of the Board of Directors for Conservation International and a strong supporter of the nationwide hunting ban in Botswana. Under his governance, Botswana has taken a strong stance against re-opening the elephant ivory and rhino horn trade market, which several other member states of the Southern African Development Community (SADC) have supported.

Tswana, to beef commodity, not only signaled a social rupture between humans and their cattle kin who were especially significant actors in political and economic arrangements. It also resulted in a public health and ecological crisis through what she terms a process of “self-devouring growth.” As commodities for export, herds have grown with no planned end, extending into the remotest parts of the country where they can graze and drink with the aid of borehole wells to the extent that cattle are literally drinking Botswana’s water aquifers dry; this in a country that had already been characterized by water scarcity. “Self-devouring growth emerges out of processes of aggregation and future making that harness the planet’s lifeblood into distorted forms of expansion” (Livingston Forthcoming:30). In Botswana the technologies of growth—water infrastructures, fences, the abattoir and others—have enacted a “nature” to overcome, control, and exploit movements, replacing other social relations to landscapes and their animated ecologies with which people once worked in concert.

One of Livingston’s main arguments is that the relations that technologies of self-devouring growth have come to replace—rainmaking and cattle familiars, for instance—may offer a way to think otherwise about the politics of ecological crisis without relying on the stale opposition between authenticity and development, not just in Botswana, but also on a planetary scale. This dissertation takes up Livingston’s argument, not by examining the same kinds of sociopolitical ruptures, but by examining the kinds of movements of landscapes and landscape relations that these infrastructures of self-devouring growth transform, seek to control, or simply stamp

out: those movements that Ingold might argue have been lost to straight lines. Fully engaging with the violence of these infrastructures and the effects that they have on ecologies requires attending to the movements of landscapes and telling their stories before they are gobbled up, not simply as a means of preservation “before it is too late” but also as an act of resistance that works in concert with the doings of such animated ecologies, without reproducing the politics of the unwinnable nature-culture dichotomy as it played out in the CKGR case.

In his analysis of a FMD outbreak in the United Kingdom in the 2000s, John Law argues that efforts to control mobilities and flows through the production of barriers often contribute to worsening the very conditions they seek to contain (Law 2006). These attempts to control flows require specific apparatuses, which in the case of the British FMD crisis, operated largely through trade regulations promoted by the European Union and the World Trade Organization. The Organization International des Epizooties (OIE), a body that advises on trade that involves animals and epizootic diseases, establishes standards and classification to determine the status of the presence of disease in each country, that in turn has significant consequences for the potential for trade in those countries by regulating trade and “the flows of animal and meat products” (Law 2006:230). Through these apparatuses, the “aspiration is to standardize flows and exchanges on a global scale. As part of this the attempt is made to render whole regions of the world uniform—for instance, drained of foot and mouth virus” (Law 2006:238). In order to be rendered virus free, these countries and regions must be able to persuade the OIE that they have systems in place to ensure the

surveillance, reporting, control, and eradication of the disease. Though Law's analysis focuses on the flows of FMD in the UK and barriers that attempt to control its mobilities, these apparatuses have significant ramifications for countries like Botswana.

For Botswana to maintain and grow its second most profitable industry, beef export, this means having those substantial veterinary fences, control checkpoints, the state abattoir, and an independent state veterinary service to “prevent” the movement of the virus into Europe. These trade, safety, and hygiene concerns therefore ripple throughout Kalahari landscapes in the ways that they encourage certain flows (commodity, capital, and trade), while seeking to control and contain others (wildlife, cattle, and virus).

For Botswana to present itself favorably to the global community—perhaps as an African Miracle—these veterinary infrastructures that control and afford certain mobilities need to be in place. However, when the veterinary fences were reported to have led to the mass die out of migrating antelope, the self-consciously conservationist state also worried about how it would be perceived, which perhaps had to do with why people like Mark and Delia Owens were rendered *persona non grata* after they passionately reported these findings in their 1984 New York Times Bestseller *Cry of the Kalahari*. The Owens' reporting on the mass die out of antelope along the veterinary fences, together with the opportunistic hunting of wayward animals looking for water, brought international attention to the issue. As a 2010 New Yorker article about the Owens' summarized, their expulsion from Botswana resulted

directly from the embarrassment they had caused the country and its beef industry: “One day, government officials in Gaborone summoned Mark and Delia to a meeting. When they arrived, they were told that they were being expelled from the country. Botswana was a major exporter of beef to Europe, and the government was embarrassed by the Owenses’ campaign” (Goldberg 2010). The Botswana government was similarly embarrassed when groups like Survival International publicized the forced relocation of San inhabitants from the CKGR, accusing the government of instantiating a “cultural genocide” motivated by interests in prospecting for diamonds and other minerals in the game reserve, thereby tarnishing its image (Survival International Press Release 2003).

This is not to say that the mass die-off of wildlife as a result of the beef export industry and their fences was easy to accept for the state or even cattle farmers. Several Afrikaans Ghanzi cattle ranch owners whose farms were near the Kuke fence told me about the sad helplessness they felt when, overcome by the smell of death, they found its source at the fence where they encountered unthinkable numbers of dead and dying animals trapped just a few kilometers from the water they needed so direly. However, these fences are also what have allowed them to profit from their large cattle herds.

A prominent former parliamentarian from Ghanzi District, with whom I shared a beer, described the excitement he felt as a young schoolboy every year when he and other children climbed on top of the school’s roof as the ground and then the school walls began shaking. A few minutes later, massive herds of wildebeest on their

annual migration passed by. From the roof they could see the clouds of dust approaching like a storm as they felt the stampeding thunder of hooves in their bodies. He lamented those days, but as a powerful politician and wealthy cattle-owner himself, he then expressed that he and others need to be able to make a living, and cattle were the way. He then said something to the effect of, “It is how we have grown the economy here in Ghanzi.” These violences are justified in such a capitalist liberal logic with the promise of an ungraspable future (c.f Povinelli 2011; Rose 2004). The problem is, with no planned end for the growth that promises a better tomorrow, things like the beef industry and diamond mining are devouring the possibility of recuperating a livable future.

Landscapes in Motion: Movement against Growth

To build on Livingston and engage with the problem of self-devouring growth and ecological crisis, I propose an approach that attends to the movements of landscapes to challenge the hegemony of growth infrastructures and their dominance over stories of landscape movements. Tim Ingold has long argued that greater attention to movements in landscapes are needed to engage with the politics of perception, particularly as a way of intervening in the dominance of modern, rational perspectivism and the reification of the nature-culture dichotomy (Ingold 1980; 1987; 2000; 2007; 2011). Such an attention to landscape movements may help bring to light the violence, contradictions, and challenges of self-devouring growth, while also presenting a way of engaging with the politics of landscapes. Importantly, this, I

suggest, requires attending to actual landscape movements and gatherings, rather than just elaborating human environmental perception.

The approach I aim to develop is largely inspired by Hugh Brody's *Maps and Dreams* (1981), which powerfully describes the tensions and gaps between the plans of the white developers who aim to build a new pipeline in British Columbia, Canada, and the lifeways of the Beaver Indians, who continue to move about and conceptualize landscapes despite the ongoing appropriation and damage of their places. *Maps and Dreams* looks to make visible the movements, mappings, and multispecies social worlds of the Beaver Indians that are rendered non-legible in the maps of state and pipeline planners. Brody's work shows Beaver Indian landscapes and their embedded social worlds as at once marked by the violences of colonial encounters, but not destroyed by them. The book—which aims to map landscapes otherwise—is a form of resistance to the continued enactment of colonial violence on peoples' worlds and their environments. While Brody draws our attention most strongly to the mapping of movements, I use his insights to focus more directly on movement itself through tracking.

Numerous scholars, including Brody and Ingold, have argued that movement is central to the making of place, and is therefore also important to understanding processes of knowledge production. As Australian Geographer David Turnbull argues, “the making of knowledge is simultaneously the making of space, and space is made from traveling” (Turnbull 2007:142). The idea that there is a space “out there,” a reified nature or environment subject to human control, inhibits our

understanding of place. Instead, it may be more useful to think of the world being made in the process moving through and knowing it (ibid). A worldview, therefore, would be in constant production and is performed in the course of people's lives through their movement in the world. Similarly, Tim Ingold suggests that "wayfaring" is the primary mode in which humans and nonhumans inhabit the earth (2007: 81). Through wayfaring, inhabitants are active participants in the continual coming into being of the world, contributing to its "weave and texture" (ibid) as inhabitants that make the world rather than occupying an already pre-existing place. These are the kinds of movements that become overshadowed by infrastructures of self-devouring growth. The straight wire line of Kuke fence interrupts and governs the wayfaring of Kalahari inhabitants, or dwellers, based on the assumption of ordering and occupying already pre-existing places in particular ways.

The movement of lines offers a more relational way of understanding being and becoming in the world (Deleuze and Guattari 1987). In the course of modernist history, however, the line has lost the very movement that gave rise to it and has been replaced by the pre-composed plot that has transformed our understanding of place (Ingold 2007). The Red and Green Zones north and south of Kuke fence show this clearly. In modernity, the line is essentially one movement of growth despite frequently being thought of and utilized as static, and as a tool for boundary making: the straight line of modernity is one of the means through which the violence of spatio-temporal disjunction is achieved, history is made linear, and nature cordoned off as a bound and objective space (Ingold 2007:155). For Ingold, the loss of

movement in the line, its straightening, is at the very foundation of Western “rational” thought where straight symbolizes modernity, science, and culture and curves symbolize tradition, primitive thought, and nature (2007: 154-5). It is perhaps, a technique of growth and progress that, like development, has no planned end. Instead of thinking of the straight, static line, Ingold suggests “that in order to understand how people do not just occupy but *inhabit* the environments in which they dwell, we might do better to revert from the paradigm of the assembly to that of the walk,” thus emphasizing dynamic movement of becoming in the production of space (2007: 75). This approach opens up ways of understanding human and nonhuman relations in their mutual capacity to move and produce space together, with regard to, in spite of, or even because of certain technologies and infrastructures of modernity and growth.

It is this kind of movement that I aim to attend to in this dissertation as a way of drawing out the liveliness of landscapes that are so quickly being stamped out by infrastructures of self-devouring growth. The point is, however, that this is not just a matter of how humans perceive these movements, though how to notice and track is an important component of this dissertation. Rather, the dissertation develops an approach to explore what these movements actually do, how landscapes emerge through the gatherings of a diversity of actors human and nonhuman, living and nonliving, and material and discursive.

Part Four. The Trackers

As a more-than-human ethnography, I must emphasize that the humans, and especially those people I refer to a “my interlocutors,” are not only critical to this

dissertation but are also important actors in Kalahari landscapes, and it is necessary to situate them in relation to social, economic, and political contexts in the Kalahari. As I described above, my research in the Kalahari began with a concern for San land rights in the CKGR, and it was out of frustration with the discourse surrounding that case that I was inspired to seek alternative approaches, eventually pursuing a more-than-human approach.

There are many challenges for people living in the Kalahari, particularly San people, not just for those who once lived in CKGR but also for those living and working on farms, in towns, in settlements in the corridor between CKGR and KTP, or other places where people are deemed “Remote Area Dwellers.” It has been well documented that, “[i]n spite of efforts to ensure the wellbeing of San by well-meaning anthropologists and development workers, many San are worse off today than they were in the 1950s by almost every measure (Hitchcock, Biesele, and Babchuk 2009:170). Access to lands and mobilities have been greatly restricted. There are high rates of joblessness, a prevalence of discriminatory and exploitative labor practices for those who do find some employment, and growing health challenges—including but not limited to tuberculosis, HIV/AIDS, and alcoholism and other related illnesses (ibid). And people are often hungry, no longer allowed to hunt. Gathering activities are often monitored, and though the drought relief programs sometimes provide food rations, individuals frequently have to stretch their received supplies to feed whole families. Many of these challenges share their origins with the same processes that are encroaching on Kalahari landscapes and challenging livability for nonhumans:

growing human settlements, failed development and infrastructural projects, growth and expansion of the cattle economy, and privatization of the commons, among other things.

Today, virtually no one in the Kalahari lives—or rather, no one is allowed to live (by law)—the mobile, semi-nomadic lifestyles that people once did. Instead, most San people live in towns or villages, on farms, at cattle posts, or in small settlements that arose out of sedentarization schemes established by the state. The first of these sedentarization schemes was set up as an experiment, not by the government, but by an anthropologist named, Hans-Joachim “Doc” Heinz. The name of this settlement is Bere, and it is home for three of my five primary interlocutors: !Nate, Njoxlau, and Gustel. Though I moved throughout the corridor’s Wildlife Management Areas during the course of my research, Bere and its associated Wildlife Management Area (GH11), is where I based myself and spent the majority of my research time. As a result it receives greater attention here than other areas to situation the research.

Today Bere is fairly typical for a Kalahari settlement, but its original formation is somewhat unique and controversial, the details of which I describe further in Chapter 3. In its earliest iteration, Bere was established as settlement for a number of !Xo speaking bands who moved around the areas of Takatshwane, Okwa, and Lone Tree. Heinz, who had been working and living with a band from the Takatshwane area in the 1960s, became frustrated with what he saw as the discriminatory and exploitative treatment of bushmen by Tswana and Bakgalgadi

cattle herders, which he considered to amount to a kind of indentured servitude, if not slavery (Heinz and Lee 1979:163). By this time, San bands were already frequenting government boreholes and water stations within their movement patterns. At times of drought these water points attracted more and more people, including cattle herders, which seemed to exacerbate or amplify the mistreatment of San peoples and inhibit the mobility of the bands. Anticipating significant socioeconomic changes as these parts of the Kalahari were increasingly made available to herders and cattle ranchers, Heinz initiated the Bere settlement as a pilot project in 1972 with the goal of transitioning the bands to a “more advanced economy” (Heinz and Lee 1979:243). Heinz was opposed to Silberbauer’s proposal for the CKGR that would allow San to live a more mobile, hunting and gathering lifestyle, for he thought that not only was it doomed to failure as cattle ranching and expansion continued but also, even at its best, it would amount to little more than a “human zoo” (Heinz and Lee 1979:163). The settlement of Bere instead, which Heinz called a “project of anthropology,” funded largely by a grant from the Max Plank Institute, aimed to incorporate livestock keeping in order to reduce the reliance on hunting and gathering, which was becoming increasingly difficult (Heinz and Lee 1979:253). It was meant to develop into a kind of communal ranch as a means to claim territory and establish livelihoods in an area that was increasingly encroached upon by ranchers or plans to ranch.

The settlement had an ablution block, a school, a shop, a clinic, several houses and a dispensary. As a settlement, the role of a “headman” was formally established, a position that was initially and controversially assumed by Heinz in 1971. Heinz has

been greatly criticized for this role in establishing the settlement and for assuming the position of headman. As Heinz himself wrote, “In a pilot scheme of this nature and amid the pressures of intruding interests, it was inevitable that I would be criticized and blamed for its failings. My administration was criticized as bourgeois and paternalistic. It was said that my headmanship prevented Bushmen from identifying with the land that they considered it to be my land, my ranch” (ibid). Ultimately, after a series of events, failures, and political controversies, Doc Heinz either resigned or was removed from the position. The settlement continued on, and despite its flaws, it became the model for sedintarization schemes in Botswana as San mobilities were increasingly restricted. Though there is officially a headman in Bere today, he is largely absent, and the three subheadmen in Bere are often at odds with one another. There appears to be a leadership struggle in the settlement, not only between these men but also the “community trust,” Village Development Committee, and other factions and community groups. Though many years removed, this struggle appears to be one of the longterm effects of the leadership structure Heinz initiated, combined with the arrival of new residents from other settlements and cattleposts that have exerted extra pressure on the community’s infrastructure and political structure.¹⁹

¹⁹ One such pressure includes the arrival of several hundred people who were displaced from a settlement called Ranyane. This is considered another instance of a forced displacement, around which there is an ongoing legal case.

The Trackers

!Nate, Njoxlau, and Gustel grew up in and/or around the settlement of Bere. Lone Tree served as the primary base for !Nate's family, and though it lay some thirty kilometers away from Bere, he attended school at Bere for a couple of years before he "ran away," as Njoxlau put it. !Nate was (officially) the oldest of my interlocutors, born in 1956 according to his national identification card, though dates of birth for people born before the 1970s were often assigned rather arbitrarily by government officials. An Afrikaans professional safari hunter for whom !Nate worked as a tracker in the late 1990s and early 2000s once remarked, however, that he'd be surprised if !Nate were more than forty-five years old at the time of his passing.

!Nate continued to move between Lone Tree and Bere throughout his life until he met and married a woman, !Nasi, from Bere. He eventually settled in Bere for good to be with her. Around this time, the Lone Tree settlement was dissolved, and people dispersed either to Bere or nearby Kcaegae. !Nate became renowned for his skill as a tracker and often found short-term or seasonal employment working for safari operations prior to the hunting ban. It was at Lone Tree in the early 1990s that he first met tracking scholar Louis Liebenberg and became one of Liebenberg's greatest teachers and collaborators, which I discuss in greater detail in Chapter 1. Like the tracking jobs he found, his other forms of employment were only temporary, and !Nate also spent a great deal of time in Lone Tree, Kcaegae, and Bere without work or money, often relying on drought relief rations in times of food scarcity.

!Nate, who stood approximately five feet tall, had a larger than life personality that drew people to him. He was an exceptional storyteller, and though !Xo was his first language, he also spoke G/wi fluently—a mutually unintelligible language with !Xo—some Nharo, Sekgalagadi, Setswana, and English, and he was not shy about trying to translate his stories to anyone who would listen. And though I had hoped to learn to speak !Xo (a notoriously difficult language to learn) over the course of my research, !Nate and my other primary interlocutors insisted that we speak mostly English to one another. “Because being good at English can help us get jobs. You must teach us too,” !Nate and Njoxlau told me early on.

Thusly, while English became our primary language of communication, with some Setswana, Sekgalagadi, and a bit of !Xo that I picked up along the way, English is not a language of the everyday for my interlocutors. Most of the !Xo I learned related to the names of plants and places though G/wi, and, at times, Sekgalagadi names were sometimes taught to me instead.²⁰

When I met !Nate in 2009, he lived in a concrete replica of a traditional !Xo grass hut with !Nasi on the edge of the settlement. These huts were introduced as a more permanent alternative to the grass huts (whether by an NGO or the state I could never figure out), but though they took the shape of the grass huts, they allowed none of the cross breeze, instead baking like ovens in the sun. !Nate often complained

²⁰ This mix of languages and my interlocutors’ insistence on speaking was both convenient and challenging. The greatest challenge proved to be maintaining some consistency in the language used to name particular species of plants and animals. I have tried to keep and introduce the !Xo words when possible, but I often move between the Sekgalagadi or Setswana names as well.

about his house and slept outside around the fire whenever he could. However, as the population of Bere grew, !Nate became more and more annoyed with everyday human disturbance near his house. Flat and open, sound carries through the settlement, especially on days or nights when social gathering or party is occurring.

In addition to the noise, !Nate often worried about theft and the threat of violence, particularly at the end of the month when people received their wages and beers were consumed in high quantities. Though !Nate often partook in the pay-day festivities, he grew especially weary of young drunk men looking to steal and fight. When possible, he and his family would travel a few kilometers outside of the settlement to a small plowing field that !Nasi's family had acquired. There, they'd camp for extended periods to get some relief from the business of Bere, with its 700 or so residents. Most of the original !Xo families, I was told and came to notice, prefer to spend their time on the peripheries of the settlement for similar reasons. Others, however, have told me that this may be less a choice than an effect of an implicit social hierarchy in which government employees, officials, and other wealthy residents (often Bakgalgadi families) occupy the center, while poorer or older San families live in the edges of the settlement. Most of the original !Xo residents, as far as I could tell, now live on the periphery of the settlement.

The center of Bere, though small—roughly two to three hectares—is now dominated by built structures, namely the school, clinic, and houses provided for the government employees, that include doctors, nurses, teachers, administrators, and even a few policemen. The co-op shop is still there and active, but other small shops

owned by Bakgakgadi families seem to receive most of the settlement's business. These shops sell canned goods, maize meal, and other basics, but they also sell beer, which is a main attraction for many people. There is a community hall, but this structure has fallen into disrepair and been taken over by goats. The whole of Bere, the center and the periphery, are entirely denuded and cleared of grass. And though a few shade trees remain in the center, with more and more shrub bush as one moves out from the center, the most prominent feature of Bere, like other Kalahari settlements, is sand.

Njoxlau lives in the bushy edges of Bere on a compound with his wife, Qua'qai.²¹ The government has recently built a two-room house on the compound, which Njoxlau said was built for his wife because she is a pensioner. Qua'qai and her family were one of the first to settle in Bere with Heinz who, she told me, photographed and recorded her dancing quite a bit as a child. A few years younger than !Nate, Njoxlau is in his late forties and moved with his family from the Okwa band to Bere in the early days of the settlement. He too went to school in Bere, where he first met !Nate, beginning a friendship that would continue into adulthood when they became hunting partners (while hunting was still allowed). He completed more years of schooling than !Nate, up to about an equivalent of 5th grade, and likes to read bits of newspapers before using them to roll tobacco cigarettes. Njoxlau, a tall and skinny man, is quite the craftsman and has a reputation as being quite knowledgeable

²¹ This may be a misspelling of the name.

about bush plant medicines. He speaks English quite well but is not fluent. He also speaks Sekgalgadi, Setswana, and some G/wi.

Njoxlau is rather reserved, and though he has much to say, he seems to sit back and wait for opportune moments to make his contributions to conversations. Whereas !Nate was prone to outbursts of shouting, whether of a jovial nature or out of anger, Njoxlau always speaks in a level monotone, never raising his voice, even when confronted. This, however, also made Njoxlau an excellent teacher, and he always took the time to explain tracks and describe various plants and their uses to me. I did hear Njoxlau raise his voice on a few occasions, mostly when being teased by !Nate or while socializing over a few beers, but the moments that stood out the most were when he shouted at me directly because of mistakes I made while walking in the bush that could have put me in danger.

Though also an excellent tracker, he never worked as a tracker for safari hunters, and he did not work with Liebenberg until fairly recently. His first employment as a tracker came as part of the wildlife survey of the Western Kalahari Conservation Corridor (WKCC) between 2008–10, where I initially met him, !Nate, and another primary interlocutor, Karoha. Following that term of employment, Njoxlau is now rather frequently hired as a tracker by wildlife researchers. Njoxlau has also earned some income making traditional hunting kits, selling them to craftshops and tourists, and selling bush medicines to people in Bere. He has also occasionally found employment at events or tourist lodges with a dance group performing traditional !Xo dances at festivals or for tourists, though he no longer

finds performing in that context appealing, even if he is paid. He and his wife have also accumulated a small goatherd.

Gustel was born in 1973 in Bere, the son of Doc Heinz and N/amkwa, whom Heinz married. Gustel was raised between Bere with his mother and the town of Maun with his father, upon Heinz' departure following his period as headman in Bere. Gustel's story deserves greater attention and will be further addressed in Chapter 3, but as a key interlocutor, some situating is necessary here. Gustel spent his early childhood in Bere but spent many of his adolescent years going to school in Maun and living with his father. As a result, he is quite fluent in English, !Xo, Setswana, and Sekgalagadi and has also learned G/wi since marrying Koaklxa, a G/wi speaking woman from !Xade in CKGR and Kgacae near Lone Tree. Gustel came to play an important role in the research for this dissertation as a host to my eventual research camp, as a teacher, and skilled translator, in which he has significant experience having worked for a number of linguistics researchers over the years. Koaklxa too became an important interlocutor, though our relationship was almost entirely mediated through Gustel, for she speaks G/wi and some !Xo, but little English or Setswana. Still, Koaklxa is a skilled tracker and gatherer in her own right, and often corrected and out-gathered the men with whom I worked, especially Gustel.

When Gustel returned to Bere as a young adult he set out to learn to hunt from people like !Nate and Njoxlau, among others, and while highly skilled, the elder trackers say he is still learning. He has resided primarily in Bere since that time, with brief stints in Ghanzi and working on roads and telecommunications crews along the

TransKalahari Highway. As the son of Heinz and N/amkwa, who also became an influential leader in the settlement, Gustel carries significant social status in Bere, though he has not, until fairly recently, benefitted much materially from that association. For all intents and purposes, he is accepted fully as a member of the Bere community, if not as a central figure, but faces many of the same hardships as other residents. Recently however, he was one of a few Bere residents allocated 6x6 kilometer plots of land to establish cattle posts, which he has begun, and where I eventually based myself for the majority of my research period.

Not all of my primary interlocutors, however, are from Bere. Two of them, Karoha and /Uasi, live in the settlement of Kgacae. Kgacae is located eleven kilometers down a gravel road from the site of former Lone Tree settlement that now intersects with the TransKalahari Highway. Established shortly after Bere, it is populated primarily by former G/wi speaking residents of the Lone Tree settlement and other G/wi from as far as !Xade in the CKGR. It is also home to !Nate's extended family, including his mother, who are both G/wi and !Xo. It is of a similar size to Bere, though without quite the same origin story. Its community groups and leadership seem to be more cohesive, and there is a quite active church, a fully functioning a cooperative shop, a community trust, and a very present and active headman. While these groups seem to be cohesive in themselves, struggles for power seem to exist primarily between the different community groups more so than between individuals.

Karoha, who was once the pump operator of the borehole for the settlement, was also once a candidate to become headman at Kgacae. In the end, he did not assume the position and instead found semi-frequent employment as a tracker for safari hunts and a dancer for cultural tourists' at various lodges in Ghanzi District. He is roughly the same age as Njoxlau, in his late forties or early fifties, depending on the accuracy of his government identification card. Like !Nate, Karoha also became a key collaborator for Louis Liebenberg, and he became a primary pilot tester of the GPS tracking data collection application Liebenberg developed called "Cybertracker." Karoha, who also received several years of formal education, is both an expert tracker and, through his experience with Cybertracker, is especially curious about computers and GPS devices and has become quite fluent at using them.

I met Karoha, !Nate, and Njoxlau together during the WKCC Cybertracker tracking survey in 2009, but I would not meet /Uasi, my last primary interlocutor, until early 2010. I met /Uasi when I joined Liebenberg who was planning to certify the four men as "Master trackers," the highest level of Liebenberg's tracking certification system. /Uasi, however, who had also been a key interlocutor of Liebenberg's, had not been invited on the tracking survey. /Uasi only speaks G/wi, and the project coordinators feared that he would be unable to work with other trackers and field researchers on the project with whom he could not communicate. !Nate and Karoha, in particular, were unhappy about his exclusion from such projects because they respected /Uasi's bush knowledge and because the three of them had become a tight-knit group over the course of years hunting together and then working

together with Liebenberg. The three played integral roles in testing Cybertracker in its developmental stages and also starred in two documentaries about “persistence hunting,” the practice in which they would run an antelope down on foot until it collapsed from exhaustion.

Though based in Kgacae today, /Uasi was the last of my interlocutors to move permanently to a settlement, and even then, he and his family camped in the bush in the distant fringes of Kgacae until about 2014. /Uasi moved further into the settlement when the government constructed a concrete house for him and his wife. /Uasi, as Karoha and !Nate often put it, was the only one of them who went to the “bush school,” which I later realized meant that he had undergone the full G/wi initiation into manhood. Having been initiated, my other interlocutors often deferred to /Uasi about the proper use and handling of certain plants and medicines. Indeed, there were particular plants and associated healing practices that only /Uasi was allowed to handle and perform.

As respected as /Uasi is by interlocutors, he seemed to be the target of much discrimination in Kgacae and other settlements he passed through because of his insistence on speaking G/wi exclusively, his lack of any formal education, and his general lack of conformity to the norms of settlement life. /Uasi often got into fights, particularly during bouts of drinking. He was frequently cheated out of the wages made on various piece jobs, or his money and belongings were simply stolen from him. On one occasion, I delivered shoes to /Uasi after he gave me money to buy them for him, only to learn that a few days later someone stole them from him at the local

bar. /Uasi said this was because the person in question was “jealous” because he had run out of money to buy him beer.

Despite our shared language limitations, /Uasi and I became good friends, and he was a key interlocutor. !Nate, Karoha, Njoxlau, or Gustel often served as translators between me and /Uasi, though we also learned to communicate in our own way by doing things together, especially while tracking and gathering. Overall, because of the variety of languages employed by my interlocutors, it was often difficult for me to discern when !Xo or G/wi was being spoken, which also slowed my attempts to learn !Xo. Nonetheless, our group learned to communicate rather seamlessly, and though I was certainly at a disadvantage because I could not speak !Xo or G/wi and definitely missed key insights, what we did together walking, tracking, gathering, and noticing the landscapes became as much a mode of relating as did any single language.

I end this introduction with this focus on the trackers who taught me and who informed my work in order to highlight the situatedness of tracking in the Kalahari and the changing stakes of learning to track at this moment. While the dissertation focuses on the more-than-human aspects of landscapes and the politics of landscape emergence, people were critical to the development of this project along the way. Even so, these men and myself became immersed in the landscapes through our own movements and are part of the processes described as this dissertation unfolds. The

next chapter, Tracking, explores tracking beyond its association with hunting as a philosophical mode of attention to and engagement with landscape movements.

Chapter 1. Tracking After Hunting: Landscapes in Motion

By the time I began my dissertation fieldwork my interlocutors in the Kalahari were no longer allowed to hunt. In fact, they hadn't even been allowed to hunt for the pot since the early 2000s when most Special Game Licenses (SGLs) for subsistence hunting were discontinued for most Remote Area Dwellers (RADs) in Botswana. The 2014 nationwide hunting ban also meant that the few jobs available for trackers with safari game hunting operations no longer existed.

!Nate, Karoha, Njoxlau and several of my other interlocutors did, however, find occasional work identifying and counting tracks on wildlife surveys with environmental researchers. They also continued to track in their daily lives as well—even without hunting and when they weren't on tracking surveys—as part of an ordinary activity of paying attention to Kalahari landscapes and their elements. Whether walking, traveling by motor vehicle, or simply sitting under the shade of a tree socializing with friends and family, they noticed and discussed subtle changes and shifts in landscape patterns, the weather, where animals had passed, which patches of bushes were fruiting and boasted the sweetest berries to gather. They followed those movements, sometimes even just to investigate things that evoked their curiosities. These kinds of mundane observational activities may not usually be characterized as “tracking,” for tracking is mostly associated with the act of following and finding an animal as part of a hunt. However, in the context of these ordinary aspects of tracking, I came to understand tracking as a practice that exceeds its

application for hunting, encompassing more than an exclusive focus on a tracked animal.

Tracking, even in combination with hunting, always involves attending to the various movements of landscapes and how those movements relate to and affect each other. In this way, tracking is a material semiotic practice of noticing, knowing and engaging with landscapes through their continual emergence. As a method of analysis, John Law has summarized material semiotics as an approach, or set of sensibilities, that treats “everything in the social and natural worlds as a continuously generated effect of the webs of relations within which they are located” (Law 2009:141). Tracking does just that: it is a practice that investigates relationalities that cross material and semiotic conceptual distinctions between the social and natural, in matter and meaning, as enacted with and unfolding through landscapes.¹ Tracking is a material semiotic practice. This chapter focuses on the ordinary, everyday ways of noticing and analyzing material relations to elaborate on tracking as a method for understanding landscapes and their doings. This version of tracking then frames the chapters that follow as the dissertation unfolds.

This chapter begins with a vignette that highlights how my interlocutors were always tracking when we walked through Kalahari landscapes. It is a story about how

¹Material-semiotic approaches have emerged largely out of Science and Technology Studies (STS) (see Haraway 1991; Law 2002; Mol 2002; Barad 2007) and have increasingly been taken up in a variety of disciplines, including but not limited to anthropology (see Kohn 2013) and political theory (Bennett 2010). These works, sometimes characterized as post-humanist, have been especially important in opening up social analyses to nonhuman, or more-than-human, actors and worldings by decentering the human and the priority that has been given to language and meaning making. Instead they have argued for greater attention to relational entanglements of matter and meaning.

the encounters that are shaped by tracking pulled us in different directions and informed how we were *with* the landscape without necessarily pursuing a single thing, animal or otherwise. This story resembles the way in which Brody (1980 [2004]: 37) has similarly described Beaver Indian hunting as an activity of continual engagement with the open-endedness possibilities, emerging with and through the hunters' actions —“alive to constant movements”—in ways that undermine the notion of a plan. While tracking is purposive, and usually directed, it is not confined to the predetermination of a particular plan, but rather emerges through specific material encounters.

I then set out to consider theories that traditionally conceptualize tracking as a knowledge practice to describe the elements and range of skills involved in tracking, from simple identification of animal signs to speculation about movements and occurrences in the landscape. This consideration of theories of tracking (as a theory itself) turns into a critical discussion of how tracking is deployed in contemporary Botswana as a tool for wildlife monitoring and conservation. In this context, tracking is treated as an important and useful method for collecting data about the distribution of wildlife in increasingly encroached upon and endangered landscapes. But while this contemporary use of tracking as a tool in environmental science already breaks with an evolutionary reading of tracking as “the original science”(Liebenberg 1990; 2013) it still subscribes the practice of tracking to the evidentiary regime of science, quantifying and measuring tracks and turning them into data sets about wildlife populations in an otherwise largely static landscape.

In a move informed by feminist science studies, I then challenge the privileging of knowing over other doings involved in the making of science. This theoretical move allows me to take tracking into account in a broader sense, which I experienced and was introduced to during my fieldwork. Tracking attends to animals moving across landscapes and *with* landscapes, necessarily involving much more than simply counting tracks: the art of tracking attends to the actual movements of landscapes as more than a mere background. Considering tracking as a material semiotic practice allows me to move this activity further than its use in wildlife monitoring and to also account for the kinds of landscape philosophy that tracking affords. In its attention to landscape movements and how they gather the various material semiotic relations that both make and are landscapes, tracking reveals the stories of those relationalities as the entangled worlds of landscape actors. As such, tracking emerges from this chapter as the simultaneously conceptual and practical emic framework through which I encounter the Kalahari in my fieldwork and in this dissertation. It is a sensibility towards the multiplicity of landscapes temporal and spatial coordinations that are the central focus of this dissertation.

A Day of Tracking

!Nate, Karoha, Njoxlau, and I set out early in the morning to look for honey. This was one of our favored daily activities, and it came to guide many of our walks through the bush, even though we usually didn't find honey. Instead, looking for honey became a kind open-ended noticing of the landscapes that guided our days, leading into other unfolding encounters along the way.

The late summer sun had just risen, and the air was cool and crisp after a light evening rain. As we often did, we wandered out from camp in the direction of the large trees in the distance where bees liked to build their nests, noticing various plants and animal tracks as we walked. We walked in single file with Karoha in front. When we passed a set of *±xam*, or gemsbok (*Oryx gazella*), tracks, Karoha swept his hand in the direction the animal was traveling, shook his hand rapidly in the air to indicate that the track was fresh, from earlier this morning. Then, in a continuous motion, with another hand signal he identified the track as belonging to a gemsbok.

After several stints over a few years with this group of trackers, I understood these gestures immediately. The hand signs for animals and their movements was one of the first things that !Nate taught me when he began teaching me how to identify tracks back in 2009. The identification and movement signals always happen together and usually offer a temporal and directional assessment of the animal's passing. There are hand signs for the species of animal (especially antelope), direction of travel, and age of the track. The hand signs, reflecting the trackers reflexive attention to their own positionalities, are used as a nonverbal method for relaying information quickly and over distance without making noise that could potentially startle animals. It is a relational semiotic practice sensitive to presence of (nonhuman) others.

Now, six years after I began learning to track, I knew to glance at the set of tracks based on the signals offered and could follow Karoha's nonverbal assessment. The imprints of cloven hooves in the sand were very clear and spaced at a regular

walking gait, indicating that while the tracks were fresh they were not so fresh that the gemsbok ran away, startled by our presence.

The edges of the tracks were pock marked from the prior evening's light rain, but the inner impressions of the tracks were smooth, showing that the gemsboks had passed after the rain. The ridges on the outer edges of the imprints were sharp, but bits of dry sand had already begun to crumple into the cavity. And the depths of the impression were still slightly damp. This set of tracks revealed that the gemsbok had passed since the rain, but enough time had passed that the tracks themselves had started to move as small bits of sand and debris had, ever so slightly, begun to collapse into the cloven hollow in the ground.

This all happened quickly, the movements of the animals and our own movements mundanely and temporarily engulfed each other in a present that slipped away. !Nate and Njoxlau glanced at the tracks without breaking pace, shaking their hands to confirm Karoha's assessment that it was a fresh set of tracks. "It was two," !Nate then called out, after he and the other trackers glanced around to look for the animals, which were nowhere in sight. But we were not tracking the animals in pursuit.

As we continued walking, the wind blowing into our faces, Njoxlau broke off from the single-file line to look at some plants, called out to the group, and then stopped briefly to dig up a few roots. !Nate and Karoha also veered off, stopping to gather the same kind of roots. "It is a medicine," Karoha said while digging. "It is for cleaning your blood." Njoxlau's bounty was the largest, while !Nate found only a few

very small roots. He asked Njoxlau for some of his, to which Njoxlau obliged. Separating a small bundle, he handed them over to !Nate, but gripped them tightly. !Nate pulled until Njoxlau released his grip. Medicinal roots, I later learned, cannot just be handed over but must be pulled by the receiver until released by the giver in order to transfer possession. It is a way of sharing without diluting the power of the medicine as it is passed between hands. If these steps are not followed the medicine will have little to no effect on the receiver of the roots. The roots, in other words, are active, and my interlocutors were careful not to stifle their healing potentialities by passing them around carelessly. This careful negotiation came about through an attunement to, and a readiness to be available to, potential offerings and affordances that, however briefly, pulled us in different directions. And in sharing the roots, my interlocutors were attentive to their own potential to affect the medicinal power of the plants. This was another encounter that my tracking interlocutors had made themselves available to, even as we were still in search of honey, through an attunement to particulars in relation to the general potentialities afforded by the emerging landscapes.

Then, without comment, we continued walking and moved back into single file. We stepped between tufts of grass and bushes, not along a well-laid path but in the openings in the bush. When the shrub bush thickened, we weaved through the gaps. We moved along a trail of gaps that facilitated, or afforded, our movements. Passing a small patch of *n//aa*—known as morethlwa in Setswana and brandy bush in English (*Grewia flava*)—!Nate casually pulled a few berries off of a branch and put

them in his mouth. “These ones are old,” he said as we continued walking. If there were fresh berries we likely would have stopped to eat our fill, as we often did on other occasions, but we could come back to this bush at another time when fresh berries had arrived.

We passed a few small steenbok and jackal tracks, moved around a thicket and came across a set of aardvark tracks. These tracks were very fresh. The sand had been recently kicked up by elongated toes, and !Nate quickly spotted the aardvark’s den several meters off. He walked towards the hole dug into the sand and slowly began to re-enact the aardvark’s movement, explaining to me through his re-enactment what the animal had been doing. “He came here. He was looking for ants. He went there, far. When he’s coming back he is looking. Coming to his house, he doesn’t want anyone at his house,” !Nate explained as he moved towards the den, at each sign shimmying his body to imitate its movements, before kneeling down in the sand near the entrance.

“Koko, koko?” !Nate asked. Koko is a commonly used term to ask if someone is there or to see if they are home. !Nate listened, but there was no response. He then noticed the tracks of a hare and started laughing. “He don’t want the hare stealing his food so he has gone now to make another house!” Karoha and Njoxlau laughed, nodding their heads.

“Ey! These hares!” Karoha exclaimed, while !Nate laughed as he dusted himself off before we continued on.

A few minutes later, with the mid-morning sun now beating down on us, we came across another set of gemsbok tracks. This time Karoha shook his hand even more quickly, to signal that the tracks were very, very fresh. Freshly bent grass and markedly clear prints told him so. He, !Nate, and Njoxlau immediately ducked down into a half crouch and looked back at me excitedly, again reflecting a keen self-awareness of the imposition of their own bodies into the sensorial world of an animal and a potential encounter with it. They were affected by the encounter in their bodily dispositions and were careful about how their movements might affect the gemsbok. They each looked around carefully, taking slow steps forward, careful not to step on anything that would make a sound. I was much more clumsy and may have cracked a small twig as I carefully attempted to follow my interlocutors movements. Karoha indicated that he was going to move towards the right, behind a *≠hee* (silver terminalia or *Terminalia sercea*) bush. We gathered behind the bush, crouched. Njoxlau then quietly said to me, “You see?” and pointed into the distance. I had almost missed the two gemsbok naturally camouflaged by their tan fur.

They were standing at high alert, looking in our direction, about fifty meters in front of the bush. The wind was blowing towards us so it was unlikely that they had picked up our scent in the air, but they may have heard us, or rather me. Prior to the hunting ban in 2014, and before the restrictions on hunting in the 1990s–2000s, gemsbok were a favored antelope to hunt amongst my interlocutors and others in the Kalahari, to the extent that Jiro Tanaka suggested that bow hunting in 1960s central Kalahari implicitly meant gemsbok hunting (Tanaka 1996). My interlocutors,

especially !Nate and Karoha, were always very excited when they saw gemsbok, perhaps more so than any other antelope, except for the occasional large eland we encountered. They missed seeing their landscape companions more often as much as they missed the taste of their salty meat. “When I see them,” Njoxlau once told me, “I feel alive. Like when I was young.”

After a few minutes of watching, we slowly stood up, and the two antelope ran off. !Nate, Njoxlau, and Karoha then spoke to each other briefly before telling me that those were the same two gemsbok whose tracks we had seen earlier in the morning. Though they did not say so this time, the three trackers had shown me before that they can identify the specific tracks of individual animals and attribute tracks that they later encounter to the same individual. These attributes might include a combination of marks and patterns in the track itself, such as a chip in the hoof together with its size, and even aspects of the animal’s gait. But, this is often combined with the fact that the set of tracks were encountered earlier and an assessment was made about where the animals might have traveled in the intervening time. Karoha explained that when we saw the first set of tracks he thought we might catch up to the gemsbok if we continued on in the direction we were headed. We did not follow the gemsbok trail, but instead were mobilized by Karoha’s curiosity that emerged out of his attunement to the patterning of tracks as we carried on in a direction that Karoha thought might intersect with the gemsbok. He knew that there was a valley in the direction that they were travelling and, judging the age of the tracks, he guessed that they had gone to that valley in the early morning to lick for

minerals—minerals that make their meat taste salty—before retreating back into the thicker bush for shade once the hot sun began to rise overhead. He was attuned to a multiplicity of temporal and spatial coordinations.

Karoha made sure that we walked into the wind—so that the wind was blowing into our faces—to ensure that animals in front of us would not pick up our scent too quickly. “If you want to see something, the wind must always be coming to you,” he told me. “If the wind is going in front of you, you will see nothing.” An exception to this rule is if you are looking for bees to follow when searching for honey. In that case, you want bees to find you because they can guide you to their nests. When we saw a bee, we would then sometimes walk with the wind, in the direction it blew, in hopes of finding other bees that we could follow. On this day, however, other encounters had already shifted us away from the, or undermined a plan to, search for honey.

In the end, while we did briefly look around for honey, we didn’t find many of the large trees with holes in them where bees could make their hives. We returned to the camp having seen plenty and done enough for the day. Though we didn’t find what we were actually in pursuit of, honey, we encountered many things that pulled us in different directions as we tracked the landscapes.

Tracking After Hunting

The vignette that opens this chapter describes a day of tracking during my field research in the Kalahari with expert trackers who once hunted for subsistence but who are no longer allowed to hunt. It does not describe tracking as is most

commonly understood: we were not pursuing a specific animal to hunt. Instead, it exemplifies how I came to understand tracking as an ongoing practice of noticing in my experience of moving through Kalahari landscapes with my interlocutors. It was not about overcoming prey but rather about being ready and available for encounters with nonhuman *others* in a shared environment made possible by an attention to material signs and traces revealed by the landscape. It is in this way that I suggest, even in the case of hunting, landscapes themselves *are the relation* (cf. Strathern 1995; Strathern 2005) between tracker and animal and environment rather than the site or place in which the relation occurs.

When I first started to learn about tracking in the Kalahari in 2009 during my Master's research, hunting was already, for the most part, no longer legal as a subsistence practice for people living in Botswana. Some people did still track for hunting as hired trackers in commercial safari hunting operations, something !Nate and Karoha had done in the 1990s and early 2000s. Safari trophy-hunting was still legal in 2009, but all forms of hunting were entirely banned in 2014 (a year prior to the start of my dissertation research) except on privately owned "game ranches" as Botswana attempted to solidify its international perception as being at the forefront of conservation efforts. Nonetheless, some people in the Kalahari do still sometimes hunt illicitly for their own consumption, a practice now deemed poaching² even if for

²I follow Clapperton Mavhunga's (Mavhunga 2014:6) lead in that I use the term "poaching" with caution because it emerges out of a deeply problematic and colonial discourse. As Mavhunga explains, "to poach" has its roots in the English word "bagged" which is famously and romantically associated with Robin Hood, but which was increasingly criminalized in 19th century England with the Night Poaching and Game Acts that was part of the processes of enclosing the commons and restricting

subsistence. Today then, tracking associated with hunting is criminalized, a move that has been widely criticized by indigenous rights activists while simultaneously applauded by many in international wildlife conservation circles, even though most conservation researchers I met in Botswana were skeptical about the impact of hunting on wildlife population declines in the country.³

Yet, however violent this detachment may be, it is in part because of the ban that I came to see tracking as so much more than just a tool, or skilled practice, for relating to animals through the hunt. Even if studies of how hunters relate to the subjectivities of nonhuman animal others have yielded rich insights into more than human relationalities (Willerslev 2007), the framework to articulate these relations has remained strongly hinged on tracking as part of the hunt. But, as already mentioned, my interlocutors continued to track in their daily practice even though they were not hunting. Because I was not tempted by the excitement of the hunt as an event of overcoming and killing prey, I could see tracking as so much more. As a practice that taught me about animals freed from the narrative of the hunt, tracking drew me into life's variety in the liveliness of landscapes. It is in the context of the

hunting for elites. The term "game" implied hunting to be a sport for amusement, which I use with equal caution. When the English colonizers brought this ideology of hunting to southern Africa, African hunters were quickly framed as criminals. As poaching and game are of "the colonizer's language," I instead use the terms hunting and animals, and sometimes wildlife, unless poaching or game are specifically mentioned by interlocutors or within the discourses of particular legal frames. I do this in an attempt to keep up Mavhunga's "decolonizing move" that is meant to "restore the spiritualized and humanized values of the forest and its animals according to African values," (7), albeit differently situated within Africa and with attention to specificities of my interlocutors' practices rather than a generalized set of African values.

³For a scathing critique of the effects the hunting ban has had on village livelihoods see Onishi 2015. Conversely, for a rebuke of this position from conservationists see Cornell 2015.

hunting ban that it became apparent to me that tracking is a generative way of understanding and engaging with landscapes that reaches beyond hunting.

The trackers I first met—including !Nate, Njoxlau, and Karoha—were tracking for wildlife conservation researchers gathering data about the distribution and population densities of wildlife in the Kalahari. It is perhaps not surprising then that because I never learned about tracking through hunting, I came to understand it as practice that far exceeds this application. Perhaps the hunting narrative, particularly within the anthropological frame of “Man the Hunter,” has partially obscured tracking as a broader “arts of noticing” (Tsing 2015:23–24). Kalahari ethnographies were critical in challenging this narrative and its embedded gendered assumptions. Anthropologists like Richard Lee (1973; Lee and DeVore 1969), Jiro Tanaka (1980), and George Silberbauer (1980), amongst others, showed that gathering—carried out mostly by women but also some men—rather than hunting was the primary source of subsistence in the Kalahari, thereby refuting the assumption that hunter-gatherers’ survival was dependent on hunting men. Later, others showed that women also hunt, assist men in hunting, and are also expert trackers (Biesele and Barclay. 2001. Liebenberg 1990). Nevertheless, attention to the kind of skills involved in tracking has mostly been limited to understandings of tracking as related to hunting. Scholars of tracking have considered how the practice involves a keen sense of interpreting landscape ecologies and conditions emphasizing the *skill* over the *kill*, but ultimately tracking always ends up being discussed in relation to the hunt, culminating in the kill.

Though its association with hunting is undeniable, learning about tracking outside of this association reveals how, as a practice of noticing, tracking involves much more than just an attunement to, and a relational becoming-with, animals. I take this, then, as an opportunity to investigate what tracking can tell us about landscapes. As I argue in this chapter, tracking is a way of engaging with emergent landscapes and their contingent histories and relations, of which animals are some but not the only relational constituents attended to.

To begin with, consider the first part of the vignette above as an example of how, even when attending to a particular set of tracks, the landscape is engaged with through a few simple gestures. Hand signaling reflects processes central to tracking. First and foremost, hand signals reveal a self-reflexive relation between tracker and animal in that the silent gestures meant not to startle a potentially present animal are an acknowledgement of the trackers' own presence in these shared landscapes. But the hand signals are much more. They are material gestures that indicate the move from a general knowledge of a species to the particular movements of an individual (or group) in the landscape, and the ways in which those particularities are situated in the landscape. Karoha attended to the gemsbok through the materiality of the landscape, precisely because the animal was not immediately present. Tracking is quite literally the practice of doing figure-ground reversals (Strathern 2002; 2005)—the practice of inversion in which the ground comes to stand for the figure in a mutually constitutive relation—through these material traces of a nonpresent animal in the ground. The identification of a species type—in this case, gemsbok—is located

in the shape, or pattern, of a track or set of tracks with reference to past encounters with other sets of tracks with similar shapes and patterns associated with gemsboks. Once identified, the general quickly moves into the particulars that have emerged from the specific movements and doings of a particular animal: the freshness and direction of the tracks, and even the specific characteristics of an individual antelope's hoof print. The animal figure comes together, for the tracker, through the tracks in the ground. In indicating the temporality of the track and direction of travel, these particulars in turn are situated in relation to the landscape as an emergent space with multiple potentialities: of all the possible places the animal could have gone, where might it be and what might it be doing? Those general potentialities are then situated by the particularities of specific landscapes and what they may afford, say a known watering hole where the animal might drink or a mineral deposit to lick that is known to be in the vicinity of the direction of travel, time of day, and weather conditions.

In this way, tracking involves the continuous and fluid movement between a variety of potentialities and emergent particulars that are co-constitutive of each other and the landscape. Put another way, both in terms of material practice and metaphor, tracking involves a constant movement back and forth between grounds and horizons that emerge together in their situatedness relative to one another. Tracking then, I argue, is a way of engaging with plants, soils, other environmental movements, and landscapes as gatherings of relations, always in motion, that hang together with

certain potentialities and affordances through tracks and traces. These are the emergent histories of landscapes.

To show how this analytic emerged from my fieldwork and shaped my research, I first need to elaborate how tracking has been understood with regard to hunting, how it has been theorized in relation to scientific knowledge, and how the practice has been applied as a tool for conservation science after hunting.

Tracking: From Hunting to Science

My initial interest in tracking investigated it as a knowledge practice used and applied within the frame of conservation research (Du Plessis 2010). In this sense, I came to tracking through my concern with the relationship between diverse knowledge practices, particularly the ways in which western sciences can or do engage with indigenous knowledge practices like tracking. At the time, these interests centered on what was framed as the Indigenous Knowledge (IK)-Science debate, in particular in the post-colonial, post-apartheid setting of southern Africa. There, the authority of science, which had somehow come victorious out of the “science wars,” when it was challenged at all, was mostly questioned from within for privileging its own claims about reality, rooted in an European, Enlightenment, and modernist epistemological tradition (Latour 1993a). The privileging of science tended to either delegitimize the claims to reality of “other” epistemologies, or, conversely, legitimize indigenous knowledges by appropriating certain aspects into the frame of science in the contemporary setting (Green 2008; 2012; 2013). This was evident, for instance, in the case of traditional medicine and healing practices, in which a common reaction to

the IK-Science debate has been to test the efficacy of specific practices through the same evidentiary regimes of western science. This move was criticized by anthropologists as failing to take broader cultural context seriously, forcing the western illusion of a “culture of no culture” (Traweek 1988) onto other epistemologies, thereby committing imperialist violence all over again.

Indigenous knowledges, scholars argued, should be understood on their own terms rather than judged exclusively as universal fact or belief as assessed by an Enlightenment epistemology (Watson-Veran and Turnbull 1994; Agrawal 1995; Turnbull 1997; Verran 2001; Nadasdy 2005). While conceptually sound, these analyses rarely managed to shift the debate, as the strategy of relativizing knowledge in terms of the practices of science found weaker ground in the wake of the science wars. Furthermore, these studies risked reinforcing an implicit assumption about the purity of knowledge traditions or systems, whether framed as science, indigenous, traditional, or local.

Tracking presented an interesting case to examine these issues. The skill of trackers in the Kalahari had almost reached mythological status for many in the West as an indigenous practice in tune with nature, performed by a kind of “ecologically noble indigene” (Nadasdy 2005). But this too created an impossible situation in which the recognition of the knowledge practices was dependent on the same “politics of recognition” that, historically, was at the root of effecting the marginalization and dehumanization of these populations (Povinelli 2002). The stereotype of the Bushman tracker was even violently capitalized on by “counter-

insurgent” militaries of the racist regimes from apartheid South Africa and Southwest Africa (now Namibia) as trackers were deployed to track down freedom fighters during the decolonial era. Widlock notes that:

“At that time, the depiction of Bushmen as particularly skilled superhuman, or rather 'superbeastly', beings was part of the psychological warfare against SWAPO [the independence movement in Namibia]. Fabulous orientation and tracking skills were attributed to the Bushmen, not as individuals but as an ethnic group” (Widlok 1997:317–318).

He continues:

Gordon (1992) has presented archival records that show a continuity between the way colonial administrators exploited the skills of 'tamed' Bushmen in tracking down 'wild' Bushmen and recent attempts by the South African army to maintain the myth of the animality of the Bushmen. Although their skill was valued, the ideology of 'instinctive' wayfinding in the bush has contributed to an overall negative ethnic stereotype” (ibid).

In a comment to Megan Biesele and Steve Barcalay, applauding their article about women trackers in the Kalahari, Edwin Wilmsen noted the importance of demystifying San knowledge like tracking to “emphasize its practical application to the conditions under which the San live” (Biesele and Barclay 2001:80). Louis Liebenberg (1990), a scholar of tracking in southern Africa, also challenged the essentialization of indigenous knowledge by focusing on the scientific merits of tracking. In his theorization, tracking is the “original science”(1990) in human cognitive evolutionary terms such that even the notion of modern science is deeply rooted in the practice of tracking. As a science itself, Liebenberg argues, tracking can and should be incorporated into conservation and wildlife research.

My first research about tracking followed a project that utilized a GPS data-gathering application developed by Liebenberg, called “Cybertracker,” for use by non-literate trackers. With this tool, trackers could walk transects along which they would enter species location data about tracks they encountered in a wildlife survey

in the Western Kalahari. But ultimately, in my experience working with trackers, even in these conservation focused projects, I understood that while tracking as a practice of knowing and relating to animals that could operate as a tool in scientific research through the formation of partial alliances with conservationists, there was a much more excessive aspect of tracking that was not captured in these approaches. In the thesis entitled “Tracking Knowledge: Science, Technology, and Tracking” (2010) I discuss the broader implications of Cybertracker, the problematic politics of authorizing knowledges in terms of science, together with a critique of the processes by which technologies are thought to mediate knowledges, all the while compartmentalizing aspects as abstracted data points. One line of argumentation the thesis takes is that trackers still engage with Cybertracker through tracking as a relational practice, explicitly expressing that the technology itself owes its existence to their knowledges, or knowledge practices.

Liebenberg’s analysis of tracking and my experience following this conservation research project were my entry points for thinking about tracking landscapes. Still, tracking, first and foremost, is a practice that needs to be understood in its specificities. As a directed and particular form of noticing, relating, and knowing, the broader and mundane aspects of tracking can be elaborated as simultaneously enacting a theory of landscapes, doing landscapes, and landscape emergence.

Next, I elaborate on how tracking is understood as a specific directed practice with pursuit and hunting. From these specifics, I will then move out to show how I

came to understand tracking as part of a broader practice of engaging with landscapes in motion.

What Is Tracking?

To track, as a verb, as it is most commonly understood, is to follow a trail or the movements of something, usually in pursuit or to mark its course (OED online). While I argue that tracking is much more than this, what is entailed in this formulation is important. Here, tracking is the practice of following or trailing an animal through the interpretation of the tracks in the ground together with other signs that the animal makes as it moves through the landscape. While tracks mostly come in the form of footprints, the signs and clues an animal makes along the way encompass much more.

Signs can include anything from scat, territorial markings, to effects on vegetation – from a bent piece of grass or a broken twig as a sign of movement to grazing or browsing sites – and other signs of eating and so on. Cumulatively, these signs are referred to as spoor⁴.

Other clues are brought together that include a variety of environmental phenomena, landscape terrains, weather patterns, wind direction and more that contextualize the signs to assess or predict the likely location or direction of movement of the animal in the broader context of the landscape. This requires, also, a

⁴Originating from the Dutch word spoor, meaning track (train tracks are called spoor in Dutch), spoor has come to mean much more. The Afrikaans word for tracker is “spoor snyer” which translated directly to track cutter.

working knowledge of animal behavior and preference of habitat, eating habits, and so on, which is garnered through histories of interaction in one's own experience and as taught by others. Knowledge of animal behavior is largely generalized to the species level and even sex within a species, though an expert tracker may distinguish between individuals from tracks and signs whose behavior s/he may come to be familiar with. All of this is knowledge gathered over time as one becomes familiar with landscapes and their inhabitants, and may also be passed along from one person to another, though mostly one becomes familiar by acquiring experience.

As with any practice, there are varying levels of skill involved in tracking and different requirements in employing those skills, depending on the circumstances. Some trackers develop highly refined skills to the extent that only the minutest signs need to be available in order to speculate about where a particular creature is and what they may be doing.

The most basic form of tracking is the identification of footprints, or tracks. This requires a very basic knowledge of the shapes and patterns of particular species' footprints, which overtime become immediately legible. Second, from a familiarity with those tracks, trackers may arrive at a level of skill in which only partial prints are required for identification. Third, as familiarity grows, and knowledge of animal behavior increases, a tracker may interpret other spoor in order to identify the species if the partial print is not enough for diagnosis. Identification of individual spoor allows trackers to become aware of what species are present, or have been present, in the surrounding areas. This is particularly important with regard to safety, for

knowing what creatures are around helps to prevent unwanted and dangerous encounters, especially with predators but also with large antelope, snakes, porcupines, badgers and other animals that can cause harm if irritated. In this way, a tracker may be more concerned with avoidance than encounter.

Trailing and pursuit is the directed application of tracking through which an individual animal is located, and therefore differentiated from others and other landscape doings. If the tracks are fresh and clearly visible, this can be a fairly straightforward task. However, if the intent is to catch up with an animal, trailing might require digressing away from the trail in order to cut it off at another point further along the route. Two things are of primary importance in these cases. The first is the temporal dimension. Assessing the age of a track and trail is critical to trailing because how a tracker can speculate where an animal is, is largely dependent on when the animal passed the current location. If the trail is extremely fresh the animal might be directly in front of you, behind a bush, and so on. Together with this temporal assessment, spatial orientation and knowledge of the terrain are the other components crucial to trailing.

Tracking Skill

Liebenberg (1990) describes three levels of tracking skill (Simple, Systematic, and Speculative) towards establishing a standards-based protocol for tracking, which I more fully examine at length below. First, I address the important consequences of Liebenberg's theorization.

Liebenberg's identification of these levels serves the dual purpose of developing a theory of tracking as "The Origin of Science" (or scientific thinking) and establishing a protocol by which a standards-based assessment of tracking skill could be developed. The resulting assessment was used in the conservation project I followed during my Masters research as a means to ensure the reliability of the data collected by the trackers and is generally meant to provide certification for trackers as a means for job creation, and it is also now used as part of some assessments for attaining safari guide licenses. Liebenberg conducted his field research in the Kalahari about tracking in the 1980s, 1990s, and continues to return for research trips when the opportunity allows. In fact, Liebenberg and I have conducted our research in roughly the same area, share several key interlocutors, and have even spent time together walking the landscapes with these trackers. Because he has worked for an extended period with trackers in the Kalahari, Liebenberg has been able to study tracking in a way I never could: he has been present while hunting was legal, participated in hunts, and seen the push towards wildlife conservation and the criminalization of hunting. Indeed, along with !Nate, Karoha and Njoxlau, Liebenberg has been one of my primary tracking teachers, and, though our philosophical and theoretical approaches diverge at times, I still defer to his expertise in the practical aspects of tracking.

Liebenberg's is a political project. His establishment of a protocol for tracking was explicitly meant to intervene in a politics of knowledge in which non-western, non-institutionalized knowledges have been marginalized from mainstream science.

In this sense, his politics of knowledge takes the form of a grid in order to render tracking legible to dominant scientific discourse and also to make it recognizable specifically in wildlife scientific conservation practices, where it could be used for job creation. Trackers can work in contexts where they are no longer allowed to hunt, thus preserving their endangered knowledge.

While much of Liebenberg's theorization about tracking is specific to hunting, he has also sought to find ways of applying tracking beyond hunting as a skilled practice that can be used for wildlife monitoring. As much as he argues that it may be the "original science," he has advocated for tracking as a tool for scientific research in contemporary contexts. With regard to the origins of science, Liebenberg writes:

The art of tracking, as practiced by contemporary trackers in the Kalahari, is a science that requires fundamentally the same intellectual abilities as modern physics and mathematics. It may well have been the first creative science practiced by the earliest members of anatomically modern *Homo sapiens* who had modern intellects. Natural selection for an ability to interpret tracks and signs may have played a significant role in the evolution of the scientific intellect (Liebenberg 1990:93).

For Liebenberg, tracking skill ranges from basic identification of tracks to complex, speculative predictions. As the most advanced form, he argues that speculative tracking involves fundamentally the same reasoning processes for developing and testing hypotheses as in "modern" science. From a cognitive evolutionary standpoint, he suggests that hominids and early humans may have first begun to develop these mental processes while tracking down prey as hunter-gatherers. Rather than engage his evolutionary point, however, I focus on Liebenberg's attention to the practices involved in tracking and the insights he develops about how humans come to know and relate to animals through tracking.

Liebenberg's theorization of tracking as a practice has created generative spaces for reconsidering how humans and their environments are necessarily entangled. His theory was also important for the application of tracking as a tool for scientific research. Perhaps most importantly, he explicates in great detail a method for humans to attune themselves to nonhuman worlds that is both empirically legible to the sciences *and* engages with local (or vernacular) ontologies.

Liebenberg's three levels of tracking deserve further explication before proceeding. These distinctions are useful because they enable the description and standardization of tracking as part of his particular political project. That being said, the actual practice of tracking is much more fluid than the categories imply.

The most basic form of tracking, which he terms "simple tracking," involves the identification of clear tracks in the substrate. Simple tracking may even include trailing if the path of tracks is clearly visible. At this level, Liebenberg argues, very little skill is required beyond being able to associate particular shapes of tracks with corresponding animals. In essence, this skill is chalked up to simple memorization that can be practiced in ideal conditions. Such conditions are those where the substrate is soft and open, in sand or snow for instance, where the tracks are not obscured by vegetation or other matter and where the substrate has not been overly trampled by other animals, making it difficult to associate the specific track with its animal (Liebenberg. 1990: 29).

Nonetheless, the designation of "simple" seems to betray the difficulty involved in such identification, at least in my own experience, though it is part and

parcel of the ongoing attunement to the landscape. Depending on one's exposure to the range and variety of tracks, mistakes are easy to make even at this most basic level. For instance, though it is quite easy to tell the difference between the track of a jackal and an aardwolf, jackal tracks are so common in the Kalahari that one might think an aardwolf track is that of a jackal at first. There are other factors too that can be misleading or confusing. A young lion track might appear to be the size of leopard track, which could also cause confusion. Mastery of simple tracking, to build on Liebenberg's description, requires a keen sense of the variety of possible phenomena and ability to differentiate between them, even when a rare track is least likely. A track must be engaged within its context through its relationship to the landscape. Still, this is "simple" in that it mostly relies on memorized familiarity and knowledge of the particular shapes and patterns of tracks.

The more involved aspect of simple tracking, per Liebenberg's own admission, may bleed in to the next level, systematic tracking: "One cannot make a clear distinction between simple and systematic tracking. The difference lies in the degree of skill, and the skill required for systematic tracking depends on how difficult tracking conditions are" (1990: 29). This more rigorous, directed, practice of tracking involves the "systematic gathering of signs" until a detailed indication of what an animal was doing and where it was going is built up (ibid). Identification of a track and its association with a particular species may be built up by examining a number of tracks to build a composite of the animal and/or comparison to other tracks. For instance, the initially inferred aardwolf track mentioned above might then be

corrected once the pattern of the trail is more closely examined or those tracks might be compared to the next set of jackal tracks and the error recognized. Systematic tracking, however, takes into consideration all variety of signs in the landscape, not just the track, and together they are used to “interpret” what an animal was doing and where it was going. Rather than interpretation in the sense of meaning making, this is perhaps better explained as a material semiotic engagement with animal-landscape relations.

It is here, building on Liebenberg’s theory again, that tracking can be reframed as a material-semiotic phenomenology that generates a speculative empiricism, rather than a cognitive process of interpreting an outside world: the way the sand and grass move or have been moved present particular potentialities about where an animal is and what it might be doing. The animal is available and relatable to the tracker as a present nonpresence through the gathering of the traces of its own movements as they materialize in landscapes. In other words, the relation between tracker and animal is the landscape. Landscapes are not simply the containers of these relations; they *are* the relations.

The animal, as a landscape actor, is engaged with more closely in systematic tracking, though perhaps at greater distance. That is not to say an animal is not an actor in simple tracking, just that the consideration of signs extends beyond identification of the track itself and into the landscape. In systematic tracking, the gathering of multiple signs together are used to assess what an animal is *doing in a landscape* by how the landscape is *affected* by its doings. That is to say, the animal is

differentiated from the landscape and other actors through the connections it has with the landscape and the traces it makes as part of the assemblages with which landscapes emerge.

Systematic tracking is most practiced in conditions where the actual tracks, or footprints, are not easy to see and/or follow. An animal's doings can be reconstructed through the gathering of spoor and other signs. Key to tracking down an animal through such a reconstruction is establishing the direction of travel, the temporality (or freshness) of the spoor, the speed of travel, and, of course, recognizing the spoor of specific animals. Liebenberg argues that in this approach to tracking, "emphasis is primarily of gathering empirical evidence" to reconstruct an animal's activities (1990: 106).⁵ It is in this way that I suggest, through a slight rearticulation of Liebenberg's argument, that a key question in tracking, as with other speculative knowledge practices, is: how can one know something that is not present or immediately self-evident? How can one know an animal and what it is doing when it is not in front of you? The answer is found in the traces that the animal makes in the world, with the world, and in response to the world. Tracking actually requires that the thing being

⁵Liebenberg argues that systematic tracking, like simple tracking, is based primarily on "inductive-deductive" reasoning (1990: 106). "In the logic of science," he writes, "one may distinguish between inductive-deductive and hypothetico-deductive reasoning. Inductive-deductive reasoning involves a process in which the premises are obtained by generalizing observed particulars. These are then assumed to be representative of universal principles. This initial process of induction starts with the assumption that statements about a number of individual animals, for example, can lead to generalizations a species of which they are members. Such generalizations are then used as premises for the deduction of statements about particular observations" (1990: 153-4).

tracked is not present. By virtue of this non-presence, it is not the animal but the landscape that is present and tracked.

Liebenberg argues that “projection” and “imagination” are aspects of “speculative tracking,” that follow this gathering of empirical evidence in the landscape which he then uses to support his hypothesis-making argument upon which his case for tracking being the original science is built. At the systematic level, if we are to use these categories, trackers also take on, or enact, a kind of empathetic, mimetic approach to reconstructing what an animal was doing and where it might have been going. Attunement to the multitude of spoor becomes possible not just by reading inscriptions in the landscape already there, pulling together the clues, but considering where and when to look for those clues through an empathetic relationship to the animals’ behavior, how a particular landscape patch is assembled, and what might have been happening in the landscape at the time of the passing. The primary difference between systematic and speculative tracking, Liebenberg writes, is that the former does not predict anything (it is inductive) while the latter does (it is hypothetical) (1990: 154).

For Liebenberg, speculative tracking is the most advanced form of tracking and the approach that he most closely associates with science and the scientific method because it does something more than trailing: it is predictive, and its predictions can be tested. It involves moving away from the trail based on speculation about where in the landscape an animal is located at present and where it might be encountered in the future. Liebenberg argues that trackers gather the available

empirical evidence in order to formulate a hypothesis to be tested. The hypothesis about an animal's location is formulated through an assessment of spoor, with the tracks, and while still following the course of a trail. That hypothesis is tested by moving away from the spoor and trail in anticipation of meeting the animal by intersecting it along its path.

While this description of tracking is useful in thinking about the specificities of tracking, in Liebenberg's work, there is a tension between scientific knowledge and belief. He devotes a chapter to what he calls "Non-Scientific Aspects of Hunting," describing the aspects that sit awkwardly next to what he considers scientific claims to the nature of reality. He includes peripheral perception, intuitions, and "non-rational beliefs" as non-scientific aspects. In effect, he assigns these aspects to the realm of belief and myth, in direct opposition to his formulation of science as rational, objective knowledge, yet he notices how they are still engaged with empirically to speculate about potentialities. This tension is perhaps a consequence of and a major violence inherent in approaches that attempt to authorize knowledge practices in terms of a rational science. Much of the embodied practice of tracking is improvisational and does not adhere to a predetermined plan, much in the way Hugh Brody (1981) has described hunting among Beaver Indians in Canada. Brody writes about the mistake of trying to list and separate the various components that influence the movements and decisions of hunters:

To disconnect the variables, to compartmentalize the thinking, is to fail to acknowledge its sophistication and completeness. [The hunter] considers variables of a composite, in parallel, and with the help of a blending of the metaphysical and the obviously pragmatic. To make a good, wise, sensible hunting choice is to accept the interconnection of all possible factors, and avoids the mistake of seeking rationally to focus on any one consideration that is held

primary. What is more, the decision is taken in the doing: there is no step or pause between theory and practice...The hunter moves in a chosen direction; but, highly sensitive to so many shifting considerations, he is always ready to change his directions (Brody 1981b:37).

Metaphysical and “non-rational” aspects cannot simply be removed because they do not fit the equation. These, like the material signs, are constitutive of the gatherings of spoor in the process of tracking. Nonetheless, though Liebenberg separates them from his argument, he does not discount the importance of these aspects. They are part of the constellation of gathering landscape spoor that work together with what he considers empirical evidence. This begs the question of what counts as the evidentiary and what kinds of purifications must occur in such an approach to knowledge translation. Liebenberg’s is a project that serves a specific intervention, which is largely to render tracking legible to the sciences, in a frame of science that limits what counts as proof. Nonetheless, in practice, as I have learned from conversations and experience with Liebenberg in the Kalahari, these “nonscientific” aspects are deeply informative to him and his understanding of tracking. As such, tracking is a practice that can be applied as a tool in scientific research in which partial alliances can be formed for specific projects. However, defining tracking exclusively as science becomes politically problematic in that it requires dismissing certain aspects as non-rational, belief, or myth against others that transcend this cultural dimension to make what Sharon Traweek calls the “culture of no culture” (1988). That is, that definitional work requires subsuming tracking and local knowledges into an abstracted epistemological space in which they become detached from the very processes with which they emerge.

The Political Situatedness of Tracking

!Nate, Njoxlau, and Karoha were my first tracking teachers but, as I have mentioned, I did not meet them as hunters living an idyllic, peaceful, and egalitarian life. By law, they were not allowed to hunt, even for subsistence. Instead, I met them when they worked as part-time laborers for a conservation research project that utilized their skill as trackers to collect data, which at the time was their only formal employment, encompassing only three-months in a one-year period. They were among only a few trackers, all men, who had found employment, even if only part-time. Such jobs are few and far between. For most parts of the year, they reside in their settlements with little more than the odd job here and there. They often rely primarily on “drought relief” programs for food rations distributed either to them or family members by the state and occasional work for the government clearing brush on the sides of roads and the like. While living in these settlements, even gathering activities are limited, both materially by the denuded landscapes of the “sacrifice zones” around settlements and politically by the assumption of state authorities that people wandering the bush may be “poaching” animals.

Still, my interlocutors did not stop tracking in their daily practices because hunting was not allowed. On the contrary, it is perhaps because of the hunting ban that it became easier for me, as an ethnographer, to see that tracking is about so much more than hunting and bilateral human-animal relations. Furthermore, the hunting ban was not the only change that transformed the lives of my interlocutors: communities have become increasingly sedentarized, people have been displaced from areas they

once lived in, cattle have proliferated, wildlife populations have declined, and much more.

Tracking in the Kalahari must be understood as situated, politically and historically. Rather than a recent adaptation to historical changes, tracking must instead be situated within a broader context of becoming-with landscapes with regard to these political, environmental, and socioeconomic changes. We also need to engage with the kinds of movements enacted by capitalist logics, the movement of capital itself, and their effects or role in reordering and governing space that produce their own tracks and traces as part of these changes: these movements can be and are also tracked. My interlocutors would still track plants, truffles, animals, weather, landscape in their daily excursions out of their settlements, but they also tracked histories done by the landscapes, cut through the landscapes, along with the traces of particular political projects.

Tracking must be understood as a practice, however mundane or spectacular, that is enacted alongside and within the frames of a variety of contingent histories; histories of colonialism, dispossession, capitalism, but also the contingent histories of the landscapes and their different species. As such, what tracking is and how it is applied as a skilled practice is multiple, with the potential to shift from encounter to encounter. More than just a context for history, tracks and traces are landscapes doing emergent and contingent histories. Tracking then is also a way of seeing the sedimented traces of politics in landscapes, traces which—much like the gemsbok

track, the berry bush, and the aardvark den—can be attended to more or less and offer multiple, differing potentialities, affordances, or even erasures.

Tracking is situated within a broader socio-political history of San peoples, Botswana, and southern Africa. What my tracking teachers taught me, or rather that they even taught me in the first place, can only be understood in this context of political and economic marginalization, dispossession, oppression, and objectification not just by the state and political circumstance, but also in anthropology and the essentialist representations of the “Bushmen” that the discipline has helped to perpetuate. These histories are processes that manifest in declines of wildlife populations and ecological disturbances that established the context in which wildlife monitoring and conservation, another form of tracking, have been deemed necessary in this part of the Kalahari.

Yet, for my tracking teachers, all this was more than mere context. These are histories that not only have been experienced but also can be tracked through landscapes, which are very much part of the story of their relations to animals, plants, and the contingency of their landscapes. They did not teach me about animals and plants in a vacuum. Our days were spent talking about the many different ways that their engagement with landscapes has changed, or rather has been thwarted, for a large number of reasons: they are no longer allowed to walk out of settlements and into the bush for prolonged periods of time without being suspected of poaching, even if going for gathering; they are no longer able to go certain places because landscapes were territorialized, privatized, fenced, and held still; and wildlife no longer migrate

in as large numbers because of species die outs from commercial hunting, veterinary fences, and spread of cattle. These are the kinds of practices and movements that come to be disallowed or overshadowed by the political logics that promote unending infrastructure growth in a vision of continuing “progress.”

Furthermore, my interlocutors expressed their frustrations about the disinterest that younger generations—lured by the business of settlements and towns, and discouraged by the criminalization of hunting and the lack of jobs as trackers— have shown towards learning to track. This disinterest is a reason why !Nate asked before his passing that we ensure his son learns to track. Finding employment as trackers with research projects is slowly creating some jobs, which is beginning to generate some renewed interest in younger generations. These were all things they talked about and also tracked as material presences of histories and landscapes. While they reflect approaches to the environment and people that attempt to hold movements still, to sedentarize, they too made tracks and traces, also full of movement, though differently. They also influence the kinds of movements afforded to and by landscapes. Where large herds of antelope once migrated, in their place now we might hear the rattle of a cattle truck, or a pick-up truck with wayward travellers, making its way along a gravel road. A world connected by points in an attempt to hold landscapes still, is still full of movement, points that only connect along roads, trade routes, and points of extraction.

On the day described in the opening vignette, we did not venture out from the homes of my informants. They all live in settlements where wildlife in now largely

depleted, as the number of people living in settlements has grown, and with them the populations of livestock. In the language of rangeland ecology, and as acknowledged in territorial governance of wildlife management, these sedentary settlements are considered “sacrifice zones” (discussed further in Chapter 3) devoid of significant wildlife, denuded of grass by livestock, encroached upon by shrub bush, and depleted of firewood. But they too are full of movement. They are the tracks that emerge out of the concentrated movements of many dwellers in the amplification of place. The concentrated movements of people and their livestock in their “sedentary” settlements come at the expense of all other life, admittedly framed as acceptable sacrifice zones. The term sedentary is misleading. It does not stop or prevent movement, rather it concentrates movement, and the proliferation of these zones too can be tracked.

If one were to think about how to track a sacrifice zone or how to track the proliferation of sacrifice zones, like the tracks of feet or hooves, it would be good to start with the fact that they resemble tracks, are both full of movement themselves, and that they indicate movement. However, we might do better to think of settlements and sacrifice zone more like the moving animal than the actual track, making and leaving tracks and trails in its own movement while simultaneously emerging with that movement. These settlements draw in traffic from trails that lead into their concentration points, their centers, as part of their sedentary mobilities.



Figure 3 Google Earth image of the settlement Bere, Ghanzi

To track wildlife with my interlocutors, we moved out from the sacrifice zones along trails cutting through the bush. We drove away from the settlement along a sand track cutting deep into Kalahari sand. This was one path connecting several others trails and roads, and ultimately settlements. About 13 kilometers outside of Bere, we turned off down another barely visible cutline. Cutlines are scars cut into the bush, usually to demarcate boundaries, create fire breaks, or made along particular latitudes and longitudes during exploration surveys. As marks of histories of trade, mining, and governing landscapes, they often become well-travelled roads, exceeding their initial purposes, facilitating movements to and within settlements. Sometimes,

cutlines are also simply left as scars that hang through the bush, still slightly visible in over-growth patterns of vegetation.

We turned down onto of these old, over-grown cutlines, a trail left by diamond and mineral prospectors in the 1980s. Had we continued on the track instead of turning to the prospecting scar, we would have run into another, much larger cutline that is now heavily trafficked as a road between the Trans-Kalahari Highway and several settlements in the Western Kalahari.

Cutlines are infrastructures that formed and were formed by a labor economy in which my interlocutors were immersed, informing their own readings of these landscapes. !Nate, Njoxlau, and Karoha had all, at some point in their lives, worked as cheap laborers to clear these cutlines. Their work clearing bush and making cutlines, however, also gave them different perspectives on the landscapes and their histories. Each road and cutline told a story, revealed a history, and offered different potentialities, some more or less wanted than others. Their knowledge of particular areas was sometimes informed by their travels for work in making these trails, but also in moving along these trails. !Nate and Karoha, for example, had also worked as trackers for commercial safari hunting operations that took them well out of the areas they were most familiar with. This is to say, what I learned about tracking and landscapes is deeply embedded in and informed by these socioeconomic and political histories as experienced in the lives of my tracking teachers, as well as within the broader structural histories of ordering people; histories that emerged in the tracks and traces of the landscapes. Thus, to reiterate a central point, while I focus on

tracking as an art of noticing that elaborates on more-than-human landscapes and relationality, it must also be understood as a situated practice that reflects back to and is embedded within histories that have dramatically changed social and landscape relations among human and nonhuman constituents and ecologies.

Tracking an old and over-grown cutline, !Nate, Karoha, and Njoxlau eventually led me to a place in the bush where we set up the camp from where we walked out in the opening vignette. The cutlines created other unintended affordances too. Researchers use these sand tracks as transects, canvases from which a team of trackers can easily see and count spoor to estimate the wildlife populations in this wildlife corridor. Tracking and tracking surveys are one of the ways that researchers are trying to show that the Western Kalahari and its landscapes are still active with wildlife: they are changed but not dead. As researcher Derek Keeping explained to me in a conversation during a tracking survey:

This space between Make and Monong is busy with animals. And this is supposed to be a **deadzone** for animals because it is all a communal grazing area. If you look at where the boreholes are allocated, it's Hukuntsi villages and north, Hunhukwe north, and then there is this gap in between. I mean look at the grazing here. It's still...it's not bad...This is just me [conducting tracking surveys] desperately trying to make these points [that the corridor is still active] before it's too late with all these fences [closing off migratory routes].

This area falls within the wildlife corridor between two large game parks: The Central Kalahari Game Reserve (CKGR), the second largest game reserve in the world, and The Kgalagadi Transfrontier Park (KTP), which as the first “peace park” in southern Africa is managed as a single ecological unit straddling boundaries between Botswana and South Africa under a bilateral agreement between the two countries. The wildlife corridors between the two parks encompass one of the longest

remaining wildlife dispersal areas in sub-Saharan Africa, but they are steadily closing, encroached upon by growing human settlements, the proliferation of cattle posts, and cattle ranches and cut off by fences, roads, and other human infrastructures. In fact, as Keeping indicates in the quote above, important parts of the corridor are thought to be “deadzones,” but as Keeping argues and my interlocutors have taught me, these areas are far from dead.

While parts of this corridor are communal grazing lands, large parts are Wildlife Management Areas (WMAs):

A WMA may be defined as an area where wildlife utilization is to be the primary form of land use. Other forms of land use will be permitted provided they do not prejudice the wildlife populations and their utilization (Carter, 1983; DWNP, 1982). A policy paper for the utilization of wildlife resources emphasizes the sustainable use of wildlife, the potential contribution of wildlife to the rural economy and the importance of WMAs in the use of wildlife resources (GOB, 1986) (Parry and Campbell 1990).

With its protected parks, reserves, and WMAs, as much as 25% of Botswana’s national territory is considered protected for wildlife. However, WMAs are mixed-use areas in which the primary focus is purportedly sustainable resource management. As Twyman notes:

While the government does not consider these areas as ‘protected’ in their strict policy definition, the IUCN and CNPAA recognize them as ‘protected’ under Category VI of IUCN’s protected-area management categories, a ‘managed resource protected area’ (Ghimire & Pimbert, 1997: 10). Under this category the protected areas are managed ‘mainly for the sustainable use of natural resources’, and further they should provide ‘benefits to local and national economies’ and act as ‘models for sustainable development to be applied elsewhere’ (Ghimire & Pimbert, 1997: 10) (Twyman 2001:46).

WMAs then are often areas that find themselves at the center of political debates in Botswana in which the question of “benefits to local and national economies” is highly contested. For some, it is argued that the growth of the beef industry and mineral resource extractive industries would be of most benefit to the

economy and the livelihoods of citizens. For others, WMAs should be maintained for wildlife conservation, which in turn, they argue, will help develop the growing tourism economy. In the meantime, boreholes proliferate with human and cattle mobilities encroaching upon these corridors.

In recent years, the WMAs in this corridor have become increasingly contested for several reasons. One is that the parts of the corridor border some of the most productive cattle ranches in all of Botswana and many have made the case that these corridors are underutilized as they are currently gazetted and should instead be rezoned for cattle ranching. Prior to the country-wide hunting ban, safari hunting tour operators worked in some of these WMAs through agreements with the communities in the areas, from which the communities were meant to benefit from the profits generated by hunting quotas sold to tourists, first rights to the non-trophy parts of hunted animals, as well as employment opportunities through these hunting and tourism ventures. However, with the hunting ban, many of the already few tourism operators in these more remote parts of the Kalahari ceased their operations. Though a direct correlation is only speculative, rezoning for parts of these areas and the sale of natural gas and mineral prospecting rights began shortly after the hunting ban. By 2015, rezoning was already underway in some of the WMAs in Ghanzi District in the corridor.

Another major issue impeding wildlife movements is the Trans-Kalahari Highway that slices across the desert, including the corridors. This is a major economic trade route connecting Namibia, Botswana, and South Africa, and the only

route Ghazi cattle farmers have to transport their stock to the national abattoir in Lobatse. While the highway is itself a fairly significant obstacle to migrating animals, controversial fences have been constructed along parts of the highway to lessen the presence of livestock on the roads and the resulting traffic accidents. These fences invariably impact migrating wildlife as well. In addition, there is a proposal in the works to build a railway line adjacent to the highway to expedite this trade route, and with the railway have come additional proposals for building fences. These are in addition to the veterinary fences already in place that cut off migratory routes and led to die outs of hundreds of thousands of antelope from the 1950s onwards.

Finally, as described in the dissertation Introduction, the Botswana government recently sold shale-gas prospecting rights to the majority of the WMAs between CKGR and KTP to private prospecting firms. During my year of field research, I came across two sites where intensive gas and mineral exploration was, or had been, underway. The two sites were in some of the most remote and underpopulated parts of the Western Kalahari, and it almost went unnoticed by the public, except for residents and researchers in and around small settlements in the area. While claims that rights have been sold to frack in the parks and WMAs have been overstated, this move exemplifies the extent to which this region of the Kalahari is viewed by the state as underutilized and empty, or devoid, of significant wildlife and tourism potential.

Detecting the Unseen

The notion that the corridor is a deadzone is one of the issues that wildlife monitoring projects in the western Kalahari have attempted to address. They are challenging the presumption that the western Kalahari WMAs are already devoid of wildlife and have been lost to cattle posts and fences. They have hoped to show that wildlife are indeed still migrating through these areas, despite assumptions to the contrary that the corridors have already been lost. Furthermore, the monitoring projects have tried to involve local communities in the research and then development of tourism plans. As mentioned above, one of the ways in which they have attempted to include communities in the research is by hiring trackers to collect data about the distribution of animal tracks. One of these projects, the Western Kgalagadi Conservation Corridor project (WKCC), led by Conservation International, was the subject of my Masters Thesis.

I participated in several tracking surveys with WKCC in the Kalahari Desert in 2009 and 2010. During this time, I moved around a wildlife corridor with 15 trackers from settlements between two wildlife parks. This was part of a Conservation International project that aimed to formally establish the corridor as a protected area linking the two parks. The surveys I participated in employed trackers, primarily San (including !Nate, Njoxlau, and Karoha), to count and record the distribution of animal tracks. In order to collect reliable scientific data, all trackers involved in the project were assessed on the level of their tracking skill by Liebenberg. Through this formal assessment, scientists could claim the validity of their data through a standards-based

protocol. Trackers walked along transects entering the number of tracks of different species into their handheld Cybertracker GPS devices. Tracks, and the associated animals, were not followed but encountered along linear transects and counted, transforming them into data sets through their direct observation, not of animals necessarily, but of their tracks and traces. This was a different kind of tracking that focused on simple identification, but it was still tracking.

This project, however, as is often the case with development and conservation projects, was discontinued before the conclusion of research and implementation of its objectives because the researchers were not able to show the kinds of measurable gains that funders and donors want to see within a relatively short period of time. This left community members and local government disillusioned and ambivalent about the prospects of conservation and tourism projects to either protect wildlife or benefit the livelihoods of local communities, never mind having the double benefit of affecting both.

Derek Keeping, however, has continued to monitor these corridors with the assistance of trackers in the Kalahari as part of his PhD dissertation research, including !Nate, Njoxlau, and Karoha. Under the moniker of Kalahari Wildlife Assessment (KWA), Derek Keeping has been implementing new methods through which wildlife populations can be estimated based on the counting of tracks along transects on sand roads and cutlines (Keeping 2014). Or rather, he is applying an old method used in Russia that first made its way into the English literature in 2006, to show that track surveys do indeed provide reliable wildlife population estimates and

that they are able to collect data on a greater diversity of species than other methods such as aerial surveys and collaring of individual animals.

Compared to other survey methods for monitoring and estimating wildlife populations like aerial surveys that miss so much—they can only count large animals and cannot see those hidden by cover—Keeping, much like Liebenberg, has been arguing that tracking surveys provide richer and more diverse data set because of their capacity to “Detect the Unseen.”

Amongst conservation biologists, tracking is often not considered to produce especially reliable data, and it is thought to be too labor and time intensive for the data that it does produce. While researchers in Botswana acknowledge and even admire the depth of knowledge of many trackers, they worry that there are no standards for measuring trackers’ skill levels and the quality of the data they collect. While Liebenberg’s standards-based tracking assessment is available, relatively few trackers have been tested in Botswana.⁶ Furthermore, biologists have been unsure how to estimate populations based on the data collected by tracks. Instead they have used a wide variety of technologies to collect data about wildlife, such as aerial surveys, camera traps, and radio collars. These technologies, Derek Keeping argues, not only inhibit the extent to which researchers can engage with their objects of study on the ground but are also biased towards large and less shy animals. A lot of animals

⁶Nate, Njoxlau, Karoha, as well as their friend /Uasi all received the highest possible certification of Master tracker in Liebenberg’s Cybertracker certification system. There are only 7 or 8 living certified Master trackers in the world, although the number who have sought Master tracker certification is limited.

are missed by aerial surveys and camera trap data, and radio collars limit the number of creatures that scientists can track. Furthermore, Keeping argues that testing tracker accuracy is fairly straight forward, and he has found the identification of tracks to be highly accurate through the process of cross testing trackers along the same transects.

In a conversation while conducting a survey in 2015, Keeping explained:

The detection by tracks is nearly perfect. And that is what this is about. What one guy sees and the next guy sees, I can assess, and it's maybe 5% they miss. And 95% is good enough for science, right. So the big contrast in the aerial and the tracking surveys is in the detection. But the challenge is, whereas it's very easy to come up with density estimates from aerial surveys because you have this defined area, with the tracking survey the trouble you have is extrapolating that into space, and that all depends on the daily movement distances of the animal.

But yeah, I've made a point in this Transkalahari report that this emphasis among wildlife researchers to throw collars on animals...I mean there is a huge bias in just wanting to do that. And it is something that people can always get funding for. If you say you want to study something and you want to throw a collar on an animal you can always get funding. And it is much harder to get funding for food and fuel and getting money to pay for trackers. But because of the expense [of the technologies] you are always limited to such an exceedingly small sample size. The number of animals out of a population you can throw a collar on to make an inference about a whole population [is limited]?

I think there is an infatuation with using high technology in wildlife science. What I think has happened is, that emphasis, combined with aerial surveys, has given us a pretty poor picture of what's happening with [carnivore] activity with these two areas. And it has led to these presumptions about how the corridor doesn't exist anymore. Because they threw collars on wildebeest and it was a couple rainy years and they didn't move really far so...unless these guys see a line of an animal, that it went from there to there, they can't make sense of it. And that's why I've been using these track surveys, like this one we're doing right now on this transect. I'm building this argument that animals are still moving through here, and that you guys are just using the wrong methods.

So that is what this tracker testing is about. Nobody has done this before. Just to show how, what percentage of tracks are missed on a survey. But that might be more out of Botswana than in Botswana. I think these guys are pretty highly regarded in Botswana, even among the Department of Wildlife. They take them pretty seriously.

Because without the awareness of the FMP [the population estimate formula Keeping is using], nobody has known how to make sense of the track counts as far as estimating the densities. It's just like a course index which isn't as useful as putting your finger on how many, what the population size actually is. So, that's why there is such a sudden interest in the FMP thing, because now there is like, wow, track surveys are up there with aerial surveys and other surveys where you can get an actual number.

Over the last 8 years, Keeping has been testing out methodologies for estimating populations from track counts and argues that his approach is more efficient and reliable and that it generates data on a greater range of species

(especially smaller critters). He utilizes a Russian formula from the 1920s that used track counts to estimate deer and elk populations. It was largely unknown and untested in the West until it was translated to English in the mid 2000s. Keeping's is the first large scale attempt to test its accuracy (Keeping 2014). In 2015, along with a group of trackers and volunteers, he conducted a large-scale spoor survey that coincided with an aerial survey conducted by the Department of Wildlife. The spoor survey was meant to ground-truth the aerial survey by providing as point of comparison for animal counts in the mutually surveyed area, but ultimately did more. It produced much more extensive data about wildlife populations than imagined by the Department of Wildlife, and it was more cost and time efficient. Crucial to this data, obviously, are reliable track counts, which require an ability to accurately identify a wide variety of species and to count large groups. In addition to the formula used to estimate populations, he has also developed a quick and fast method for assessing trackers' identification and counting accuracy.

While Keeping has tried to move away from a view from above and what he considers to be an obsession with technological devices, towards a method that recognizes and employs the usefulness of tracking and trackers living in the Kalahari, his approach radically recontextualizes what tracking is and what it can be used for.

In terms of the kind of tracking, these surveys mostly involve what Liebenberg calls "simple" tracking, in that it required only direct identification of tracks, but neither systematic reconstruction nor speculative forecasting of animal activity. Tracks were captured exclusively as static data-points with GPS, which

when gathered together as a whole data set for the corridor, would give an indication of species diversity, density, and distribution. Tracks, not animals, were captured as empirical data. At this level, trackers and scientists could form partial alliances in practice, cooperatively collecting data. However, the speculative “scientific” aspects of tracking were not employed, and the aspects that Liebenberg describes as “nonrational” were also not engaged with in data collection. It is in this way that the alliances thought to be enough for collaboration were rendered partial in the scientific prioritization of the evidentiary. Still, this work of counting is extremely important for showing that the corridors are not deadzones, even if they only engage with particular aspects of tracking.

One example of a kind of tracking or recognition of the presence of an animal that escapes this rationalized scientific method for monitoring the presence of wildlife involves the way that trackers I have worked with detect the unseen through their embodied sensorium. In other words, I want to point to a way of “detecting the unseen” that is deemed uncountable by scientists but is very real for my interlocutors.

On several occasions, trackers alerted me to the presence of lions and the potential for danger without encountering tracks or seeing lions. Instead, they explained that the muscles around their armpits started tingling and sweating. This feeling is a telltale sign that a lion, and thus danger, is approaching. When I asked, they said they never heard nor smelled the lion approaching, but they always said they felt it in their bodies. I never felt the tingling sensation, but I knew to react when

my interlocutors felt this sign of lions, even though we never stuck around to see if lions were there. It was too dangerous to do so.

I considered testing tingling armpits as a way of noticing the presence of lions, but my tracking interlocutors were never willing participants. I wanted to find proof in a moment of what Helen Verran calls “epistemic disconcertment” (Verran 2013). Similarly, the most common response to my telling of these stories is: were the lions really there? The environmental scientists that the trackers work with do not consider this embodied sensing of lions to be valid data, though several researchers have told me that they too take these warnings from trackers very seriously.

This tingling escapes the sensorium of my epistemic tendencies. In my own thinking about tingling armpits, I tended towards interpreting this as my informants embodied sensing of fine subtle queues in the environment to which I was not attuned. In the shift in the wind, a subtle mostly imperceptible sound, a slight peripheral movement, they were tracking the landscape. I rationalized, speculated about some kind of material truth that would explain the embodied sensing of the lions. But my interlocutors refused my assessment. They could feel the lion in their bodies.

While it is certainly the case that tracking involves the gathering of empirical evidence, it also involves the more affective, or perhaps empathetic, aspects that Liebenberg refers to as “non-scientific aspects of tracking,” which, again, include peripheral perception, projection, imagination, and belief. Liebenberg’s project is to legitimize tracking as a science, and because of this, certain aspects become trapped

in the knowledge-belief dichotomy upon which science has historically based its own claims to authoritative knowledge. In his assessment, these scientific processes are restricted to the mind of the tracker, in effect establishing a firm internal-external boundary between the tracker and the world in general or the animal in particular. The mental and cognitive processes involved in tracking are central to his argument that the scientific mind may have first evolved with the practice of tracking. His argument, however, is hamstrung by his assumptions about the internal/external division. Specifically, in the process that Liebenberg refers to as “projection,” the enactment of an affective, empathetic, and partially-connected relationship between the tracker and animal undoes this internal-external boundary. The relationship between tracker and animal is less of one between a subject and an object than that of landscape companions becoming-with each other as co-constitutive, partially-connected actors. “Imagination” in tracking, rather than a cognitively internal process of the human mind, can then be understood as an empathetic relation with an emergent familiar. This is the stuff of speculative empiricism, though perhaps not countable in a wildlife survey.

This is an important aspect of tracking that points to a way landscapes and their histories inform how my tracking interlocutors attune themselves to more than human worlds. Tingling armpits might be a form of peripheral perception and intuition, but, I would learn, it was described to me by interlocutors as a kind of attunement that has arisen out of shared, relational histories of dwelling in Kalahari landscapes with nonhumans. It was not until I began hearing stories from my

interlocutors about human-animal relations and the ambiguity of difference between species that I came to see this in a somewhat different light. This relational sensorium extended beyond any direct encounter. It involved histories and relations that co-mingle with a primordial time when humans and animals were not all that different from each other (see Guenther 1999). It involves a cosmological-ontological framing of more-than-human relationality and landscape making not entirely available to me nor to the scientists my interlocutors worked with. It is a history that is incorporated into my interlocutors' practices of tracking, informing them about how people relate to nonhumans, but that simultaneously does not prohibit them from tracking in contexts where this story is dismissed by scientists.

As an anthropologist of tracking, but not yet an expert tracker myself, it has been important for me to acknowledge that because I might not know or sense certain things it does not follow that they do not exist. Crucially connected to the partitions of the sensible we live by, these are important issues that hang together with, but do not undermine, the importance of wildlife monitoring in the Kalahari and the role that trackers play. After hunting, and more than a tool for scientific data collection, tracking is also a qualitative method for engaging with and noticing emergent landscapes and their movements. Critically, wildlife monitoring surveys do not capture this movement.

Tracking Landscapes

While tracking surveys are immediately concerned with counting animals, the story that starts this chapter does something else. Derek Keeping, for instance, is

concerned with animals in motion, which in turn implies treating landscapes as a still background. The vignette, however, encompasses several aspects of tracking that show it to be a practice of ongoing attunement to emergent landscapes through which encounters act as signs of and guides to movements of landscapes and those who dwell with them. Tracking in this sense involves an attention towards landscape potentialities and a sensitivity about the potential for emergent encounters and relations that helps to elaborate a phenomenology of landscapes in motion.

Tim Ingold sometimes begins his definitions of things or phenomena by stating what they are not: “Let me begin by explaining what the landscape is not. It is not ‘land’, it is not ‘nature’, and it is not ‘space’” (Ingold 1993:153). For Ingold, landscapes are dynamic. They are neither abstracted space nor deadzones. Rather, they emerge through lines of movement that weave together meshworks that bring landscapes into being as places. When landscapes are thought of only in terms of monitoring and surveillance, they can quite easily slip into empty and static frames: animals to be counted against a stable background. Tracking challenges this depiction through an attunement to lines of movement as a practice of doing and making landscapes together with other humans and nonhumans who dwell in the same environment.

While I appreciate this understanding of landscapes as made in the traces of those who live in them, Ingold approaches the notion rather holistically.⁷ Against this

⁷ Much of what I describe through tracking can be understood as what Tim Ingold calls the “dwelling perspective,” “according to which the landscape is constituted as an enduring record of—and

tendency, I have been intentionally referring to landscapes in the plural as a means to emphasize the multiplicity of their emergence. This plurality builds upon Marilyn Strathern's statement emphasizing relations over defined units as "more than one less than many," which has been taken up by others to describe multiple ontological enactments, such as in the enactment of multiple realities (Mol 2002). Landscapes, I suggest, can be similarly understood as less than whole and more than many, encompassing multiple emergent patterns that hang together enough to engage with a generalizable whole that emerges in the enactment of multiple particularities. Tracking is an attunement to those patterns, their potentialities, how they hang together, as well as a practice of enacting these emergent landscapes. Applied differently in practice, whether for monitoring, hunting, or simply noticing, tracking does not just engage with multiple landscapes, but enacts them multiply.

testimony to—the lives and works of past generations who have dwelt within it, and in so doing, have left there something of themselves" (Ingold 1991: 152). Ingold, building on the Heideggerian concept of dwelling as being-in-the-world, is writing against notions of landscape as static, inert background and against more culturalist views of landscapes as symbolic, or cognitive, orderings of space (1991:151). Instead, he argues that landscapes tell stories, and are stories, in which perceivers, be they human or animal, and landscape unfold together over lived and generational time. "[I]n a landscape, each component enfolds within its essence the totality of its relation with each and every other" (1991: 154). And it is in this relational context, for Ingold, in people's engagement with the world as a practice of dwelling that places gain significance, not as attached to the world but gathered from the landscape. This is a compelling and useful approach for understanding tracking as a practice of engaging with relational actors in a landscape, a kind of becoming together that does not resort to static objectifying depictions of nature, nor does it rely on cognitive representational views to find how meaning is made. It does, however, presume that self and world—or in the case of tracking, that tracker and landscape—merge in a way that does not adequately account for differentiation and entangled emergence, which is fundamental to tracking as a practice through which difference is made relatable. Furthermore, in its captivating romance the disparate histories, politics, and power relations in, through, and even by a landscape are flattened in a relational world of being alive.

Tracking in the Kalahari takes the movement and liveliness of landscapes as given, a precondition of dwelling. While tracking is most often discussed as a particularly goal-oriented practice, usually performed as part of a hunting, pursuit activity or retooled for data capture, my tracking teachers showed me that it is very much part of the mundane everyday practice of walking through and becoming with the bush, as a practice of noticing what may be around at any given moment in its potential becoming.

Returning to the opening vignette, we see how tracking as a form of noticing can involve a variety of encounters with multiple potentialities that can compel in different directions, such as !Nate's and the bush's entanglement when he stopped briefly to taste the berries. It was fluid and temporary because the temporal coordination between !Nate's gathering and the ripeness of the berries were not aligned. Again, out of worlds of potentialities, a specific pattern emerged out of the past, present, and future potentialities of this particular bush, detailing a sensibility towards landscapes, plants, animals, their movements, and growth. !Nate was affected by the bush through his attunement to it, compelled by the bush to taste the berries, but just as quickly he moved on. Detunement too, is an important aspect of tracking and focusing one's noticing.

Then, in imitating the movements of the aardvark through an engagement with its track, !Nate was pulled into its lifeworld and came to empathize with it and its frustration over the newly occupied den. It involved a relational empathy and a readiness to become familiar. Yet, in these shared landscapes in motion, one's home

can at any time become the dwelling of another, however unwanted or convenient. In his attunement to the aardvark, !Nate was affected by his re-enactment of the aardvark's own attunement to the landscape, affecting it, and being affected by the way its own terraforming activities offered a dwelling to an other, the hare.

Finally, through an attention to the tracks and movements of the gemsboks, animals had become familiars, moving from generalizable knowns of what a gemsbok track looks like to a material encounter with specific individuals. This familiarity emerged out of patterns and was guided by curiosity. Karoha tacked back and forth between his general knowledge of the landscape and gemsbok behavior, and the particulars of the tracks, the wind, and landscape surroundings as they emerged. In the process, he became familiar with two gemsbok, even as we were pulled in different directions, rather than being in direct pursuit of the animals. The familiar emerged through its travel from particulars across larger scales (and vice versa), revealing ways of reading the landscape.

It was in this kind of tracking as a mode of attunement to movements in these landscapes, whereby my interlocutors were open to and made themselves available to potential encounters, that I came to understand landscapes as always in motion, gatherings of emergent relations that not only have histories, but do histories, in the potentialities they afford. Tracks and traces are the contingent and emergent histories of landscapes, done in their past movements and made available in the potentialities they offer.

As we moved through the landscape, I came to see tracking as my interlocutors' everyday, mundane refusal of an inattentiveness to the movement of landscapes and their relation to those things through their own movements: the tracks, animals, patterns of plant growth, sand, dunes, pans, wind, and weather were all in motion and all attended to while walking. It involved a shifting of attention to movements and rhythms across scales, and in this shifting of attention, tracking revealed the profound scalar instability of perception. Perception was never fixed, located solely from a static position of my interlocutors eyeline towards a track, for instance, but always jumping back and forth from particular track to its situated surroundings, from animal to landscape, pasts, presents, futures, and their potentialities, together with our own movements. Thus, as an anthropologist of tracking, I came to understand tracking as the mundane, everyday practice of gathering together the signs and relations of emerging landscapes worlds, populated by human and nonhuman others,⁸ entangled together becoming familiar.

Elaborating on Deleuze and Guattari's *Nomadology* (1987) to argue that territory is not a map, Bruce Janz points out that that they suggest,

Our wandering is not the condition of being lost, rather being still is being lost. Wandering is our human condition, and movement binds our territory together in a way that remaining stationary cannot. The bird that sings the refrain sings by habit, reacts to its environment but also asserts itself to create its environment. Its repetition produces place, itself (Janz 2001:397–398).

For Deleuze and Guattari (1987), refrains are the resonances of differences in repetition through which territory can be understood, not as static space, but as action.

⁸I argue that tracking in this sense is like ethnography in the way Harry West (2007) has described ethnography as sorcery. Perhaps, put better, ethnography is tracking.

This is precisely what tracking enacts: a world in motion, a territory that becomes through its action, though here I emphasize movement above action because of its association with the heroic narrative and the implicit causality. It is important to note that refrains, as Deleuze and Guattari point out, are the repetition of habit. They are not direct copies, but necessarily entail difference and contingency. A material analogy is the path or trail. A path emerges as a route, with place-like qualities, through its repeated use. Each use is different from every other use, and together it becomes a path that indicates and enacts movement and direction. Place emerges through difference and repetition which is, in other words, a way of becoming familiar.⁹ Thus, to extend Deleuze and Guattari's argument, wandering is a condition of tracking and becoming familiar that refuses being lost by remaining stationary. Furthermore, tracking refuses to treat landscapes as stationary, for to do so not only implies the potential for getting lost but for the landscape itself to be abstracted and co-opted. It is in this way that I want to suggest that it is as soon as landscapes stop being tracked that they can be treated as if they can be *held still* and made available for objectification, commodifiable, and subject to governance by the state apparatus, even if this fixity is only partial and temporary. Land-use and property boundaries, for example, may create fixity in the way they map territories to establish hierarchical use rights. However, in practice, this momentary fixity reveals other kinds of tracks,

⁹These, I suggest, are landscape histories. Whereas Deleuze and Guattari argue that history is always written from the sedentary position as an apparatus of the state such that nomadology is history's opposite, I argue that landscapes themselves do histories in their entangled mobilities. A path, here, is a clear case in which a trace or trail of different but repeated actions enact a material history with the landscape.

possibilities for other kinds of movements, and other forms of tracking. Some have pushed back against this kind of mapping for the ways that it also renders invisible indigenous relations to their lands in the Kalahari (Albertson 2000; Albertson 2002; VanderPost 2003) and elsewhere in the world (Brody 1981b; Rocheleau 1995; Turnbull 2007) by engaging participatory mapping projects that challenge (state-sponsored) rationality and fixity to establish property rights and boundaries.

In tracking, some encounters stand out more than others. Therefore, tracking is an emergent field of difference. Difference is important because, for obvious reasons, it is key to engaging with the multiplicities of landscapes. There is only difference, and with difference, relations may be uneven, some attended to more than others. In emergent fields of differences, there are different differences in which some are attuned to while others may be detuned. For instance, when !Nate danced around the aardvark den, he demonstrated the embodied, empathetic, and mimetic aspects of tracking in which the trackers project themselves into the world and body of the animal, more so than he did when he passed by jackal and steenbok tracks and even the old berry bush. On this day, he was more attuned to the world of the aardvark than to the jackal and steenbok tracks we also crossed. The activity of the den compelled him and his curiosity, while he was previously detuned from the jackal and steenbok tracks. And while he attuned himself to the old berrybush, the various temporal coordinations—the ripeness of the berries, !Nate’s hunger, etc.—did not compel him to stay with the bush.

This is an essential aspect of tracking, one that makes the connection between noticing and relating to other subjectivities in terms of their doings, while also differentiating them from others. It is an entirely relational approach of becoming-with in shared landscapes, in which noticing does not imply a world out there of objects to be discovered, or even hunted down. Rather, it is more akin to adopting the perspective of an other, much as Viveros de Castro (1998; 2004) has famously explained in his description of Amerindian perspectivism, and later in the way Willerslev (2004; 2007) has described Yukigir hunters. Trackers are compelled by some more than others, sometimes because of the potentialities they afford and at other times simply because of a curiosity that arises out of relatability. As evidenced in this case, however, this relationality does not emerge only through tracking as relation between predator and prey, as elaborated by Willerslev (2007) and Liebenberg (1990), but as neighbor or co-dweller in a shared and emergent landscape that involves an ongoingness of becoming familiar with the movements and doings of landscapes.

Again, returning to the aardvark, this case, then, demonstrates a relation of familiarity, or becoming-familiar, with other actors and assemblages dwelling with landscapes in motion. !Nate was greeting a neighbor, seeing if it was home, and then together with Karoha and Njoxlau, laughed about its annoyance with the hare disturbing its den. They related to the aardvark as an other, but not a fixed and incommensurably different other, in its dwelling in a relatable place (perhaps even

too relatable, to the extent that place became temporarily available to be occupied by the hare).

This was not an exemplary case. When we encountered dens of animals like aardvark, porcupines, and honey badgers, my interlocutors would often talk aloud to them and re-enact what the animal was doing. They also spoke back to birds singing songs and laughed at the names the birds tried to say. (Njoxlau and I once travelled to a town more than 600 kilometers away, where we met a bird that kept calling his name, which made him laugh for weeks and became one of the main things he told people about his trip to this town). The three, especially !Nate, would sometimes shout towards bushes in a cough like manner to tell dangerous predators that they were there and scare them off. These are the mundane and everyday, but relational, parts of the tracking that exceed the specific pursuit of an animal. They are part of a bodily disposition informed by and part of the practice of tracking, reflecting a more general way of being and becoming in the world with relatable nonhuman others. Not necessarily as people, nor just as things to hunt or food resources, but as others dwelling in a shared landscape: friends, neighbors, and strangers, and even sometimes dangerous, malicious co-dwellers that may cause bodily harm.

We hardly ever walked following the particular trail of a specific animal, however, that does not mean that we were not tracking, or rather that we were not aware of the potential for encounter based on the directionality of the tracks and our movement in relation to them. Like the gemsbok we saw, this was a possible, perhaps even hopeful, realization of walking that day in which various tracks and other signs

or spoor accumulated until Karoha could anticipate arriving at a particular encounter. In this attunement, or through this attunement, intersecting the gemsbok was more than a chance encounter but less than a directed practice. We were always tracking, even when we were simply walking, and noticing this noticing was not always easy because it became so common-sensical and mundane that it is difficult to separate it from what may seem to be a rather unspectacular phenomenon of being in the world. But this being is always changing and emergent, it is a kind of becoming-with done through a practice of becoming—familiar, of noticing and tracking through the simultaneous self-reflexive engagement with one's own contingent situatedness in the landscape.

Becoming-familiar-with, however, again brings us back to the implication that it is individuals that become familiar, and this may very well be the case at times, but it is much more mundanely encompassing than that. The weather, the wind, the berry bushes, the silver terminalia shrub, the aardvark, jackal, steenbok, gemsbok, the valley, and even the tall trees we never arrived at when looking for honey, were all part of this everyday practice of noticing, of being affected and affecting. It was a tracking of emergent assemblages generalized as landscapes, but that became familiar in the particularities of ways they came together, in the ways that they gathered, and were in process themselves.

Conclusion

Tracking as a goal-oriented pursuit is sometimes too closely associated with the event of a hunt that culminates in a kill, in which landscape is largely

backgrounded as static space. In this formulation, tracking often slips into the frame of a politics of “Man the Hunter,” as an advanced cognitive skill that brings the human hunter into relation with the hunted and nothing else (a relation between heroic masculine individual and resource-object animal). However, this chapter has argued that tracking is an immersive practice of engagement with and attunement to the multitude of becoming-actors and emergent assemblages that constitute landscapes as what I describe throughout this dissertation as landscapes-in-motion.

The vignette in the beginning of this chapter is in many ways indicative of a typical day during my fieldwork. Though we might often start with a goal in mind—like finding honey—our daily practices were very much informed and reoriented by emergent encounters. These emergent encounters are the doings of landscapes: landscapes-in-motion. Tracking was always the primary way through which my interlocutors made themselves, and taught me to make myself, available to those encounters. We were available not in the sense that we were always tracking and pursuing a particular animal, but in the sense that our practices, our doings, were always informed by what we encountered along the way as we noticed together with an attention to the possibility that we too would likely be noticed. In our own movements and noticing of other movements, we made ourselves more or less available for those potential encounters. I could even go so far as to say that my interlocutors were *always tracking* when walking through the Kalahari, as a state of

being¹⁰ or, rather, becoming-with, and as I will go on to suggest, becoming-familiar.

The trackers were constantly reflecting on and evaluating their relationship with landscapes and their components, and how they themselves were situated within them as they tracked, noticed, and engaged with the landscapes.

By tracking while walking the landscapes, we were brought into worlds of animals through encounters with their movements, intersecting with our movements together in the emergence of the landscapes, that we passed away from as quickly as we arrived. When associated with hunting, tracking has been elaborated as a way that hunter and prey relate, or even become-with each other. This association presumes a direct and closed relationship between entities, whether subjective or objective.

Tracking, instead, is more of an ongoing practice of becoming-with emergent landscapes and their multiple potentialities, not just a relationship between human tracker and tracked animal. As mode of attunement, rather than an autopoietic hunt, tracking brings us into the ways in which worlds and landscapes emerge in the relations prior to predetermined, or fixed, positionalities. It is a phenomenology of moving from not-knowing to knowing in the attunement to contingent landscape encounters.

¹⁰I use being in the Heideggerian sense that self and world are not dichotomous opposites, because self is always in the world. In our involvement in the world, in our practical dealings with it, there are no value-free objects. Meaning, or value, emerges in and with our practical dealings with the world and its components, it is embodied. However, these are emergent process, which is why the term becoming, as offered by Deleuze and Guatarri, and later becoming-with as suggested by Donna Haraway (2007), seem more fitting. Further, As Rane Willerslev (2007) has pointed out, Heidegger sees practical and reflexive engagements with the world as mutually exclusive. In tracking, however, that reflexive state of being is a necessary part of one's practical engagements with the world. The trackers are constantly reflecting on and evaluating their relationship with the landscape and its components, and how they are situated within it as they track, notice, and engage with the landscape.

Chapter 2. Staying with the Truffle: From Spoor to Spore

In the chapter that precedes this one, I took an in-depth look at tracking as a relational practice of becoming familiar and knowing not just animals but landscapes-in-motion. I showed how tracking involves more than attending to individual tracks and their relationship to individual animals. This is because rather than simply following an animal across a background or static landscape, landscapes are tracked as a lively space of emergent relations through the material traces of encounters. In tracking paths, trails, and ecological assemblages, places too become familiar in their particularities (i.e. a specific animal, path or place remembered from past encounters), but those particularities hang together in the framing and emergence of more general forms of the landscape: types of patterns, ecologies, and habitats through which potential encounters might be anticipated.

That tracking is more than just a way of relating to animals arises empirically out of my research experience of walking through Kalahari landscapes with my interlocutors. But it is also born out of a specific attempt to engage ethnographically, through critical description, with more-than-human socialities *beyond* animals (cf. Tsing 2013), within the field of multispecies ethnography (Haraway 2003; Kirksey and Helmreich 2010; Kohn 2013). Animals are important in these stories too, but, as Tsing (2013) points out, too often they have been privileged as possessing something that is comparable to human consciousness and, with that, an ability to make worlds—even if Heidegger argues that that they are “poor in the world” by

comparison (Heidegger 1995). Such approaches often emphasize consciousness and intentionality as the comparative categories for sociality, limiting the range of nonhuman, nonanimal socialities, available for consideration. The privileging of human-animal relations, Michael Marder argues, appears to follow the tendency in the human-centered Western tradition of philosophical thought where, though animals may have been marginalized, “non-human, non-animal living beings, such as plants, have populated the margin of the margin, the zone of absolute obscurity undetectable on our radars of conceptualities” (Marder, Vattimo, and Zabala 2013:2). Plants, fungi and other nonanimals are important landscape constituents that do things, make worlds, have effects, and are good to think with. Recently, scholars have been arguing that plant and fungi socialities and worldings deserve more attention in multispecies analyses (Hustak and Myers 2012; Tsing 2012; Houle 2015; Škrabáková 2014).

In this chapter I continue the move away from animals to elaborate the broader relations of noticing landscapes with regard to plants and fungi. I do so by focusing on gathering as a skilled practice, much like tracking, of noticing and engaging with landscapes doings, rather than following across a background context. In fact, tracking, I argue, is a critical aspect of gathering plants and fungi. In opposition to the frequent description of gathered things—plants, fungi, and other non-animal materials—as sessile and immobile resources framed almost exclusively in terms of human-use, I insist that they are mobile, lively, landscape doers with and within landscapes. Tracking brings us into the mobility of those doings as they gather.

Thus, I think of tracking as enfolded in practices of gathering plants and fungi that are immersed themselves in the liveliness of emergent landscapes.

As has already been emphasized, Kalahari ethnographies famously played a critical role in over-turning the heroic, masculinist, “Man-the-Hunter” trope by showing, empirically, that gathering has been much more important subsistence practice for San hunter-gatherers than hunting, accounting for as much as 80% of their caloric in-take (Lee and DeVore 1969; Silberbauer 1980; Tanaka 1980). Despite this emphasis on gathering, those things that are gathered have seldom been treated as more than resource objects for human use and consumption. Yet the entangled worlds of plants, animals, people, and several kinds of fungi feature prominently in Kalahari landscape makers. As such, gathering of plants and fungi in the Kalahari presents an opening as a site that is more than ripe for the picking for a multispecies investigation into the lifeworlds of these non-animals (beyond their use as a human resource).

With their attention to the emergent and relational character of knowledge practices and their objects, science studies scholars had a crucial role in opening social analysis to take into account the limits of the western foundational division between the social and the natural, and meaning and matter (Callon 1984; Latour and Woolgar 1986; Latour 1993b; Law 2002). This move—too often simplistically identified with Actor-Network Theory—challenged the human exceptionalism implicit in western framings of knowledge and reality. As such, it was instrumental in challenging the primacy of a specific (western) understanding of human language, meaning, consciousness and intentionality. To this end, science studies suggested the

heuristic of a generalized symmetry, which brackets what we think we know about how agency is distributed in order to attend to how things are done in material semiotic practices. Unfortunately, this notion has often been taken literally, crystallizing the debate around simplified positions that diverge on how agency should be attributed, to whom, and according to whose notions of power. Nevertheless, useful critiques emerged from these debates, reminding us how pointing to the relational character of material semiotics does not do away with the question of “where to cut the network?” (Strathern 1996). Stressing the western and patriarchal model of action involved in the notion of agency, Annemarie Mol argues, “An actor acts. But while in doing so some become iconic heroes, others hide behind their own achievements” (Mol 2010:256). As a result, while broad simplifications of the “agency” of matter still thrive (Bennett 2010), the vocabulary to articulate the distributed doings found in practices has been sharpened beyond the idea of agency “being expanded” to “include nonhumans,” and beyond the linear causality involved in western models of action. Against these critiques, (feminist) science studies scholars draw attention to practices and doings, their affordances and responses as better analytics and foci for getting into more-than-human, material semiotic relationalities (Mol 2002; Abrahamsson et al. 2015). This lesson is particularly important to my own analysis, as it reminds me of the risk of falling into implicit western distributions of the sensible, showing the limits of attributing “agency” to nonhuman as if we already knew what agency and action entail. It is a particularly useful approach in thinking about the worldings of nonhumans, and especially of

nonanimals, like plants and fungi in landscapes, since these forms of life are too often easy victims of these simplifications. Noticing by way of tracking, through this lesson, emerges as one method, a practice in its own right, that helps to bring us into the worlds of plants, fungi, and other nonanimals in their relational landscape practices and doings.

It is in this way that gathering is also a useful way of thinking about and describing more-than-human landscape assemblages. Anna Tsing describes the ecological concept of assemblages as open-ended gatherings that “allow us to ask about communal effects without assuming them” in how material relations come together (Tsing 2015:23). Tsing, however, finds that gatherings alone are not enough. She argues that we need more than a way of just seeing how lifeways of organisms come together as gatherings; we need to see how lifeways are *made* together with non-living ways of being. Importantly, she asks: “How do gatherings become ‘happenings’, greater than the sum of their parts” (2015: 27)? Gan and Tsing (2017) suggest that the coordination of multiple temporalities, in the coming together of many trajectories, is key to understanding these “lively practices of multispecies sociality”. Gathering, in this sense, is a way of describing particular landscape doings and their socialities.

To probe this question of how happenings become gatherings, I employ “gathering” in its double meaning as both the coordinated practices of collecting and of coming together. That is, how people find and attend to the things that they gather also has the potential to teach us about the worldings of those things.

Gathering, in its first sense, is the practice of finding and collecting, which I elaborate through the premise of tracking landscapes. Tracking landscapes involves the gathering of signs and movements that together afford the possibility of encounters (or avoidance of encounters) through an attention to how traces come together and coordinate.

The second sense of gathering is as a multidirectional practice of coming to together materially and phenomenologically, whereby lively entities emerge in and with the landscape through their relations with other things. This second sense is loosely interchangeable with assemblages: life and nonlife relations gathering together in the making of lifeways. These relations are patchy and indeterminate, yet they offer potentialities and affordances in their coordinated gatherings.

Taking these two senses together, gathering becomes not only a method of collecting objects in the landscape—in the same way that tracking is not simply following an animal—but also a way of being pulled into and engaging with sets of shifting ecological assemblages and arrangements in and with landscapes. Gatherers become-with gatherings and vice versa, as happenings.

I follow Anna Tsing's lead in taking landscape assemblages as my object of study for, as she writes: "Telling stories of landscape requires getting to know the inhabitants of landscapes, human and not human" (2015: 158). Tsing's attention to fungi and her calls to center landscapes, which she has done by following mushrooms into the worlds of forests and beyond, encourage an arts of noticing multispecies worlds and natural histories that has much in common with the art of tracking as a

method for engaging with landscapes. With this in mind, I take up Donna Haraway's—with whom Tsing also often thinks—calls for “stories of becoming-with, of reciprocal induction, of companion species whose job in living and dying is not to end the storying, the worlding” (Haraway 2016:119). Haraway calls this “Staying with the Trouble”: storying, following, and attending to enfolding multispecies relations of becoming-with, to be engaged with response-ability—that which has the ability to respond.

Both Haraway and Tsing draw on Ursula LeGuin's “Carrier Bag Theory of Fiction” (1996) to continue the work of displacing the prevalent idea of “man the hunter” in the stories they tell and thereby move against heroic narratives and the weapons of men. Instead, with LeGuin, they think with the carrier bag for gathering, collecting, making collectives, attending to and becoming-with companion species and their entanglements, emphasizing openings rather than endings, closing, overcoming, killing. What better place to follow their inspiration than one of the sites where Man the Hunter was most challenged, the Kalahari Desert, by delving into these gathered landscapes?

As such I bring us into the gathered worlds of the Kalahari Desert Truffle, *Kalaharituber pfeilli*, called *!xam* in *!Xo* or *mahupu* in Setswana, and referred to as “meat that lives in the sand” by my interlocutors. This chapter *stays with the truffle*, to be playful with words, in a serious attempt to put into practice Tsing and Haraway's calls. I think about how truffles are tracked and gathered, but also how, as mycorrhizal fungi, they gather, come together, as symbiotic relational landscape

doers that track others they become-with. With this—how they are gathered and how they gather—I suggest that tracking, freed from the spectacle of the hunt, is no less a complex practice of gathering, which in turn helps get towards what I am calling a “Carrier Bag Theory of Landscape.” Because this particular organism—the Kalahari Truffle—materializes through the entanglement and coordination of a variety of different landscape actors, it helps to exemplify tracking as a practice of noticing the gatherings that emerge as landscapes in motion rather than just taking over singular entities.

Tracking Meat of the Sand

On a tracking excursion in 2009, !Nate and Karoha showed me a different kind of spoor, or track. It was late summer, and recent rains had left the sand firm and the air fresh. The rain had washed away old tracks so only the freshest of prints were visible in the sand. But this also meant that fewer tracks had accumulated in the sand. As we paced the landscape, weaving our way through the bush, !Nate and Karoha began walking towards patches of grass, sweeping large tufts to the side and quickly glancing to the sand without stopping. I assumed they were looking for animal tracks hidden by the grass but just as I was about to ask, Karoha reached into the sand next to a tuft of grass he had swept aside, pulled something out, put it in his pocket, and said something to !Nate that was inaudible to me. Though we continued on, our pace slowed and I quickly noticed !Nate also reaching into the sand, pulling things out.

While walking through the bush, my tracking teachers often collected different plant leaves and berries on the move or stopped briefly to dig and collect

roots and tubers. But this was something different. When I asked about it, Karoha said, “It is a meat,” and handed me a roundish sandy lump. He then pointed to a crack in the sand, gesturing towards me to dig this thing up. I asked him how to do it but he responded matter of factly: “You must do it to know it.” In teaching me to track, my interlocutors often emphasized that doing is knowing. For me to learn, they could not just tell me how to do it. After my fingers bumbled about in the sand a bit, with Karoha telling me to be careful not to break it, I pulled out a lump of this meat from the sand. And doing this brought me into these worlds, affording me the opportunity to better describe the practice.

We spent the rest of the day tracking animals *and* this meat in the sand, gathering the meat as we found it. I came to know it as *!xam* (in *!Xo*), or *mahupu* (in Setswana), and whenever we located their tracks, we collected them, roasted them under the coals of our campfire, and were treated to a delicious meal of these fleshy morsels. Richard Lee (1979) and other Kalahari anthropologists have commented on the deliciousness of these truffles and how they are highly sought after by Kalahari communities, sometimes even sold to local restaurants, and at times exported for sale. The taste, while hard to describe, is a bit of a mixture between a mushroom and a groundnut. They also taste a bit like the Kalahari smells after it rains. *Mahupu*, when present, became one of the things we tracked the most, and they came to reshape the way I learned to track and understand tracking as relational practice for engaging with landscapes. They are not animals, but they are meat, and they make tracks through their relations with others in the landscape. In this way, truffles compelled me to think

differently about practices and doings beyond animals in more-than-human worlds and, in the process, opened up how to understanding tracking. Truffles make openings.



Figure 4 Truffle track

The picture above is a *mahupu* track. The track helps to tell stories of gatherings and their coordinations in both the doings of their gatherings and being gathered. The damp sand swells, bulging until eventually the rain smoothed surface cracks, creating small subterranean openings. “It is like a tent,” !Nate told me, “but it is broken.” Reach into the openings and you find the source of the swelling. A spherical lump submerged in the sand rises there. Gently dig under it, being careful not to break or damage it. Cup it in your hands and pull it out. There is a slight, almost imperceptible, snap as the sand releases its hold. In your hands you now hold the “meat of the sand.” It does not just live in the sand, my interlocutors told me, it is

meat *made* by the sand. This meat looks and feels a bit like a potato, but more humid and lumpier. There is a small but distinct nub on one side where it detached from the sand. My informants call this nub its navel, or belly button. This meat of the sand is not a self-enclosed entity but of sand, rain, and—as we will see—series of ongoing relations with others in Kalahari landscapes.



Figure 5 Truffles with navel nubs visible

This nub is the meat’s severed connection to the sand and its lifeworld. It is life and nonlife entangled in the doing of its lifeways. A sand umbilical cord, perhaps? This part, this umbilical cord, must be left intact in the sand or else the meat won’t grow there again, I was told. The lifeworlds of truffles become-with the sand—Kalahari sands form one of the largest uniform sand sheets in the world. This sand is mostly non-pedogenic, meaning that while it may contain biotic elements, unlike other soils, biotic processes are not the primary drivers of their formation. Yet, these sands are still part of life. Life and nonlife are entangled.



Figure 6 A truffle with its umbilical cord

The recent rains allowed this part (the umbilical cord pictured above and below) to drink water with plants, where it gathered minerals together in the sand. Mycologists—scientists who study fungi—describe this organism as a hypogeous, globose, mycorrhizal fungi, which means that they live below or partially submerged in the ground, have closed spherical fruiting bodies, and that they form symbiotic associations with plant roots. However, the “closedness” of fruiting bodies is perhaps overstated. It is a comparative description of the truffle’s gathered form in its appearance as it holds together, but it is not self-enclosed in and of itself. These fungi bear their spores, their reproductive bits, in the swollen cells of their outer walls. Unlike gilled mushrooms, for instance, these fungi do not have a built in spore dispersal system. Instead, they rely on their gathering and foraging partners, human and nonhuman, and wind for dispersal. This meat, these truffles, are entangled with all sorts of worlds in their becomings: they are symbiotic partners with plants, they gather minerals from Kalahari sediments, and those who gather them, in part, are responsible for dispersing their reproductive capacities. The belly button is not just the truffle’s severed connection to its lifeworld, for once released from the sand by foragers, spores find more truffled potentialities in their movement through these landscapes. Being gathered and how they gather are critical aspects of truffle worldings and futures.

But where to find these truffle tracks, these gatherings? To repeat the point, tracks do not stand on their own. Like tracking an animal, finding *mahupu* requires attending to a variety of spoor and environmental relata that themselves are shifting

and emergent with landscapes. Truffles move in and out of the landscape at a different pace than animals, but they move nonetheless, along with particular seasonal patterns and ecological assemblages. They are found by gathering signs and clues together that indicate their arrival in the landscape with certain weather events. All of these signs and clues mobilize in different ways and at different scales but then become entangled materially in the form of the truffles' fruiting body. The fruiting body of a truffle is the material manifestation of a coordinated gathering of relations, in process, alive, and in motion.

As mycorrhizal fungi, Kalahari truffles are mutualists with other plants, and it is the relation of exchange between fungi and plant—their response-ability to each other—that leads to the manifestation of the fruiting body. The coordination, however, is not just between plant and fungi, but also occurs in relation to nutrients in the sand, water and cycles of rain, sunlight, and air temperatures. These things are tracked and then gathered together before and until the truffle manifests and their tracks move into landscapes. How to find truffle tracks, then, moves us into a discussion of their communal effects in the fleshy fusion of time and space in the emergence of historically gathered, multispecies places and speculative places of gathering potentialities. To address these temporalities, I here draw on Bakhtin's (1987) concept of the chronotope. For Bakhtin chronotopes are the organizing centers of narrative events where space and time become knotted up, and where, in narrative, knots are tied and untied (Bakhtin 1987:250). They are mutually inclusive, can co-exist, and “they may be interwoven with, replace or oppose one another, contradict

one another or find themselves in ever more complex interrelationships" (Bakhtin 1981: 252). Here, I deploy Bakhtin's concept not in the intended narrative sense, but rather as a means of describing the material semiotics of truffle gatherings and the emergence of truffle places.



Figure 7. A truffle with its umbilical cord. This specimen was dug up carefully to see what this cord looked like.

Truffle Places

Truffle doings are part of the constellation of landscape making practices in the Kalahari, as are the people that gather them in process of tracking landscapes. They gather and they are gathered. What truffles live with and the material relations with which they are situated also bear in them particular histories of those relations. Truffles are found through an attunement to those they live with, their companion species and significant others, which include biotic and abiotic elements. These things, with landscapes, are always on the go, enacting certain movements, patterns, cycles, and repetitions, across varying scales that carry with them the experiential histories of their interactions. With them, chronotopic places emerge where truffles have been, are, and may be found: *mahupu* places, my interlocutors called them.

Place is contingent and carries its histories, or interwoven chronotopes with it. Keith Basso's (1996) concept of "place-time" highlights how places do not divorce space and time nor treat them as empty and homogenous.¹ Basso explains that place-names among the Apache carry stories with them through which people can learn lessons from chronotopic experiences where time and space have fused together. In landscapes where time and space are fused together in place-names, the liveliness of historical tales materialize in the present (Basso 1996:62). Place-times, I suggest, are also enacted not just in naming places, but the actual doing of truffle gatherings and people gathering truffles.

¹ Basso draws on Walter Benjamin's notion that modernity's obsession with progress treats time as homogenous and empty.

I began my dissertation fieldwork in the Kalahari Desert in early May 2015, just after the late rains at the end of April. This is the *time* to find *mahupu*, !Nate and Njoxlau told me: I had arrived at just the right moment. Truffles, like other fungi and indeed many plants, are episodic, mobile organisms, that are present to be gathered only intermittently over the course of a few months in good seasons, arriving in the Kalahari after late summer rains followed by cool air, a less than predictable occurrence in this arid semi-desert. In addition to the convergence, coordination, and gathering of the right variety of plant hosts, weather conditions, and soil/sand compositions, they need rain *at the right time*. The temporality of the rain has to come together with the open-ended gathering of those other material relations. If there is drought, there are no truffles, and in this semi-desert, there is often drought. If plant symbionts have been overly disturbed (grazed or burned for example) truffles may not appear in places they once propagated. Similarly, when livestock or wildlife continuously trample the grounds where mycorrhizal associations are developing, truffles and their fruiting body potentialities may be stamped out. These landscapes in which I conducted my research are increasingly over-grazed and over-trampled.

Truffles emerge with and through the movements of landscapes with the coordination of multiple temporalities, manifesting as fruiting bodies in their doings of *place*, but others do place too. The multitude of temporalities in and with landscapes afford the entanglements of the requisite relations, relations that are both resilient and fragile. It is in this sense that truffles make places that people track,

move towards, gather with, and gather from through temporal coordinations in spatial arrangements. But these places are not given or guaranteed.

I accompanied !Nate and Njoxlau on a tracking survey in the Kgalagadi District with our colleague and friend, Derek Keeping, for the first few weeks of my dissertation research, hoping to find truffles. While !Nate and Njoxlau were familiar with this area from past tracking surveys and had found truffles in this region before, they did not know of specific “truffle places.” However, insisting that I had arrived at the right time to find truffles, they instead showed me how to look for key signs of optimal ecological assemblages where truffles might appear, usually indexed by a particular kind of grass, and sometimes but not always near the edge of a pan or a valley. The key for tracking truffles here was knowing *when* to look, but we couldn’t look just anywhere. Tracking them meant attending to the external climatic and environmental patterns together with the sensitivities of the organisms through the truffles own material attunement to temporal and material conditions and coordinations. Potential truffle places were tracked through a material semiotic noticing of these patterns, as chronotopes that afforded speculations about truffle arrivals and their potentialities in unfamiliar places.

As we drove towards the settlement of Zutshwa where we would base ourselves for the next week, !Nate and Njoxlau pointed out stands of grass where they thought truffles could *potentially* gather. These were speculative truffle places. We stopped on several occasions to wander about looking for truffles with little luck. !Nate and Njoxlau’s main priority at this time was to count tracks for Derek’s survey,

so we couldn't stop everywhere. Instead, they suggested we find someone in Zutshwa to take us to a *truffle place*, somewhere people had gathered truffles before and knew to return.

After pitching camp in Zutshwa, we sat around and talked with a few visitors we knew from past surveys in the area when a woman named Boitumelo passed by who, one of our visitors told me, knows where *mahupu* are. I introduced myself and asked if she would take me to look for truffles with her the next day. She agreed.

Historically, gathering has been described as a gendered activity, practiced primarily by women, though men too gathered in the everyday. With significant socioeconomic changes in the last fifty years, not least of which includes sedentarization, the frequency of gathering has decreased, and perhaps the gendered boundaries have retreated somewhat, especially now that hunting is also not allowed. As my longer-term interlocutors were men, a relationship that was not doubt built on the fact that they were men hired as trackers, they have been afforded greater mobility than other people living in settlements. People in settlements, especially women, however, do continue to gather, enacting kinds of movements that resist sedentarization. These activities are so mundane that they go unnoticed, yet new regulations require permits for the gathering of foods with the intention to sell or for anything other than personal consumption. Boitumelo revealed that she herself had been told that she required permits to gather mahupu. In order to acquire the permit, she would have had to travel 70 kilometers to where the administrative permit-issuing offices is located, which was entirely impractical. I later learned that state authorities

in this particular area emphasize the requirement of gathering permits without sharing the caveat that they are only needed if bush products are being gathered with the intent to sell. Boitumelo gathered anyway but was at first weary that I or someone else might report her. I showed her my research permits and assured her that we were protected. Indeed, that an outsider anthropologist arriving with a research permit made gathering permissible for local constituents is a violence that deserves greater attention and will be explored elsewhere.

I met Boitumelo and a few of her relatives early in the morning, while !Nate, Njoxlau and Derek went to count tracks. Boitumelo's twelve year old daughter Naledi, elder brother K.B., an elderly woman named Brenda, and Boitumelo's very old aunt joined us as we ventured out. We decided to drive to an area a few kilometers outside of the village where they had collected *mahupu* in previous years. Like most of the areas surrounding Zutshwa, open grasslands with scattered trees characterize the landscape. Unlike most of the open grasslands around Zutshwa, it was not dominated by the sour grass (*Kalahariensis schmidtia*), a thick successional grass that typically lives in degraded sandy soils. This grass is so sour that the acid it secretes can cause skin irritation, burning your flesh, if you walk through a stand uncovered. Here, however, there was more of a white, wispy grass that !Nate and Njoxlau referred to as "mahupu grass," (*Stiptagrosis uniplumis*). But the grass in this area was quite dry and it was difficult to find signs of *mahupu*. As we ventured further into the bush, the vegetal communities changed, the soil became slightly

moister, and the wispy grass was more abundant, with a scattering of small shrub bush.

Unlike other times when tracking in single file as we paced the landscape, this time the group fanned out looking for *mahupu*, though I stayed at Boitumelo's side to learn from her. When we approached a suitable patch—moist sand, “mahupu grass” stands, *morethlwa* bushes—the party started calling out to each other as they found promising signs. Looking for truffles, they would bend over at the waist, gently sweeping the grass to the side with a stick to inspect the sand for tracks, those telltale cracks in the sand. At every moment, there was a continuous noticing of the various aspects of the landscape, an attention to the grasses, other vegetation, the moisture of the sand, the temperature of the air. To track truffles, we tracked landscapes, habitats, conditions, the relations between them, and how they coordinated. While looking for signs of truffles we also had to be aware of other creatures. Tracks of animals were pointed out and other plants, like the Kalahari cucumber (*Cucumis metuliferus*) that Brenda stopped to eat, were tracked and gathered as they were encountered.

Brenda found the first *mahupu* track underneath a *morethlwa*, or brandybush shrub (*Grewia flava*). She called out in celebration and gestured for me to come over to dig it out. I was surprised when I arrived at her side that she just stood there, waiting for me to see the crack in the sand. She didn't offer me much in the way of instructions other than gesturing for me to dig it out. As I had years before, I reached into the sand, my fingers still bumbling about, and gently I pulled the small humid lump of truffle out of the sand. It was small, but I was quite impressed with myself

and dusted it off to show the rest of the group. They laughed at my enthusiasm and simply carried on looking for truffles. Like before, they preferred I learn by doing the gathering than telling me how.



Figure 8 Purple witchweed emerging

A few minutes later, I spotted a truffle track on my own. Again, quite impressed with myself, I called Brenda over to show her. Just as I was about to dig out the truffle, Brenda slapped my hand away, realizing that this was a track of something else. It was a purple witchweed (*Striga gesneroides*), an obligate parasitic plant that emerged from the sand producing cracks similar to the *mahupu*. Njoxlau told me later, with regard to witchweed, “If they come out, it means there is *mahupu* somewhere.”² They make similar tracks and arrive in the landscape at similar times, though they are quite opposite creatures. While the pathogenic witchweed parasitizes

² Njoxlau was implying that witchweed and truffles arrive at similar times but that they would not be found in the same place.

plant host roots, feeding on them—infecting a variety of African small holder crops, notably tobacco—*mahupu* are mutualists. Perhaps witchweed is described prejudicially because of the way it interferes with the cashcrops of humans, yet it also seems that while they might share a similar temporal emergence with truffles, they are not usually found dwelling in the same patches. Gatherings are not always cozy; some coordinated gatherings may interrupt others.

As mycorrhizal fungi, truffles develop through symbiotic, mutualist relationships with vascular plant roots. But this is not a unidirectional relation that demands, or assumes, that plant hosts and/or sand compositions are dominant presences in landscapes. The very presence of mycorrhiza simultaneously influences sand composition and the degree of plant presence. In other words, truffles do not just arrive in the desert if the right plants and sands are available at the right time; the plants and sands are partly present due to their histories of relations with mycorrhiza. Mycorrhiza are especially important to the health of savanna grasslands in the Kalahari. Sands, mycorrhizas, and plants are co-constitutive at this scale, which is not to say they are the only variables in the relationship that constitute the life worlds of these things. Rather, they are one open-ended assemblage, or gathering, that hangs together in landscapes with others, making landscapes. In other words, their doings together with their relational histories of gathering make landscapes.

Not far away, in the same shrub grove, we did end up finding *mahupu* underneath the edges of the wispy grass tufts, and later *mahupu* were found near shrubs, both plant species that mycologists have confirmed as host plants for this

desert truffle (Kagan-Zur et al. 1999). When we found truffle tracks, my interlocutors reached into the sand and pulled out the fruiting bodies swiftly, but carefully.

Boitumelo pointed out the tracks, encouraging me to learn how to dig out the truffles without breaking them, or disturbing the hyphae entanglement, the umbilical cord, which K.B described to me as “sand-water.” This little lump of sand and hyphae was more moist than the surrounding sand and even the truffle itself, which prompted K.B. to explain that this is the source of gathered water that the emerging fruiting body drinks from. And, even in the moments of careful gathering, there was a noticing beyond the truffle. When I was digging for them, Boitumelo slapped my hand away from the sand on several other occasions, instructing me to be careful of scorpions and snakes, and to never just reach into the sand or sweep a tuft of grass to the side without checking for the presence of some of our less friendly landscape companions.

We didn't find many truffles that day: only eight in all. K.B. said that there had been too much drought, perhaps even fire, and that there were too many springbok and other animals in the area trampling the soil. Too much of any one kind of movement in landscapes might disturb, or interrupt, the movements of others. Landscapes carry with them the weathered histories of past presences. Disturbance is another way of describing how places, place-worlds, and place-doings are not static.

Looking for truffles thus brought me to two kinds of place, or rather two conceptualizations of place: places known through histories of past doings and speculative places. Places with histories of gathering through repetition emerge with

and out of experiences of having been somewhere to gather truffles. But there are also speculative truffle places that are emergent in their familiar patternings. They become recognizable as potential truffle places because of the patternings of ecological assemblages, or gatherings, as familiar to and for truffles. That is, place is not just a chronotope from which people gather meaning. Places are also done by nonhumans like truffles in their relations with others. Through an attention to patterns of coordinations, gathering, like tracking, affords speculative practices about those places and their potentialities.

For people, gathering practices bring about a memoried familiarity and an historical intimacy to the emergence of a particular place, as well as the recognition of generalizable kind of place with particular potentialities. These are pasts and futures lived together in landscapes through presences and non-presences. A place where truffles have been found can be a particular truffle place, for instance, but an ecological assemblage might also be indexical of a *potential* truffle place, unfamiliar and familiar simultaneously. Though we did eventually find some *mahupu*, there were a lot less than was initially anticipated. Two years ago they said that they found a lot of *mahupu* here, but almost as soon as we arrived Boitumelo and K.B. seemed quite sure that the sand and grass was too dry. This was a “*mahupu place*,” based on past experience coupled with histories of the landscape, even though there were not many truffles. In their nonpresence, this was still a *mahupu* place, in part because of their histories of movement in and out of landscapes together with the memories of gathering them there.

Truffle Mobilities

Movement is central to the making of place. A key difference between tracking animals and gathering plants or fungi—gathering in the sense of finding, not just collecting—may at first seem to be an issue of movement. It is easier to imagine, for example, an antelope bounding through the landscape than to imagine a tree moving through the landscape. But trees and other plants and fungi do move, albeit at different paces. Their seeds and spore are transported across landscapes and show preferences for particular habitats. Their roots and mycelia spread through the substrate tracking water and nutrients, they grow and shift, and their physiology changes with the seasons—at times moving at faster speeds than animals. This provokes an attention to the temporal dimensions of landscapes, movements, and histories of movement. It is through an attunement to temporalities, I suggest, that tracking and noticing movement across different scales that patchwork gatherings can be seen to come together in the making and doing of place. It is through these mobilities over time that gatherings and, with them, place comes into being. By engaging with gathering as skilled practice much like tracking, the liveliness of nonanimal, nonhumans in Kalahari landscapes start to come to light as unfolding through and with the landscape, as gatherings with which place emerges.

One of the things that has inhibited the philosophical and theoretical consideration of the liveliness and sociality of plants and fungi, in addition to the human-centric conceptualization of semiotics and consciousness that Eduardo Kohn (2013) and Marder (2013) elaborate upon, respectively, is that they are thought to be

rather static, or sessile at best, in a more phenomenological sense. Yes they grow and die, maybe even spread, but mostly they are thought to lack mobility. But plants and fungi do move, and they do travel, albeit at a different pace and temporality. Truffle tracks, or spoor, show us that. Not just because people track truffles as meat in the ground, following all the different spoor, but also because it helps to elaborate upon how things like plants, fungi, and minerals do stuff together, they travel, and are not immobile. For what is a track if not an indices of movement. In their movement, truffles make earthly openings—their own tracks—that pull plants, people and animals into relations immersed in sand and sediment.

Truffles, or rather their mycorrhiza, track material movements of plants, sand nutrients, and water, which they gather together in their own becomings. Desert truffles, as described earlier, are hypogeous fungi with closed globose fruiting bodies that grow entirely, or partially, submerged under the surface of the soil. Their closed globose fruiting bodies produce spores in the outer walls of the truffles, having an “abundance of large, inflated, thin-walled cells in the peridium and gleba,” that do not inhere within them a dispersal mechanism (Trappe et al. 2008:522). Instead, spores are dispersed by the truffles’ landscape partners. These thin-walled cells swell when they absorb water, forming spores, while the underground swelling of the fruiting body cracks the surface of the sand. As they dry out, the thin-walled cells collapse into powdery fragments, exposing the spores that then may be blown away by the wind. The cracks in the sand that reveal truffles and the smells they emanate attract foragers such that, in addition to wind dispersal, it is suspected that human and animal

foragers perform a central role in spore dispersal when they dig up and move truffles about the landscape. Their lifeworlds are entangled in their movements.

The dispersal of fungal spores is, thus, largely influenced by the material movements of plants, sand, wind, and those who forage for them, human and nonhuman. Spores are carried by the wind and by other species that eat the truffles, and where those spores settle and eventually propagate happens in relation to the distribution of compatible vegetal communities and sand groups. For instance, truffles are often found near tall grasses that catch the wind, almost dancing with the wind, which helps assist in the distribution and settlement of spores. Or, considering that mycorrhizal networks have evolved with plants, supplying them with nutrients, it could be just as accurate to say that vegetal communities are located in relation to the places where mycelia spread through the sand.

Similarly, fungi are commonly thought to gather around their plant hosts, presumably because they are thought to have shorter life cycles, but as relational mutualists, there is no reason that this relationship cannot be stated inversely: plants gather towards their mycorrhizal partners. And fungi do not necessarily have short life cycles. Yes, their fruiting bodies may only appear sporadically and quickly decompose, but that is only one stage in an ongoing lifecycle of mycorrhizal relations that can endure for long periods of time within sands and soils.

In forming associations with plant hosts, the fruiting bodies of truffles are relational by definition. They come about through nutrient and carbohydrate exchange between mycelia, soil, and plant root. In the ground, fungal spores develop

mycelia, fine fungal hairs, that creep deep below the sand's surface collecting mineral nutrients, that track, extend into, and latch onto plant roots. Truffles are ectomycorrhizal, which means that they form associations with their plant hosts but do not penetrate their cells. In return, plants provide photosynthetic products or energy in the form of sugars and carbohydrates for the fungi (Roth-Bejerano, Navarro-Ródenas, and Gutiérrez 2014:69).

These movements and relations provoke different descriptions and accounts. What I have just described is largely the way mycologists report truffle doings. My tracking interlocutors present something different, yet these varying accounts are all provoked by an attention to the patternings of coordinations, and “how they hold” (Gan and Tsing 2017), as gatherings in various forms.

Truffled Landscapes: *How Truffles Gather*

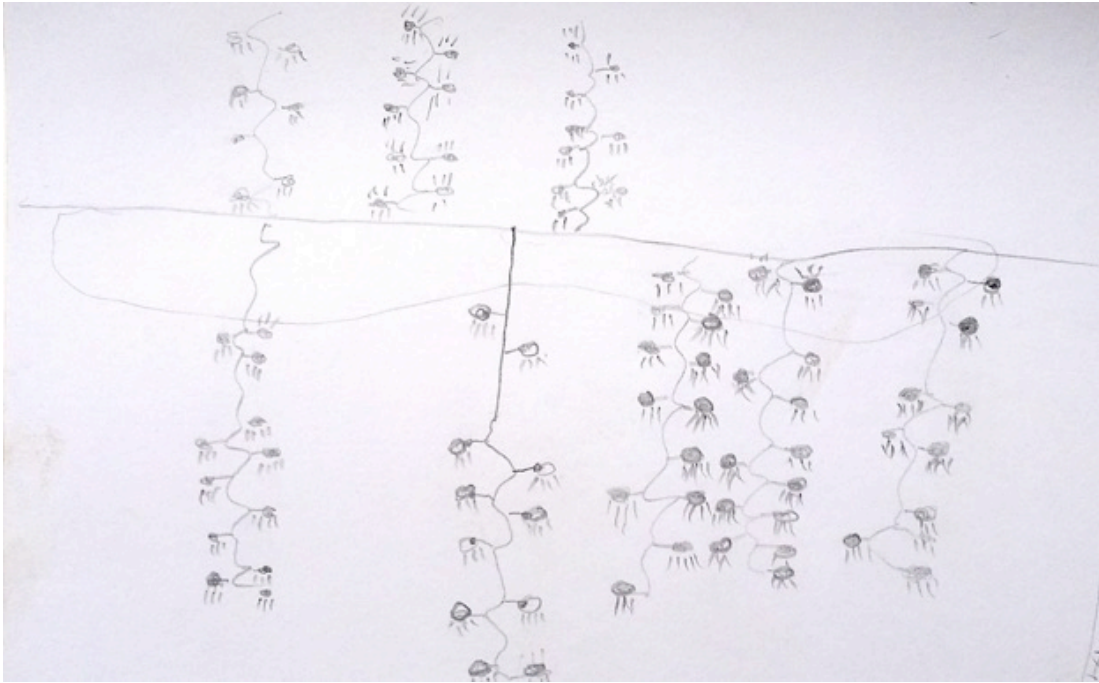


Figure 9 A truffle landscape (Njoxlau and Karoha)

Movement, I suggest, is the performance of the chronotopic fusion of time and space in the lifeworlds of landscapes. The image above is a drawing of how *mahupu*, or truffles, live in the sand. It is a speculative representation of a truffle place through time, collaboratively made by Njoxlau and Karoha when I asked them about how truffles live.

This drawing presents a birdseye view of a pan or a megkatcha (a fossil river or valley) with the top layers of substrate removed to reveal a gathering of truffle *becomings* below the ground's surface over the course of a few months. To give a rough idea of spatial scale, this might encompass an area somewhere between the size of two and four football fields.

In the center of the image, from left to right across the page is a line attached to an oblong shape, which represents a hypothetical pan or valley. The line is a “string,” as my interlocutors called it, connecting all of the truffles to each other. On each side of the string there are additional strings branching off, with little nodes attached to them. The circular nodes are the truffles.

The “strings” connect to the truffles through the “belly button,” or navel, as described earlier in this chapter by my interlocutors in reference to the physiology of truffles as “meat that lives in the sand.” In other words, the string drawn here might be understood as the sand umbilical cord. The little lines radiating out from the truffle nodes are the grass that truffles are often found living with. This is a truffle gathering at the scale of a truffle place in which the truffles form into nodes through relations between truffle strings, plants, and geological sediments. It is a map of a truffle place, a truffled landscape. In the picture, truffles are spatiotemporal chronotopes. They are multitemporal, bringing together gathering practices—in both senses of gathering—and speculative practices concerning place potentialities.

Frozen in time as an image, the picture also shows the movement through time of a whole fruiting season. It is the temporal accumulation of truffles and their connections from the first signs of fruiting bodies after late summer rains to their last flush. It is not a Cartesian spatial map of an abstract territory, nor is it empty-homogenous time. Rather it is a spatiotemporal map in action, in movement. It is a speculative gathering that points to a multiplicity of potential truffle happenings. The truffles are not all there at once. The gathering may remain present and continue to

develop, but the fruiting bodies of the truffles—the manifestation of exchanges within these gatherings of relations—are episodic. In this way the drawing is a temporal as well as spatial map of truffle potentialities and how their relations endure even in the absence of truffle fruiting bodies.

In this hypothetical situation, my informants explained that gathering truffles would begin in March or whenever the first late summer rains occur, with the first group of truffles arriving in the top left of the picture. As the gathering season progressed they would continue collecting on one side of the pan or valley, moving along the upper right side of the page by the end of April, where fresh truffles had just cracked the sand. They would eventually come around the pan, collecting truffles along the way to the bottom left side of the picture when truffles arrived there in July or August. Truffles gather, they move, and they connect, and human truffle gatherers follow these movements and connections. The map is a reflection both of when people gather and the different times at which fruiting bodies arrive in the sands. In interviews and conversations, my informants spoke about collecting the larger ones and leaving their “babies,” the smaller ones, until they grew larger, so that there may also be returns to already gathered spots in the future.

The popular assumption about mushroom or truffle producing mycorrhiza is that they appear near their plant partners. However, as I have argued, it is possible to invert this assumption to say that plant partners grow near mycorrhizal networks. This drawing shows just that. It shows how grass gathers with, and perhaps towards, truffles. You can’t just find mahupu anywhere, or anytime. They are episodic and

particular about their ecological arrangements. They move with the rainwater they drink and the plants with which they assemble. Mahupu are often referred to as “good hidlers” in !Xo because the large tufts of mahupu grass that gather towards truffles often obscure their cracks.

Another interlocutor, Gustel Heinz, who I will introduce in greater detail in the next chapter, presented another drawing of how truffles gather. I met Gustel for the first time a few weeks after returning to Bere from Zutshwa. Gustel spent part of his life living with his mother, a !Xo speaking woman from Bere, and her family, learning !Xo stories about the landscape and how to track, hunt, and gather. However, he also spent a number of years with his father attending primary school and high school. His father was a scientist and anthropologist, and Gustel prides himself on some of the scientific lessons he received from his father. He will talk with great enthusiasm about dinosaurs, lamenting their great extinction, and on more than one occasion cited his father’s warning that wildlife in the Kalahari may be headed towards a similar fate. In the same breath he will tell a !Xo origin story about how ostriches and gemsbok came to be afraid of each other after a romantic encounter gone wrong. Gustel’s perception of truffles and how they live brings together different cosmological, epistemological traditions or ontological realities as controlled equivocations (Viveiros de Castro 2004a) into hybrid form. The point, however, is not to point to ideas about purity of knowledges, but to draw attention to the different descriptions and forms of noticing that truffles provoke. Gustel’s description of *mahupu* as sand meat is consistent with those of my other interlocutors

and at the same time his drawing resembles how a mycologist might draw a truffle lifecycle in a textbook.

Gustel explained to me in an interview: “The mahupu is something that when the rain rains a lot, then you can find it on the edges of molopos, or valleys, on the hard, soft, dusty sand. Even you can find it on top of the dunes. And this mahupu is a food which is made out of water. It is moist underneath. And this moisture, when it sticks to something, the sand sticks together and when the rain rains to where it sticked, it starts to grow and grow and gets more minerals in the middle of it.”



Figure 10 Gustel's drawing of how truffles live.

Truffles, Gustel explained while describing his drawing, above, live in the sand where they gather minerals and drink water when it rains. The truffles, as indicated, are found within the small triangular mounds that they make when they arrive in the landscape. These, again, are their tracks. They live with plants but have their own kind of roots different than those of plants. The roots of the truffles, in this

drawing seen as dotted lines, are all connected to one another. At various points, the truffle roots intersect with plants roots, forging more connections that extend the range of where the truffles are found. Plant roots join in to stick together with *mahupu* roots in the sand with minerals that gather together, and when it rains in the late summer months they drink the water, with the *mahupu* eventually emerging in the small mounds and cracks in the sand. They emerge out of a gathering of relations over time in particular configurations in the landscape with plants, sand, and water. The rain and minerals are active, doing things. The rain rains, the minerals stick. Together, *mahupu* grow. It is, in other words, the fusion or emergent gathering of life and nonlife. It is geological, of the sand; it is also biological, of life.

Truffle Mycology

Other kinds of desert truffles have been found and described in every kind of desert around the world, whether hot or cold. As Kagan-Zur et. al (2014) points out, a common linkage between these desert fungi seems to be their limited access to water. They are eaten by people in some deserts but ignored or thrown away in others. In some cases they are even considered to be foul, malign organisms. Nonetheless, they are quite valuable commodities in many places but, like other wild commodities, yields of desert truffles are declining around the world while, “at the same time appreciation for their nutritional value and organoleptic properties is on the rise” (2014: v). Cultivation is considered the ‘holy grail’ of truffle mycology, but successful cultivation is relatively recent. The first successful attempts at cultivating

any desert truffles only occurred twenty years ago and cultivation of most desert truffles, like those in the Kalahari, still confounds many mycologists.

The Kalahari truffle is one of the least studied desert truffles and it has never been successfully cultivated—this despite years-long projects that attempted to do so. One of the first things Frank Taylor—someone who has worked extensively with mycologists to cultivate Kalahari truffles—said to me was that he hoped I wasn't planning to cultivate them. This, he suggested, is an impossible task. He worked for years to do so and eventually gave up, claiming that there are too many unknown variables to figure out how to cultivate them.

Determining and then controlling the range of relations, material conditions, and coordinations needed for truffle bodies to fruit is too unwieldy, too diverse, and too contingent to reproduce outside of their Kalahari lifeworlds. Kalahari truffles are indeterminate when approached as independent, bounded organisms. They are not indeterminate in their own right, but they are relational. They come into being with a range of other organisms, minerals, and climatic conditions. Attempts to control or manage the life cycle of Kalahari truffles fail to capture the diversity and contingency of these relations. They live with other things and help those other things live as they make landscapes.

The plants that act as Kalahari truffle hosts are still largely unknown by scientists, though a few plants have been suggested, including several species of grass, acacia, and possibly the tamma melon, which has historically been an important water source for animals and humans in the Kalahari, and may have even

evolved with truffle mycorrhiza (Trappe et al. 2008:524). The important point here is that in order for truffles to propagate, they need to engage in relations with a range of different plant species, many of which are unknown to scientists and other cultivators. This is part of the reason why no one has figured out how to cultivate these truffles (Taylor et al. 1995; Kagan-Zur et al. 1999). Because of the minimal water available in the Kalahari, plant roots stretch out over great distances such that the body of a potential plant host may be up to fifteen meters away from a truffle's fruiting body, which is one explanation for why mycologists' are still uncertain about the full range of plant hosts.

Recent research about desert truffles in other parts of the world suggests that prior to mycorrhization, when mycelia form associations with plant roots, the fungal mycelia secrete auxins that function as a signaling system to plant roots, encouraging lateral root growth, particularly during times of water stress. Truffle mycelia, like all mycorrhiza, potentially influence the very morphology of desert plant roots, supporting their ability to withstand drought. While not much is known about the ideal soil properties for desert truffles, climatic factors are considered to be among the most important drivers of their propagation. Sudden rainfall after extended dry periods has been suggested as one of the key factors involved in desert truffle occurrence: "because of the great effect water availability has on soil development, desert truffles may therefore occur both in very poorly developed soils, those that have inherited most of their characteristics from the parent material, as the typical

dryland ones, and on the contrary may grow in soils whose characteristics are the result of alternating relatively moist and dry periods” (Kagan-Zur et al. 2014:57–8).

The Kalahari encompasses one of the largest uniform sandsheets in the world. These sands are Arenosols, characterized by their lack of a significant soil profile—they contain 90% sand with low concentrations of organic matter—with a low carbon to nitrogen ratio. Overall, the nutrients required for plant development in the Kalahari is rather low, with low levels of nitrogen, potassium, magnesium, and phosphorus, though there are higher concentrations of calcium (Bonifacio and Morte 2014). Mycorrhiza living in these sands establish relationships with plants, exchanging difficult to access minerals and water for energy. Mycorrhiza are very efficient at solubilizing phosphorus, thus it has been suggested that the low phosphorus availability in the desert sands might, in part, be explained by mycorrhiza presence, including those of desert truffles. This is to say that truffles may be especially important to plant life in the Kalahari.

Furthermore, manifested as fruiting bodies, truffles themselves have high levels of phosphorus, potassium, and other minerals relative to the concentration of those minerals in the sand. In their emergence, Kalahari truffles undergo a process of biomagnification whereby they accumulate surprisingly high levels of potassium, according to one mycologist studying these truffles in Botswana (EB Khonga, personal communication). In an environment of relative nutrient scarcity, truffles concentrate and amplify those minerals that are present in the sand. The sand contains minerals that are enhanced in the body of the truffle in its relational becoming. The

biotic and the abiotic work on and with each other. This is to say, mycorrhiza in deserts, and elsewhere, not only establish relationships with plants but also influence and are influenced by the geochemistry of soils and sands. This is especially interesting when considering the prevalence of vegetation in the Kalahari given the low nutrient levels in the sands and the frequent periods of water stress.

In some desert truffles, it has been shown that pre-symbiotic signals are exchanged between vegetal and fungal partners in order to facilitate the establishment of symbiosis in arid, water-stressed areas (Sitrit et al. 2014:82). Mycologists sometimes describe these relations in neo-classical economic terms. In extreme environments, it is important that fungi and plant partners develop “an efficient signal exchange system” to ensure their mutual survival during times of drought. This exchange system precedes the symbiotic relationship in which mycorrhization occurs, and influences the mycorrhizal type that might occur, as well as root morphology of plant partners. In a study of desert truffles in the genus *Terfezia* in the Middle East, mycologists found:

“Under desert conditions in which both partners have only a short time in which to grow and establish mycorrhizal relations, the problem of coordinated development assumes considerable importance. In the course of co-evolution with its plant partners, *Terfezia* acquired capabilities that enable it to secure successful encounters with the host’s roots. One such mechanism is the ability to secrete auxin. Secretion of high levels of auxin in the vicinity of the developing roots directly affects their architecture and orientation” (Sitrit et al. 2014:87).

The most prominent effect of auxin secretion on root morphology is the inhibition of taproot elongation and that it induces lateral root formation. The effect of the auxin signaling on root morphology forces the plant host to rely on exploring fungal hyphae to supply minerals and water, increasing the plant’s reliance on the

symbiotic relationship for survival (Sitrit et al. 2014:82). Thus, auxin secretion facilitates the coordination of growth rates between partners which increases the likelihood of their encounter and establishing symbiosis. Through their signal exchange systems, fungi and plants track each other towards an encounter where they gather in their mutualist relationships. What the mycologists describe here, in however functional the terms, is relational coordination.

Mycologists' explanations and my interlocutors' explanations of truffles have some similarities and differences. Truffles are the manifestation of relational entanglements, or gatherings, of plant, fungi, mineral, water, and weather that emerge in specific spatial-temporal arrangements. My interlocutors elaborated on these gatherings when I asked them to draw a picture of how truffles live. What they drew shared some features with stylized representations of mycorrhizal networks of the "Wood Wide Web," which uses the internet as the metaphor to describe recent findings that mycorrhizal signaling networks that establish relationships to exchange carbon dioxide with trees, and facilitate a kind of material semiotic communication between plants and fungi.

Thinking about truffles at the intersection of tracking/gathering and comparative scientific knowledges is not meant to suggest purity of knowledge or make distinctions between indigenous knowledges and science, but rather to point to different ways of seeing coordinations and gathering. Coordinations are what make tracking possible. And part of this story involves the different accounts of humans and others through a material-semiotic attention to the doings and relational

coordinations. Rather than the “forcing” of relations between individual actors, we see gatherings and their subtle effects.

To Gather and to be Gathered: Towards a Carrier Bag Theory of Landscape

Truffles are only episodically present. They need to be located in relation to their ecological assemblages, and the patternings of plant gatherings often offer clues, but plants alone are not enough. To find *mahupu* you must walk the landscape engaging with all variety of signs, how they coordinate, and the particular convergences that call for sweeping grass and brush to the side that may be hiding truffle tracks. Less than signs to be read, they are phenomena that reach out into the landscape beyond the tracks themselves. They may be patches of berry bushes, trails of animals, swaths of flowing grass, as well as a cloud front building on the horizon, blowing in its cool air. Each of these phenomena carries with them their own stories of interaction that gather attention towards them. The morphology of a tuft of grass, for instance, is shaped and reconfigured through different interactions over the course of its life as it is rained on, colonized by mycorrhiza, withered by the sun, grazed and trampled by wayward cattle or migratory antelope, burned by fire, gathered by humans, dug by porcupines, or diseased by parasites, revealing clues not just about the life history of the grass, but potentially whether or not a particular patch might be suitable for its *mahupu* companions. Here, humans and nonhumans become entangled through tracking and gathering.

These details elaborate, and are elaborated on by, other things too. How grasses move in the wind are materially influenced by their biographies (i.e. how

much they have or have not been grazed), but their movement also tells the story of how wind currents move, rendering the air visible in the bodily comportment of the tufts. Some root systems (though not mahupu grass, which will be described in greater detail in the next chapter) too spread across the landscape sometimes as crawling stolons³ or creeping stretches of rhizomatic knots, enacting other patterns above and below ground that offer windows into truffle worlds through the lives of other entities. As truffle relata, grasses are always moving temporally—in and out of seasons—but also spatially—to and from particular patches as parts of cascading sets of relations.

In following truffles, the temporal scale of a fruiting body's movement in and out of the landscape is much different than following an animal, but the principles of attending to the gap while tracking are similar. By attending to the gaps, or nonpresent periods, during which time truffles move in and out of the landscape, my interlocutors and I were drawn to the phenomenological spoor of truffles—not the truffles themselves but their lively companions—moving through the landscape in their own right. I would follow those tracks and traces, and more than reading into the sand, my interlocutors emphasized immersing ourselves into the ongoingness of phenomena that might otherwise only be partially perceived in the landscape.

Tracking this way, as a practice and as an analytic, brought us to different sets of

³ Stolons: Botany. a prostrate stem, at or just below the surface of the ground, that produces new plants from buds at its tips or nodes (Dictionary.com). Stolons are often referred to as runners. They sprout from existing stems, whereas a rhizome is a root like stem. Also stolons tend to run above ground while rhizomes may stretch horizontally underground.

entities and broader phenomena, to present-nonpresences, through practices that exceeded, but did not exclude, the enactment of truffles. Other presences and non-presences emerged as actively gathering in their doings of the landscapes. Landscapes too are gatherings.

LeGuin's "Carrier Bag Theory of Fiction"(1996) helps here. One of the problems with the idea of "man the hunter," LeGuin points out, is that though it makes for a good story, it is too reliant on the action of a hero that culminates in a kill. It reflects individual masculine, "heroic" acts, but in the process of emphasizing the heroism of such acts, it silences the stories of everything else. We tend too often be pressed into the story of the Hero, but that is "his" story and not the story of "us," LeGuin teaches us. It is much harder to tell the story of the gatherer. Instead of a spear as the primary tool—a weapon for killing— LeGuin suggests turning to the bag or container. This is based on Fisher's carrier bag theory of evolution in which it is suggested that since gathering was the most important means of accessing foodstuffs, that the bag or container must have been the first and most important human tool. Rather than individual hunter and prey made killable, we get to collecting, collectives, and livability through the carrier bag. Tracking may be thought of similarly, despite its association with hunting, because of the attention to the collective ways in which landscapes gather. Rather than a practice of tracking down and killing a singular prey, it involves the continued gathering of signs, noticing assemblages, and being responsive to them. In this way, tracking is a mode of gathering.

By focusing on gathering we can set aside conflict and killing as the primary mode for understanding relationality and becoming other. Instead we can digress from, rather than transgress, boundaries of relationality, giving up the frontal assault to make room for play and seduction (McCaffrey 2013:16). To take LeGuin's point further, carrier bags are not perfect containers that can contain everything. What is gathered must be selected, can get mixed up, or may be sorted. Sometimes things fall out too. It does not imply a theory of everything—bags are not self-enclosed entities—and it does not culminate in the kill. There are no heroes, just collective gatherings doing their best to make life livable.

Tracking in terms of the carrier bag and gathering, rather than the heroic narrative, helps us get towards a theory of landscapes in motion, made up of bits and pieces that hang together, parts collected, or dropped out, in an ongoing kind of togetherness in which life and death are not decoupled. Thus, I suggest that tracking, thought in terms of gathering, gets us towards a carrier bag theory of landscape that best reflects landscapes in motion that emerge through their gatherings of relations rather than being defined as the space on which individual actors live in competition with each other. It does this by emphasizing gathering in the active double meaning of the word. For instance, plants move through landscapes gathered in carrier bags, forging new modes of livability, either in those humans who eat them, or in the landscape itself, as they fall out of bags and reestablish themselves in new patches.

Getting to determine who lives and who dies is the story of the hunter. How things live and die in their collective formations is the story of the gatherer. How

things gather with certain potentialities and affordances, and their uneven relations is part of this carrier bag theory of landscape.

These relations can also be interrupted, cut off, or held still, usually through the same kinds of logics, practices and politics that undergird heroic “man the hunter” type stories, those same logics driving liberal, capitalist practices that emphasize enclosure, individualism, and competition. LeGuin might call this a kind of botulism politics, drawing from Virginia Woolf, to flag botulism, the disease of contained units. These are the politics, practices, and approaches to landscapes that treat the world and its ecologies primarily as unitizable object resources. Gathering takes us away from self-contained units in a carrier bag approach to landscapes.

Truffles help to demonstrate how and why tracking is a useful practice for doing landscapes, and a useful analytic for theorizing them. They also bring about ontological questions and show how different practices enact different ontologies. These different ontological enactments too can be tracked to elucidate different knowledge politics. Tracking involves noticing relational potentialities through form and change to form. Tracking, then, is attending to movement and the various forms those movements take as they gather and assemble. In the process, certain cuts may be made materially as things are gathered and also conceptually as things are differentiated. Cuts are the most violent when they presume to hold these things and the landscape still. Tracking is in an ongoing practice of noticing and becoming with and becoming familiar with the world, such that once one stops tracking it has the potential to have the effect of holding the world still as if in a bottle where botulism

may breed. Some of the effects of such cuts end up living on in the histories and even morphologies of nonhuman actors.

Interlude: When the Truffle Left Us

After a few light showers in May, it did not rain again until the end of December and early January 2016. And then it didn't really rain again until the end of March, with the yearly rainfall measurements falling well below annual averages.¹ Furthermore, the rain that did come was late by all accounts and Botswana was in the midst of a multi-year drought.² After finding truffles in May, I did not see another one before ending my fieldwork a year later.³

The difficulty, but also the intrigue, of studying truffles over a year in the Kalahari is how to do so when they are not there most of the time. What to track? Their non-presence for eleven months forced me to attend closely to a multitude of possible signs, relations and patterns, tracing and tracking these other spoor that, despite the absence of truffles, might offer unique perspectives on/of the Kalahari's truffled landscapes. I could explore the places where my interlocutors had found truffles, the plants they suggested as possible plant hosts, and walk the desert tracing truffles relations as they were revealed to me. Specific to this approach would be

¹ 250ml in the 2015-16 rain season at my fieldsite, compared with annual averages between 350-450ml. The Kalahari is characterized by fluctuating annual rainfall. My fieldwork year was an El Nino year. There has been much more rainfall in 2016-17, a La Nina year.

² The Gaborone Dam which supplies water to the capital city reached an all-time low, holding just 1% of its capacity. The city was forced to pipe in water from South Africa but went weeks on end without water as pipes burst due to the increased pressure. Eventually, South Africa, due to its own shortages, was forced to limit the quantity of water it sold to Botswana. In addition, news reports abounded in Southern Africa, speculating about the arrival of a major food crisis after several years of failed crops.

³ Though friends reported finding a few truffles, but not many, in the weeks after I left.

connecting the experiential aspect of walking and tracking the desert world of truffles with my human interlocutors to the temporal, metabolic ecologies of Kalahari landscapes.

This presented a lot of interesting problems and questions, ethnographically and methodologically, in terms of how to trace not only the movement or mobility of one particular species but also how to follow the entangled relations between different species, ecologies, and even the human practices that are not always, or even usually, simultaneously available phenomena. What would the landscape look like through a focus on a symbiotic yet somewhat indeterminate object of study: something that, by definition, comes into being through the patterning of its relations? How does this object's non-presence materially encourage an attention to patterns of relations in unknown or unexpected places? What openings are revealed through the relations of a non-presence and where would they take me? What would truffles in their non-presence reveal about other nonhumans, humans, and political ecologies as they are configured in Kalahari landscapes. Ethnographically and empirically, I would have to follow leads that revealed themselves as I pulled on subtle threads.

My interlocutors assured me that they could teach me about the truffles even when they weren't present. Truffles are the "meat of the sand" they often reminded me, and they live with the grasses, by the pans, and with other plants. They would teach me about truffles through other plants and by digging into the sand. That my interlocutors, my teachers of all things Kalahari, were sure they could continue to teach me about truffles in their non-presence reassured me greatly. Their confidence

reminded me of what I had been taught about tracking. Tracking, after all, involves the patterning of gaps, spatially and temporally, that bring one into an engagement with something that is not immediately present. How truffles gather through their relations helps to elaborate this point, and staying with the truffle, following their unfolding relations brings us to some of their companion species, and the topic of the next chapter, *mahupu* grass.

When the truffles were gone, I continued walking the landscape, tracking and gathering with my interlocutors. We walked long distances, often between ten and twenty kilometers a day, passing cattle and wildlife, looking at all variety of tracks, animal dens and nests, forbs, succulents, shrub bushes, trees, and grasses. And though we often walked the landscape at quite a fast pace, our walking could turn slow and, at times, digressive. At any given moment we might stop as my interlocutors taught me about various characteristics of plants, their human uses, and also their relations to truffles, other plants, animals, and insects. We digressed to look for shade when the sun became too hot, shifting our focus to the larger trees that could provide cover, into berry patches to eat, or into the ground to taste the water of tubers when our water bottles were empty. In this fashion, we were frequently pulled in new directions by what we noticed, encountered, and experienced. We wandered through the bush to unexpected places, and we also plunged ourselves in, digging down into the sand—into the underworld of truffles and their companions—tracing roots and uncovering large water bearing tubers. Moving across the landscape we also moved vertically (up and down, digging as well as climbing trees, which will come later in the pans

chapter). Our engagement with the landscape involved a shifting of attention from the ground in front of us to the ground below us, or the branches and skies above.

As much as walking, digging came to influence the direction of my study across and into the landscape. Several prominent Kalahari anthropologists have noted that the single most important tool for hunter-gatherers in this desert was the digging stick. This is because tubers and water bearing roots below ground have been some of the most important food and water sources for people living in this desert. The digging stick continues to be an important tool today for people who gather foods and medicines in the bush. At each plant we stopped to gather or investigate, my interlocutors and I would dig into the sand to gain access to the roots systems and tubers that lay beneath the sands surface. When we slowed our walking, we often found ourselves on hands and knees digging into the earth. Even when the Kalahari landscape is at its most skeletal, scorched by the summer sun at the end of the dry season, the liveliness of this landscape is quickly revealed once one digs down: interlocking networks of *Elephantorrhiza elephantina* rhizomes, whose roots are used for dying leather, spread beneath the surface; tubers and roots bulge with water; rodents and insects burrow away; and larvae like that of the *Diamphidia simplex* flea-beetle once used to poison the tips of arrow heads develop in the soil under the *Commiphora africana* bush. As a rule, we always carried digging sticks, or made them along the way, when we walked.

Chapter 3. Between the Tracks: Following Grass

The previous chapter showed how things come together through truffle relations as manifest in the fruiting body of the truffle. This chapter explores how they gather *out* from those relations to tell other stories about landscapes, specifically focusing on gatherings of grass, one of those *relata*. It was not a “Carrier Bag Theory of Truffles” after all, that was presented, but a Carrier Bag Theory of *Landscapes*. Thus by tracking truffle relations, not just fruiting bodies, this chapter moves out into the heterogeneous gatherings with which truffle life-worlds are entangled. In doing so, this chapter aims to reflect on a diversity of nonhuman landscape and world-making practices as revealed by tracking out from their webs of relations. Grasses, as particular *relata*, feature as a diverse and lively groups of plants to orient these reflections and explorations.

In my early investigations of tracking, including my initial interest in truffles, I made the mistake of thinking that grasses are a rather mundane, uncharismatic, and unified feature of the semi-desert landscape. I couldn’t have been more wrong. Grasses are critical actors in Kalahari landscapes, offering different perspectives on landscapes-in-motion, their politics, and their histories, in the ways that they themselves form heterogeneous gatherings with people, wildlife, termites, truffles, sands, cattle, and much more. Indeed, after sand, grasses are perhaps the most omnipresent feature of the Kalahari, though overgrazing, other forms of degradation, and desertification are beginning to significantly inhibit their abundance. As this dissertation follows the unfolding practices of noticing that began with tracking,

moving into gathering truffles, this chapter then explores what an attention to grass elicits and how it gathers.

First, I begin with a brief return to truffles. When describing my research in the Kalahari, truffles seem to catch people's attention rather quickly. Perhaps this is in part because people are familiar with the well-known European varieties, their reputation as an expensive delicacy and the methods by which the European varieties are found—with truffle-hunting pigs or dogs that can sniff out their scent—and the initial surprise when learning that truffles live in deserts too. Truffles capture people's attention as charismatic organisms in different ways. But truffles are more than just their fruiting bodies that are most often the object of human attention in these stories. As I showed in the last chapter, truffles are also charismatic and relatable in their own ways. They help to tell good stories about landscape relations and their gatherings. When we consider the lives of truffles as gatherings of relations, it would be a mistake to think that they are fleeting or only present when their fruiting bodies can be found. In fact, the time when fruiting bodies are present in the landscape is but a small and short part of their fungal-relational lives. They are active in their other forms, as mycelia forming mycorrhiza, making companion relations all the time.

Grass arises here, at first, as a more-than-human ethnographic object of inquiry because of its material-semiotic indexing of truffle places. One might say, in the language of tracking, that certain grasses are truffle *spoor*: that is, they are one sign within the field of traces that potentially reveal the location of the *meat in the sand*.

When I began to pay attention to one particular species of grass beyond its role as truffle spoor, the huge diversity of other grass species, their varied relations, and their importance in the Kalahari quickly became apparent. Tracking relations through their gatherings opens up other sorts of other gatherings that carry with them a variety of stories and provocations about Kalahari landscape livabilities: historical, political, economic, and ecological. These stories and reflections open through the kinds of noticing that tracking allows and the descriptions this attention to movement evokes, in which grasses can be seen to be lively and mobile world-makers, gathering together with their companions. That being said, as mentioned in Chapter 1, tracking involves availing oneself to be compelled off course, or to digress from a particular linear and goal-oriented path. As such, the means of describing these unfolding stories of grass also requires narrative digression and, though grass is the orienting figure of the chapter, the reader may at times feel as if we have moved off course. This is an intentional attempt to reenact the ways in which these stories, even if digressions, were provoked through attention to grass and the ways in which it gathers. Ultimately, what grass *is* and what it *does* are different, ontologically, from the variety of human and multispecies perspectives with which grass is engaged in practice, but these differences hang together as grass gatherings in the doing and making of shared landscapes.

This chapter follows my experiment to follow landscapes-in-motion by tracing out relational gatherings in grass. Slowly, this attention to grass and my commitment to attend to their entanglements drew me into unexpected worlds and

other gatherings that might otherwise have been rendered nonvisible or that I might have simply ignored. Through truffles, grass led me to ants, termites, the political economy of cattle and other grazers, the territorialization of the commons, and some of the ways in which knowledge politics cascade through Kalahari landscapes. Each of these were reflected differently in the patterns of grass itself, together with its unfolding relations with the landscapes. This led me to ask: What stories does this grass tell about Kalahari landscapes? And, by tracking this grass, what sorts of relational gatherings might it reveal? Where I tracked grass and who I tracked it with, as I describe in the following section, also helped to situate this work in relation to the broader history of my fieldsite in this part of the Kalahari. In some ways, grass both obscures and betrays its truffle relations but, like the wind, it has an unseen force—an ability to lead people and animals with it. My own tracing of relations replayed the tracing of others and, in so doing, called forward stories about the landscape that only emerged from the effort to trace, to track, to find.

In the gaps between truffles tracks, grass—as a companion species—drew my attention to landscape relations that presented the political economy and ecology of grass, and the associated violences of colonialism and capitalism as legible and present non-presences in these landscapes. As much as I could not grab onto and hold a truffle, I could not grab and hold onto political economy as an object, however both truffles and political economy emerged as lively presences through the lives and histories of grass entangled with termites, people, cattle, water points, and fences.

Truffle Paths to Grass

Even after there were no more truffles to be found, we kept on tracking them. As we paced the landscapes in breaks between surveys, !Nate and Njoxlau tracked truffles by pointing out different grass stands and referencing their relations, or lack thereof, to truffles: “This grass is not good for truffles. Even the animals don’t like it. It is too sour.” I made the mistake of learning the hard way that Kalahari Sour Grass (*Schmidia kalaharensis*)—as mentioned in the previous chapter—secretes an acid that burns one’s skin when walking through it with skin exposed. Derek Keeping helped me to identify the grass in my guidebooks: an annual tufted grass that can form dense stands, usually living in trampled or disturbed sandy soil where it often functions as a pioneer species, meaning it is one of the early plant species to move into disturbed areas (Oudtshoorn 2012:136). It gives off a sour smell that, together with the acid, deters most grazers from eating it despite its relatively high nutritional value (Roodt 2015:176). Yet it stands out in the open western Kalahari landscapes in the WMA (KD2) between Zutshwa and KTP, especially after spring rains when it seemingly transforms these landscapes overnight into lively green expanses.

Many antelope—including eland, gemsboks, wildebeest, and hartebeest, and especially large herds of as many as 2000 springbok—can often be found moving through the area where these grasses are abundant, trampling the grassy expanses even if their grazing of this particular grass is limited. It is perhaps this trampling that accounts for the disturbance that attracts these grasses in the first place, which in many ways gives it the aesthetic appearance of being far from disturbed. The

openness of these grassed landscapes is magnificent and alive with plant and animal activity, perhaps attracted by the mineral nutrients of the area's many pans. Though !Nate and Njoxlau admitted this was one of their favorite areas to visit, they insisted we avoid such patches when looking for truffles, knowing that they wouldn't be there.



Figure 11 Open expanse of grass on the edge of a grassy pan in KD2. Note the heard of springbok (barely visible as specks) in the background of the pan depression, in front of the treeline that marks the edge of the pan's dune.

What grasses did and where they moved influenced our movements in this way, and it also influenced the movements of other species through the landscapes.

“That is a grass the eland like to eat. Also the gemsbok. All of the animals like this grass. But this is not a grass for truffles,” Njoxlau told me as he pulled at the luscious growth at the base of what looked like an old, but still highly palatable

annual grass. Pointing out the grasses that wildlife eat, my interlocutors anticipated the ecological assemblages with which truffles may gather, aggregating together with trails of animal activity according grass habitats and their transitions through different kinds of sand. It is in this way that such noticing attends to movements as landscape morphologies as much as the morphology of a particular figure, say a tuft of grass, a truffle, or even a pan. These morphologies of movement and the incumbent trails included those of human settlement and travel, state-built mobility infrastructures such as roads and cutlines built as fire breaks or pathways for water and mineral extraction, and even the cattle that also move about large parts of the Kalahari in search of grass forage and sometimes water-bearing tamma melons (*Citrillus lanatus*) and tubers in the dry seasons, all of which too are visible through patternings of grass.

Truffles attend to these patterns. “Truffles like the tall soft grass, but it is not so soft,” !Nate told me. “See that grass there? It is *!xa aa*.” He pointed to a large patch of light, golden blonde grass with a feather-like inflorescence—their flowering heads—that together seemed to be dancing in the wind. “This is the grass for the truffles.”

In an ethnobotanical study, Heinz (1973) found that for !Xo speakers, grasses are the only plants with their own taxonomic grouping, meaning that there is greater differentiation between kinds of grass than among other plants. !Nate and Njoxlau continued to point out this “truffle grass” or “mahupu grass,” to reinforce this association for the benefit of my learning. This repetition was key to my learning and

moving towards the mundane-ness of noticing patterns of movement in these landscapes in motion.



Figure 12 Looking for truffles in truffle grass (*S. uniplumis*)

Truffles were not only found near this grass; sometimes they were near *Grewia flava*, or *Terminalia serecea* shrubs, among other plants and trees. But almost invariably, this grass was present. It is the grass that was most often accompanied by the smooth sweeping action of human gatherers looking for truffles. And though the Kalahari has quite a wide diversity of grasses for a desert, this grass is one of the most common in the areas of my research. Being so distinctive, it was also one of the few grasses that I was able to identify in field guidebooks on my own: Silky Bushman Grass (*S. uniplumis*).

It is a relatively tall, heavily tufted, blonde, perennial, grass. This grass is also well known for its association with the mysterious “fairy circles” found in nearby Namibia, another kind of gathering this grass forms, the origins of which scientists continue to debate. Unlike European fairy rings, these circles are not thought to be

caused by fungal mycelia.⁴ Some scholars suggest that these rings may be made by harvester termites (*Hodotermes mossambicus*),⁵ while others argue that they result from self-organizing complex system of plants, water, wind, and soil (Sahagian 2017; Cramer and Barger 2013; Getzin et al. 2015; Grube 2002; Picker et al. 2012). Though these circles are not found in my research area, they are another example of the kinds of interesting unfolding relations of landscapes that can be tracked through grass and the varied questions they provoke.

In the Kalahari, Silky Bushman grass dances in the wind following the choreography of the wind's lines of flight, bowing to its every whim. This movement made it easy to imagine how, together with truffle foragers, the wind worked with the many spikelets on the tufts of grass to propel the spores of truffles through the air. In fact, this can be seen in the morphology *S. uniplumis*, which has feathered awns on each spikelet that help to facilitate their own seed distribution when it dances with the wind. I imagined the movement and propagation of the truffles through the interaction between wind and grass: wind, grass, and truffle travelling in convoy. Like a track, the movement of grass rendered these other movements visible. But grass too moves—in this case the feathered-awns are a morphological vehicle for its mobility—and makes its own tracks, indexes of its movements and landscape making.

⁴ It is therefore noteworthy that this grass seems to partner with Kalahari Truffle mycelia.

⁵ This termite species came to feature prominently in my exploration of grass and their role in their Kalahari landscapes.

If I were to stay with the truffle even in its non-presence in the prevailing gaps of time in which fruiting bodies had not gathered together, I would start with *S. uniplumis*. And as much as I was compelled by this grass, it guided me to the heterogeneity of Kalahari grasses, their surprising movements, and how much this heterogeneity matters in grass spaces.

As we moved around the Kalahari, I pointed out patches of grass, asking, “Is that the truffle grass?” It did not take long before I became familiar enough to quickly identify it at a glance while walking through the bush. The more I noticed this grass, the more my interlocutors told me about it. It is the preferred thatching grass for their huts. In fact, this was the same grass that Gustel Heinz would later use to build a hut for me at my camp near his cattle post. Animals don’t usually eat this grass, but they will sometimes eat new growth after rains or old inflorescence in dry seasons when more palatable grass is unavailable. This dry grass also catches fires easily and can burn entire landscapes. Fire tends to destroy its root systems, so even controlled burns do not stimulate regeneration as they do with other grass species (Roodt 2015:209). And it is also a decreaser, which means that it tends to retreat and not recover quickly from overgrazing (ibid). This was also the primary grass in my fieldsite cut by harvester termites, insects that I first thought were ants and that came to play a significant role in my understanding of grass, as I will describe later in this chapter. The grass-ant relationship seemed as if it might offer another kind of gathering that would bring me into the sands of the Kalahari, into the lively worlds of the ant nests beneath the surface. And, much like fire, which is often seen as a threat to the

grasslands but can actually promote growth, my interlocutors seemed to suggest a similar relation between these ants and the grass, with the additional benefit of reducing the potential of future fire by pulling the dead biomass into their subterranean homes, aerating and cycling nutrients through the soil.

Bere, GH11, and Gustel Heinz's Farm

By the end of May, following the tracking survey, !Nate, Njoxlau, and I returned to their home settlement of Bere in Ghanzi District. Karoha and /Uasi, who lived in the nearby settlement of Kagcae, joined us, and began to teach me tracking on a regular basis.

Bere falls within a wildlife management area (WMA) called GH11, while Kagcae includes the WMA GH10. GH11 and GH10 both encompass important parts of the wildlife corridor between CKGR and KTP, but areas in both WMAs are currently being rezoned for cattle farms. Though WMAs, residents are allowed to keep livestock but are supposed to limit grazing to the area immediately surrounding the villages, and no farther than 20 kilometers from their centers.

We continued to look for truffles when we walked the landscapes in this area, even though they were gone. Karoha was especially happy to do so, for truffles are his favorite food and he is always excited to look for them, even when the chances of finding them are slim. To do so, however, we needed to find a base, or make a camp, away from the settlements where my interlocutors lived. The place where we finally made our base camp brought us into another story about the history of these landscapes and the people who live there, together with an interesting experiment

with grass. This story involves the history of the establishment of Bere, part of which has already been described in the introduction, meeting Gustel Heinz (who would become a key interlocutor), his life history, and the story of his father—an anthropologist who played an important, though controversial role in establishing Bere as a permanent settlement for !Xo families (see Introduction). These histories have helped shape the landscape and, together with the accompanying stories, influenced the way I saw patternings of grass.

The areas surrounding settlements, often referred to in rangeland management terms as sacrifice zones, are largely denuded of grass and firewood and have been encroached by shrubs. As a result, in sacrifice zones, gathered plants are much more difficult to find than in the past. Furthermore, in sacrifice zones, degradation spreads outwards from a borehole due to continuous pressure exerted by livestock, becoming the “centre of its own little desert” (Perkins and Thomas 1993:179). The sinking of boreholes, as Pauline Peters has argued, is one of the ways that territory in the commons has been claimed, or privatized, to support cattle herds grazing the highly coveted grass in these water-scarce landscapes (Peters 1994). The non-presence of grasses in these sacrifice zones, then, are like tracks of the movements of what grasses have attracted, or gathered.

I wanted to be based outside of a sacrifice zone so that we could track animals, plants, and fungi, but also wanted work in an area where cattle are moving into the landscapes in order to observe some effects of this transition. Though GH10 is also under threat of cattle encroachment, large parcels of GH11 seemed to be

moving towards cattle ranching more immediately. GH11 is a large area and after years of pressure from cattle farmers requesting permission to graze into the WMA, a 2009 land-use change proposal began to re-gazette GH11 for cattle ranches between 2014-15.⁶ According to my interlocutors from Bere, the first parcels of land in this rezoning were given to applicants from Bere settlement, though a much larger swath would later be put up for lease to larger cattle holders.⁷ Cattle were not new here, however, as the formalization of Bere as a permanent settlement, I learned, is tied to the history of cattle in this area. Sedentarization schemes and the intensification of livestock holding go hand-in-hand in Botswana.

We decided to base ourselves in GH11, and my interlocutors suggested looking for a friend of theirs, Gustel, to ask if we could camp on his land. He was one of a handful of people who had recently been allocated a 6x6 kilometer plot of land to establish cattle farms, and his land was about 20 kilometers from the center of Bere, as the crow flies. This was one of the outermost plots from Bere, reaching deepest into the WMA and, though cattle were slowly moving in, my interlocutors suggested that it was far enough away from the settlement that wildlife and vegetation would still be relatively abundant. Gustel also had a borehole on his property that would give us a convenient point from which to access water, and though it had not yet

⁶ (Review of National Land-Use Map. Department of Lands. Ministry of Lands and Housing. 2009).

⁷ I have recently learned that large portions of this proposal have been approved, which in effect closes off the wildlife corridor for cattle ranching. This comes from reports on the ground, however no official statements have been made about the extent to which WMAs will be transitioned. One community with a wildlife tourism plan for its WMA is filing a complaint about the rezoning because they were not consulted during the process.

become the center of a significant sacrifice zone, it is the central marker of his property.

!Nate, Njoxlau, and I set out from Bere to look for Gustel one morning. As we left the settlement, !Nate pointed out, shaking his head, how little grass and firewood there was near the settlement. The first few kilometers were dominated by open sandy spaces and small woody shrubs and was completely denuded of grass, contrasting sharply with the open grasslands outside of Zutshwa. GH11 is generally more diverse in its vegetal communities and is more of a shrubby woodland. There is very little Kalahari Sour grass (*S. kalaharensis*), though a more palatable variety, *Schmidtia pappopharoides*, is present. As we drove slowly south along a sand track towards Maitlo-a-Phuduhudu, the bush gradually thickened, stopping to investigate whenever my interlocutors spotted something they thought was interesting.

About 10 kilometers out from the settlement, we stopped at a *Commiphora africana* shrub, where !Nate saw a good place to dig for the *Diamphidia simplex* flea-beetle pupae to show me the poison once used on arrow heads.⁸

!Nate and Njoxlau dug for the poison beetle underneath a shrub, but it was too dry. All the cocoons were empty. “It is the wrong time,” !Nate remarked, but he then turned to show me a few different grasses, plants, trees, and flowers. After a short while, as we were about to continue on our way, we saw several figures traveling by

⁸ In its larval stage this beetle is parasited by another host-specific ground beetle (*Lebistina* spp.) that, in its adult form, comes to closely resemble the poisonous flea-beetle, an example of bio-mimicry that helps deter predators (Roodt 1998:93).

donkey on the sand track ahead of us. When we drove towards them, the donkey riders moved off of the track to make way for us, and we stopped to greet them. After an exchange of greetings, !Nate turned to me and said, “Here is Gustel. He says we can stay with him.”

With a big smile, Gustel dismounted from his donkey and came to introduce himself. He was much taller than the rest of the party, whom we both towered over, and he wore an old cap and dusty trench coat. He was younger than my other interlocutors, but already well into his forties, his skin weathered from the sun. He introduced himself in almost fluent English as Gustel Heinz and said that we were welcome to visit and stay with him at his farm. Gustel, I quickly realized, is the son of German parasitologist-turned-anthropologist, Hans-Joachim “Doc” Heinz. Heinz, who had worked in the area in the 1960s and 70s, was a central figure in establishing Bere as a permanent settlement for !Xo communities he had been living with and studying. During this time, he married and had a child with a !Xo woman named N/amqua, after whom he had titled his ethnography *Namkwa: Life of a Bushman Woman* (Heinz 1979). Gustel is their son.

Doc Heinz is one of the anthropologists to have worked most in this part of the Kalahari amongst !Xo speaking people, and his studies focused largely on !Xo ecological knowledge and social structures. His book, *Namkwa*, is a kind of memoir about his experience living with the !Xo and his role in establishing the settlement of Bere, both of which made him a controversial figure, still widely respected and criticized for his work. Margaret Mead, who visited Bere in 1974, wrote in the

foreword to *Namkwa* about Heinz's relationship with N/amqua and the settlement of

Bere:

The encounter began as a scientific expedition by a middle-aged parasitologist into the Kalahari Desert, where he fell in love with a Bushman girl, became enamored of Bushman culture, and returned again and again to investigate new aspects of Bushmen life, and finally to attempt to introduce the Bushmen to a settled way of life which would mediate their relationship to the impinging modern world.

The reason I have been asked to write this foreword is that I was there, there at the very moment when the structure of many years was falling apart, when the structure which he had built so hopefully was crumbling under the onslaughts of new forms of exploitation. (1979: xii)⁹

Heinz initially moved with several !Xo families to Bere in 1971, where he drilled a borehole to set up a permanent settlement, introduce cattle raising, and establish a school— which !Nate and Njoxlau both attended in its early years—and a cooperative shop, all for a group who had been semi-nomadic families subsisting mostly by hunting and gathering. According to Gustel, his father feared the families he was living with were increasingly being pushed into subservient positions looking after cattle for Bakgalagadi herders. At Bere, Heinz hoped that by introducing cattle individuals could tend to their own livestock, free from the risk of being pushed into subservience and the processes of cattle clientelism, much as Wilmsen has argued has historically been the case (Wilmsen 1989). Bere has been referred to as a “social experiment” (Barnard 2007:71) in which Heinz founded the settlement on capitalist

⁹, Meade wrote about Heinz and Namqua's relationship rather awkwardly: “They faced each other over thousands of years of technological change, and she was equal to him, just as their union demonstrated cross-fertility of all human groups, for she had born him a child” (Mead 1978: iv as quoted in Barnard 2007: 72).

principals of private ownership, requiring each person to own one to two cows that, collectively, would grow the size of the community herd. As Barnard writes:

He insisted that individualism, and therefore capitalism, was part of Bushman culture. The idea was to increase the collective herd size, but, with one or two cows each, people stood little chance of utilizing their new wealth in meaningful currency units. A few years on, N/amkwa had acquired more cattle than anyone else, and many others were without livestock or any means to regain the small herds they once had had (2007: 71).

Ultimately, this created social problems as Heinz's wife, N/amqua, who not only ran the store but also accumulated more cattle than other residents. Heinz engaged in a relatively well-known debate with a teacher in the school and later a development officer for Ghanzi District, Liz Wiley, in which they argued over—in a rather essentialist style—whether Bushmen were the original capitalists or communists. As Alan Barnard has pointed out, these arguments probably better reflected Heinz and Wiley's own political leanings than anything else. In truth, Barnard argues they were both partly right:

[I]ndividualism and individual ownership are significant elements of Bushman ideology, while collective ownership of land, the sharing of food and the equalization of wealth through various means (giving, lending and so on) are part of Bushman society too" (2007: 71).

Doc Heinz eventually left Bere bitterly after being ousted as headman of the settlement—a position established by the government in settlement/sedentarization schemes to facilitate governance. One of the major criticisms of Heinz is that he assumed too paternalistic of a role in his attempt to formalize the settlement and introduce cattle. The details of this issue in written accounts, as well as my interlocutors' recollections, all seemed to differ slightly and never became entirely clear, other than to say it was controversial and Heinz left shortly after. In the afterword to *Namkwa*, Marshall Lee notes that a South African newspaper even ran

the headline: “White Bushman King Exiled” (Lee in Heinz 1978: 257). Upon Heinz’s departure, the government took over the settlement scheme, and the “social experiment” was mostly considered a failure, yet it set the precedent for San sedentarization schemes in Botswana that later came to be associated with Remote Area Dwellers (RAD) programs.¹⁰ Bere remains today with a school, clinic, and cooperative shop, though it has grown considerably in population, with roughly 700 residents.

Gustel, born in the early 1970s, was raised in Bere with his mother N/amqua and her family. Heinz later brought Gustel to Maun, the village in which he resettled after his removal from Bere, to live with him and attend school. While in Maun, Doc Heinz engaged in an assortment of activities, including working as a wildlife training officer for the Department of Wildlife during the time Gustel stayed with him. Though Gustel speaks fondly of this time with his father, and especially the lessons he learned from Doc about surviving in the bush, he admits that he often got into trouble and eventually returned to Bere to live with his !Xo family, where he felt more at home. Gustel only intermittently stayed in touch with his father in years that followed. Unfortunately, Doc Heinz was brutally murdered during a home invasion in Maun in 2000, and Gustel has lived almost exclusively in Bere since.¹¹

¹⁰ RADs is the term used by the government referring people living in remote areas of the Kalahari. It is a term that is meant to encompass San and Bakgalagadi dwellers, but is specifically meant to be a nonethnic category.

¹¹ The Okavango Research Institute at the University of Botswana in Maun is currently reviewing and archiving Heinz’s unpublished writing and photography. They are interviewing some of the original residents of Bere in an attempt to reconstruct the history of the settlement.

All this is to say, not only did Gustel end up providing me a place to base myself during my dissertation research but he also proved to be an invaluable, though curious, interlocutor who offered a variety of unique perspectives that were entangled with the history of Bere, anthropology in the Kalahari, San sedentization schemes in Botswana, and the growing movement of cattle into this region. He learned about the bush from his !Xo family and friends, including !Nate and Njoxlau when he returned from Maun, and he also learned from his father, who took a more traditionally western scientific approach, even as he documented !Xo ecological knowledge (Heinz 1973). In fact, !Nate and Njoxlau often joked when Gustel was out of earshot that he had bee like me when he first came back to Bere from Maun, implying that Gustel knew little about the bush and had to learn from them. He was “half,” they said. In those days, Gustel hadn’t known how to hunt but had been eager to learn, so they had taken him along on hunting trips and taught him how to track, shoot bow and arrow, and use a spear when hunting was still allowed. I once asked Gustel about this, and he confirmed, but interjected that it was mostly his mother, N/amqua, who taught him about plants and how to track. “She was very clever,” he said. Nonetheless, although they never wanted to embarrass Gustel, !Nate and Njoxlau said that they were still teaching him, and he still often makes mistakes.

Gustel Heinz has also worked with anthropologists studying the Western Taa language group, which includes !Xo. He worked closely with Tony Traill, a linguist, who compiled the first comprehensive dictionary of the !Xo language, famous for having more consonants than any other language on the planet (Traill 1994). More

recently, he worked with German evolutionary linguists from the Max Plank Institute, conducting a study dating the origins and evolution of the Taa language family (Güldemann and Naumann n.d.; Naumann 2011). While he became a crucial teacher and translator during my fieldwork, his views often differed and conflicted with those of !Nate, Njoxlau, Karoha, and /Uasi, as well as some of the ecologists that joined us for excursions into the bush. Gustel's own life history was tied to the social, political, economic, and even ecological transitions through which this part of the Kalahari underwent in the form of settlement schemes, the proliferation of cattle, as well as a unique aspect of the history of anthropology in this part of the Kalahari. As such, he also seemed to constantly navigate between multiple perspectives of the landscapes and their histories, often attempting to perform these roles as an expert.

That Gustel is one of the few Bere residents to receive a farm in the rezoning of the GH11 land-use plan speaks, in part, to this history and, subsequently, my own research. Not everyone received plots, and perhaps Gustel's life history afforded him this privilege, which in turn allowed me and my interlocutors relative freedom to conduct our research away from the settlements, for his farm became my research base for eleven months. Gustel, in some ways, came to exemplify the different ways of seeing grass when we walked his farm as part of the political economy and ecology of the landscape.

Walking with Grass

Gustel's farm is 5 km off the main sand track to Maitlo-a-Phuduhudu, a relatively well-trafficked artery (at least for a remote Kalahari sand road) between

Bere and other settlements and cattle-posts to the south. He has re-opened an old survey cutline, a track that is itself full of past movements, that Gustel said was made in the 1980s and 90s by diamond and mineral prospectors, and then the government, to search for water and drill boreholes (possibly related and simultaneous activities). The track leads to the center of Gustel's farm, which continues on as a barely visible scar of a track for more than twenty kilometers into the bush.

Approaching his camp, you first see a set of 10 large solar panels that power his borehole pump, which was partially subsidized by the state and a friend of Gustel's in exchange for keeping some of his livestock on the new farm. A few meters around the bush there is a small camp with three grass huts that Gustel, his family, and the occasional visitors stay in, wooden fenced enclosures for fire and hearth, and a few tents. Behind the camp are two kraals for cattle and goats that were still being built at the time, but did not yet house more than a few livestock, and four commuter donkeys, one of which was killed by a lion the day before our arrival.

After several visits to camp with Gustel, he suggested that we open a clearing in the bush near his compound to make a more permanent research camp. I accepted the offer and we made a nice little camp, complete with three tents and later the grass hut—which, thatched by truffle grass, my interlocutors and Gustel referred to interchangeably as "P's office" and the "cold house" because it was the coolest place to rest on hot summer days. It became our base for the rest of the year where Gustel and his family, especially his wife Koaklxao, became good friends and invaluable interlocutors during that time. Gustel was eager to explore his new plot with us and

often spoke about his hopes of having both cattle and wildlife living on the unfenced farm. He was especially interested in the grass for this reason. “The grass here is plenty!” he often said.

As we explored the farm, Gustel and my other interlocutors often made observations about the quality of grass and pointed out different things to learn about that truffle grass. One winter day while walking to gather some plant medicines and investigate activity near a porcupine den we had passed the previous week, Karoha and Njoxlau pointed to a clearing surrounded by the truffle grass: “You see,” Karoha said, “it’s not only the truffles. The ants also like this grass. They cut it at night.”

He and Njoxlau then proceeded to show me how the clearing was actually a trimmed patch of grass. The grass tillers were cleanly cut 3–6 centimeters above the sand. Unlike the uneven grass stems munched by grazers, these were very neat cuts. And the ants left bits of the cut grass litter around a series of little mounds leading into their nest. The grass gathers the ants, bringing them together, and the ants gather the grass.



Figure 13 A patch where grass has been cleared



Figure 14 A few grass tufts that have been cut by insects



Figure 15 Entrance to a subterranean nest with bits of grass debris surrounding

“They come at night,” Gustel interjected. “You don’t see them in the day. They come when the moon is full. But they come out more when it’s hot. In winter they stay in the ground more.” Gustel then lamented that he often feels quite lonely in the winters when the singing birds have gone and the insects are quiet. Without all the sounds of life that they bring, he told me that it is easy to feel all alone in the bush.

Karoha interjected with a laugh: “Tsk! Tsk! Tsk! You will hear them at night when they are cutting! Eish, they make noise!”

I was provoked by this and wondered whether the ants kill the grass that seems important to truffles and asked my interlocutors. Gustel’s response surprised me: “These ants cut the grass when it is dry. When they cut the grass they help to stop fires. It also makes it open so you can see if there are snakes.”

The ants also pull the grass debris into their nests in the sand, which Gustel later told me is good for the soil. Gustel insisted that, by removing the dead and dry

grass, the ants reduced the fuel load and therefore also reduced the spread of unwanted wild fire. “So, the ants are good?” I asked.

“They are good and bad. If they are close to your house they are bad because they will cut it. But when they are here they are good. We also like to eat them sometimes when they are flying after the rain. We will show you in the next months,” said Karoha. Though it might be possible to see them at night, he explained that these ants were more active in the warmer months and it would be better to show them to me then. In fact, months later I saw more than my share of these ants in action, eating large holes through the walls of my grass hut. At the time Njoxlau explained in an interview:

These ants which are cutting the grass are the two kinds of ants. If they live in the ground for a long time, when the rain rains they come out with feathers...wings and fly and fly and fly. And they take off the wings and then they get in again. They live just a few days there and then they come out again and cut the grass. They are grass cutters now and they make more grass cutters. Because if they are few, they will change themselves again and make more of them.

So the grass cutters are many different kinds of ants that can make to cut grass. The big ones are not the grass cutters. No. These ants which we talk about, there are two types. But they change themselves and go out again and cut the grass. In the winter time they pack that grass inside and live there for a long time until the time comes and they go out again and cut, and cut, and cut. If they see that they are few they change themselves and make themselves to make many again to make more people. And [laughing] they make those people because they make them grow themselves so there are many there. Make them many there where they are living.

They are cutting the grass because for food and for lying on top of, for the others that are changing inside...We never understand what is happening inside but we think they are growing themselves again and making others, when they are going out and have wings. And fly and fly and take of the wings and go in again and going to mix with them. And when they come out they will cut and cut. Cut for winter.

Though this interview came months after my initial introduction to these grass-cutting insects that we called ants, there were clues all along that Njoxlau and the group were actually talking about termites. This was a (silly) mistake I would not realize until months later and that would come to haunt my investigation into this

insect-grass relationship, because I had often asked about ants and not termites. Nonetheless, these denuded patches of grass and their ants (as I thought they were) intrigued me as I thought about Kalahari rangelands. Often, cattle, drought, and shrub encroachment are discussed as the primary actors that affect grass stands. However, the grass-ant relationship seemed as if it might offer another way to think through grass that would bring me into the sands of the Kalahari, into the lively worlds of the ant nests beneath the surface. And, much like fire, which is often seen as a threat to the grasslands but can actually promote growth, my interlocutors seemed to suggest a similar relation between these ants and the grass, with the additional benefit of reducing the potential of future fire by pulling the dead biomass into their subterranean homes, aerating and cycling nutrients through the soil.

I made notes of these observations and then carried on learning about various plants and grasses from my interlocutors for the next few months. The more I learned about the different plants the more I began to appreciate the diversity of different species in the desert. But I struggled with the grasses. Once I began to pay attention to grass, and my interlocutors taught me about the different kinds, I was amazed by how many more there were than I initially realized. I had generalized them as “grass,” but once I was taught to notice their differences, it seemed as if worlds of new questions opened up. And noticing these varieties of grass literally slowed our walking. The problem was that I had a really difficult time finding their scientific names.

Different curiosities show different things. By engaging with a variety of different perspectives and curiosities, the politics of grass began to emerge. Learning

to identify grasses can be quite difficult for a novice, especially for an anthropologist like me with no formal training on the topic. After months of walking the Kalahari with, and learning from my tracking interlocutors I had begun to recognize different grass types and some of their habitat preferences, but other than *Stipagrostis uniplumis* and *Schmidia kalahariensis* I was failing miserably at matching those we encountered with pictures and descriptions available in my reference books. While I was learning some of the !Xo and Setswana names as best I could, this did not help me get much closer the scientific names. Certainly, these things did not need to map onto each other directly, but since I wanted to be able to speak to scientists about my findings as well, I invited a rangeland ecologist friend and colleague to help me.

Again, efforts to track call forward stories about the landscape. The knowing is about the historical efforts to know, just as the patterning of vegetation and cattle emerges from historically specific efforts to know the landscape. In this way, grass inspired and brought together a gathering of diverse knowledges and landscapes perspectives.

Edwin Mudongo is a rangeland ecologist with a particular interest in Kalahari grasses. I had worked with him during my Masters research in 2009–10 while conducting tracking surveys for the Conservation International (WKCC) project that aimed to conserve the corridors between CKGR and KTP. At the time, he was a field biologist with Department of Wildlife and National Parks (DWNP), a partner in the project, and was assigned to accompany the research team. He knew several of my primary interlocutors well from the project, with the exception of Gustel and /Uasi, and was interested in what we were doing. He has a huge amount of respect for the

trackers expertise in what he referred to as their “Traditional Ecological Knowledge.” And he had a special bond with Njoxlau, whom he credited with saving his life on an occasion when they got lost in the bush together (see text box below).

As a field biologist with DWNP, Eddie was initially interested in large predators, but soon came to the conclusion that if he wanted to know about predators he would have to learn more about their herbivorous prey. After several years with DWNP he applied to graduate school to study rangeland ecology. Ultimately, he told me, if he wanted to know anything about herbivores, he would have to study grass, and he developed his PhD thesis on the topic. While tracking led me to truffles and

then grass, predators led Eddie to herbivores, and finally grass. Eddie's own tracking of trophic cascades in the Kalahari led him from apex predators to grasses.

When Njoxlau and Tsamma Melons Saved Eddie's Life

On a sortie during the spoor survey in 2009, Eddie and Njoxlau were among a group of four people who got lost in the bush after their vehicle broke down. Eddie and Njoxlau stayed with the vehicle while the other two went to look for help. They were without water, and when no one had returned to collect them a day and a half later, Eddie and Njoxlau decided that they needed to look for help on their own. They began following the tracks of the two other men in their party but quickly noticed that those two had become disorientated and were walking in circles. Eddie and Njo decided to find their own path. They walked into the evening without coming across tracks or trails to lead them out of the dense bush. Neither had drunk any water that day and they were quickly becoming dehydrated. As they walked, Eddie became weak and started falling over every few meters. Njo realized they both needed fluids but also feared that if they stopped walking they would be vulnerable to predation by hungry leopards and lions. Njoxlau broke off several acacia branches to build a small fence around a tree, an enclosure that he hoped would keep Eddie safe. Once Eddie was safely inside this kraal, Njo went off in search of tsamma melons, though he knew they were not in season. He hoped to find some old melons from which he could squeeze some bitter liquid. Prior to boreholes, tsamma were one of the most important sources of water for people living in the Kalahari during the dry season, and are the same melons after which the well-known film "Bitter Melons" is titled. Njo found a few old melons, brought them back to Eddie, pounded them to a pulp, and squeezed out some bitter water for both of them to drink.

Njo insisted they continue walking, but Eddie refused. Eddie thought they were both too weak to continue, but Njo knew they needed to find a safer place if they were going to sleep that night. After an argument, in which Njo shouted at Eddie, "You want to die!" and Eddie refused to walk, Njo gave in and reinforced the kraal with additional branches before nodding off for a couple hours of restless sleep. They continued walking at the crack of dawn, but, recounting the story later, Eddie admit that he had already given up. Njo confirmed this, saying, "That man wanted to die that day." Every few steps Eddie took he would fall back to the ground. Njo shouted at him to keep walking, fed him with melon water when available, and pushed him to keep moving. Eddie said he was sure that Njo wouldn't stop walking because he was scared of lions in the area, and Njo, who was extremely exhausted himself at this point, admitted that this was at least partly the case. But mostly, Njo knew that if they did not keep walking they would never find a track that might lead them to help. By mid-day on the second day of walking, Njo led them to a sand road that they followed to a pan where there was some water, and eventually they were rescued by a vehicle searching for them a few hours later. Eddie and Njo laugh when they tell the story now, but it was one of the scariest events of that 2009 survey. Fortunately, tsammas and Njo saved Eddie's life.

Eddie and I met up in early October and drove to Gustel's farm. Eddie was excited to see the "Masters" again, he said, referring to the Master trackers !Nate,

Njoxlau, Karoha, and /Uasi.¹² He and I were also excited to see each other for the first time since our work together with WKCC. We had both progressed in our own studies over the years, were happy to find we continued to have shared interests and were hopeful that his visit would entail more than a lesson on grass identification and taxonomy, perhaps culminating in a new collaboration in which we could draw from our different disciplinary backgrounds. Following an evening of catching up with each other and the trackers at Gustel's, we planned our activities for the next day. Eddie was happy to spend the next day walking Gustel's farm to teach me about grass, while also offering Gustel a basic assessment of the grasses before large numbers of cattle were introduced (at this time there were no more than twenty head of cattle). Gustel told Eddie that there is "plenty of grass. Plenty! Plenty! Plenty!" He even noted that a few days earlier he had seen a kind of grass he had never encountered before. It was a few kilometers away, but Gustel would take us to it the next day. When we began walking early in the morning, the air was still cool and crisp, providing some much-needed respite from the pounding Kalahari sun that seems to explode into October. We set out just after sunrise in anticipation of the arriving heat that, by 11am, would be debilitating. We walked from Gustel's compound along some newly emerging cattle trails.

¹² Shortly after the WKCC project, I accompanied Louis Liebenberg on a field trip, during which time all four trackers were certified as "Master" trackers, the highest level of Liebenberg's certification. At the time, they were the only four certified in Botswana and among less than 10 certified in Southern Africa.

Gustel, Njoxlau, and Karoha led the way as we walked in single file. They scanned the ground, pointing out the occasional fresh animal track as we crossed them. And they gestured towards the different grass patches we passed through. With each grass, Eddie and I stopped briefly to confirm the species and Eddie showed me the different identifying characteristics, explaining which were annual, perennial, and those which were more of a semi-annual or semi-perennial variety.



Figure 16 Newly emerging cattle trails

When we came across truffle grass (*S. uniplumis*), Eddie confirmed that I had identified this one correctly on my own. But Gustel intervened: “This is the male one. There is also a female one. They are the same but different.”

He then showed Eddie and I a female strand and pointed to morphological differences. The female, Gustel offered, has softer stems and a noticeable elbow-like

bend at its base. Eddie looked and quickly shook his head, saying that it is not a different kind of grass, and carried on walking. The dismissive moment was uncomfortable. It was perhaps a moment of what Helen Verran describes as “epistemic disconcertment:” in which a “taken-for-granted account of what knowledge is has been upset or impinged upon” (Verran 2013:144). This was the case for both Gustel and Eddie and also for me, in attempting to recognize the truth in both claims.

But Eddie’s was more than a simple dismissal. I had invited him to perform the authority of his knowledge by asking him to teach me to identify grass. He was in a position in which his particular knowledge practices were on display, and in this case, they came into conflict with Gustel’s, who too was accustomed to the role of teaching me about grass. Here, I was a clumsy instigator, inciting a certain performance of expertise that required assertions to be confirmed or dismissed. But as much as a moment of disconcertment, the unexpected findings revealed the possibilities of emergent ontologies in which what was to be encountered was not yet known, and in the encounter, the ontological instability of the grass was brought into being as a cause for disagreement. However, the difference may have preceded the encounter, lying in the gaps or non-presence of the yet-to-be-encountered, bringing about disagreement in the mundane, in the morphology of the grass coupled with the invitation to perform expert knowledge. This story reflects historically situated efforts to track the traces, including the social relations that give it purchase.

I wanted to keep up with Eddie, but I also wanted to understand what Gustel was showing us. But Gustel, shrugged and walked on as well. We emerged out of a thicket and into another *Stipagrostis* patch.

Eddie noticed a clearing just beyond the patch and asked, “When was there a fire here?” I looked over at the clearing and was quite puzzled by the question. Interestingly, this was much like ants cleared patches I had been shown and I was surprised Eddie didn’t recognize it as such.

“That’s not from fire,” I responded. “Ants have cleared that patch.” Already, another disagreement.

Eddie was surprised and, doubting my conclusion, walked over to the denuded space.

Njoxlau looked at the clearing and quickly said, “Yes, this is the ants. You see it is cut nicely. Not like when the cattle are eating. There is no fire.”

Njoxlau and Gustel showed Eddie the clean cuts to the grass stems, a few inches above the sand and base of the stem-root entanglement. There were also small mounds with traces of harvested grass where ants carried the matter into their underground nests. These clearing and the various signs were the tracks of the ant colony. This time, Eddie was convinced.

My interlocutors reiterated that while ants can be a nuisance if too close to grass huts, they help prevent fires by reducing the fuel load of old and dead grass. The clearing was not a track of fire burned grass, but of ants that had reduced the chance of burning. Eddie, though a Kalahari grass expert, did not expect to learn that these

clearings were made by ants, despite having seen such patches during his time working in the region. Having just dismissed Gustel's classification of the grass, he was now convinced and excited by the notion that "Local (or traditional) Ecological Knowledge," could inform his scientific practice and understanding of grass.

Because of this moment of surprise, contrary to Eddie's initial assumptions, he wanted to test the finding. The question of the grass taxonomy was not an issue for him. He later told me that Gustel may have been right in that he could have been pointing out a subspecies, but for the purposes of teaching me, this distinction was not important to him at the time. Gustel, though still insistent about the different male and female types, was also more interested in showing Eddie the work of the ants and grass together. Here, the thing to agree on was not a category or a type, but a relationship. Eddie had worked with Njoxlau and Karoha before and held them in high regard as trackers for their ability to notice things. On this particular walk, he was focused on identifying species that were relevant to his field, fitting them into categories and quantifying them. When the focus shifted to landscape processes evidenced in the grass-ant relationship, the awkwardness of Eddie's response to Gustel's grass suggestion was suspended, at least temporarily. The interest in the relationship was enough for us to ask a question of interest to the trackers, Eddie, and myself.

As we continued our walk, Eddie showed me more grasses, pointing out no less than 12 species. He was quite impressed with the size and abundance of palatable grass patches and told Gustel as much. Eddie, reading the landscape for co-existence

of livestock and wildlife, concluded that cattle would do well here and that the farm was big enough that grazing antelope migrating through the corridor would still be able to utilize this space, at least until it was fenced. It would, however, eventually need to be fenced.

When we arrived at some grass that Gustel had never seen before, Eddie quickly identified it as a *Schmidia* and began to walk away, unimpressed. But then he saw another tuft and stopped in his tracks. Eddie kneeled down, looking closely at the grass' inflorescence, leaf blades, and stolons. He then asked to look at my grass field guidebook and flipped through the pages. Eddie was stumped. After making his way through the entire book he said that this too was a grass he'd never seen before, and what's more, he couldn't find it in the book. We took a few pictures and picked a sample in hopes that we might be able to identify it at later date, before walking back to camp.

It was almost noon when we got back, and the heat was overwhelming. We all found a place in the shade and waited through the afternoon heat for the sun to set and the air to cool. Bored with fighting off flies, Eddie paged through the grass book until he found a small picture of a grass in the appendix of less common grasses and suggested this might be the mystery grass. Happy with his assessment, Eddie then suggested that we develop an experiment together to measure the effects of these grass-cutting ants.

We decided to compare the effects of ants on grass stands and their re-growth to the impact that the newly introduced cattle would have on these grasslands over a

period of a year. Cattle were only introduced in significant numbers to this area in the weeks following the start of our experiment, so the idea was that we would also be able to measure the impact cattle have on previously ungrazed land.

A month later, Eddie and I built four 5x5 meter plots, two fenced and two unfenced. While my tracking interlocutors were not present, Gustel was there and helped with building the fences but left it to Eddie and me to locate the patches. Within the fenced plots, we would see how much the area cut by ants recovered, as well as measure how much ants cut fresh grass in that time. The unfenced plots targeted the impact cattle would have on the grass. In other words, the fences were built to keep cattle out.

Eddie directed us in the setup of the experiment, did a survey of living and dead grass along transects within the plot, and set up random pitfalls to catch the different insects moving about for identification. Working on the design of the experiment it became clear that Eddie was targeting specific measurables: the species of grass along particular lines within a defined boundary, the particular species of harvester ants in randomly placed pitfalls to catch specimens within the parameters of fence, and measures of growth. Focusing on the specific interactions we were interested in required excluding other relations and transformations, so we needed a fence to keep grazers out and we also sprayed an organic repellent on certain quadrats in order to keep the grass cutting insects out and observe the grass recovery. During all of the building, Gustel was a willing participant eager to be involved in the

experiment, but he also seemed unsure about why Eddie and I wanted to build the fences where we did.

The Mistake of Holding Things Still

Grass moves and so do those things with which it gathers. In our design of the experiment, focusing too closely on grass we forgot the relational movement of the ants. I returned to the plots with Gustel, Karoha and Njoxlau a few days after Eddie had left. As soon as we got to the fences, Njoxlau and Karoha looked and shook their heads, mumbling something to each other and Gustel. Njoxlau then looked over to me and asked, “Why did you make the fence here? The ants have already eaten all the grass. They have moved over there now to eat. You will never see them cutting here.” We then walked about one hundred meters, and they showed me a patch of grass that the insects had moved on to. I was disheartened, thinking that all our work had gone to waste. Gustel looked over to me and smiled knowingly. He said that he knew this but thought that Eddie knew where to place the fences and didn’t want to interrupt. And indeed, when we examined the pitfalls, we had not caught any of the grass-cutting insects.

In building the fences, Eddie and I forgot about the movement that tracks signify. In the attempt to create an experiment, we fenced the patch as if it were an object that could be held still. We focused on the object instead of the dynamic relationship and the inherent movement. But the track itself, this patch, was only part of what we wanted to know about. The fences would be effective in keeping cattle out, and we could still measure grass growth over the year, although we would learn

nothing about how much grass ants cut over that time. Gustel later told me that he thought I knew that the ants had moved on; a sentiment Njoxlau reiterated as a lesson when he told me that you can see a lot when you look at a track, but you see nothing if you only look at the track. What Njoxlau was telling me was, don't forget about the movement. Don't forget about the walking. Things don't hold still: you need to read into the sand, or rather, immerse yourself into it.

Finally, in our development of the experiment, neither Eddie nor I questioned the category of ants. When I eventually caught specimens for identification, I immediately realized that they were not ants but termites. When I took the specimen to an entomologist, he confirmed that that they were indeed *Hodotermes mossambicus*, one of the common harvester termites in Southern Africa, and also a suspected culprit in that Namibian fairy ring mystery. This is the termite that that the bat-eared fox eats almost exclusively, which is also one of the mammals known to feast on Kalahari truffles.¹³ *H. mossambicus* is famous as a pest for the impact that the termites have on crops, and, coupled with mammalian grazing, they can completely denude rangelands, though grasses usually recover fairly well on their own. Thinking of them as ants was a terrible mistake, and, of course, harvester termites made much more sense. When I passed this finding on to Eddie, he soon realized that the fencing experiment would be for naught. He had designed it specifically for ants. Termites harvest and nest differently and would require an

¹³ The bat-eared fox has big radar-like ears that enable it to hear the harvester termites over great distances. They also have a uniquely evolved dentition for eating the termites.

entirely different sort of experiment, especially with regard to the method for random capture of specimens.

All was not lost, however. After Eddie left, he sent me a message asking that I do a tiller count of ten randomly selected tufts of *S. uniplumis* at two different sites. He asked for me to count how many grass stems in each tuft were cut, how many were uncut, and how many of the cut and uncut stems were dead or alive. I performed these counts with Gustel, Njoxlau, and Karoha on two occasions: once right after Eddie left in November at the end of the dry season, and once at the end of the rain season in early April. Eddie ran an analysis of these counts and found that the number of cut stems were overwhelmingly dead. Because we counted during at the end of the dry season and end of the wet season, Eddie suggested that we have statistically significant data confirming !Nate, Gustel, Njoxlau, and Karoha's claims that these insects almost exclusively remove dead biomass.

Gaps between Tracks

Tracking grass after the truffles left us was much like attending to the gaps between a set of animal tracks. In these gaps, an animal's body moves or has moved. And in the gaps between truffles, while mycelia worked away, their companions also moved. It is in this way that tracking is a mode of attending to non-presences through the gathering of their unfolding relations that brought me into the politics of Kalahari landscapes in surprising ways. These were not the big stories framed in the political landscape of human plans, though they certainly spoke back to those politics from another, more relational, vantage point. Rather, they were the unfolding stories of

relations found in the gaps between tracks—tracks in the very broad sense of material traces of doings—that are too often diluted as mere background or simply stamped out. This ground—and beneath the ground—is where many of the stories of landscape doings lie. Following those relations in the unsettled gaps between tracks guided me to towards different gatherings, their worldings, and variety of politics that unsettled my own—and others—assumptions about landscapes. This required an open-ended noticing that my interlocutors impressed upon me, a noticing informed by the open-endedness of gatherings, but also “how things hold” (Gan and Tsing 2017). That is: the mode of noticing was informed by and took the form of the configurations of relations noticed. The noticing had to be open-ended in relational response to the gatherings. Following this open-endedness led to stories other than those hegemonic proliferations of capitalist logics, liberal humanism, and a conservation ethics of pristine nature, yet they often speak back to the power of those big stories, the ones of human plans. Figuring out how to resist the temptation of allowing the stories of these gaps to be subsumed, however, is not always easy. It requires staying with the trouble, however uncozy.

Tracking is a heuristic for knowing, engaging, or relating with the unseen. As much as the track itself—the material trace of a being left in the sand—what is important in tracking is what lies between the tracks. A track is a material index of movement, of walking. In this sense it is a useful analytic for how we come to know: or the potentiality of knowing from non-presences.

And it involves the movement, the walking of both the tracker and the tracked. The experiment did not fail entirely, but in many ways it did. In the end, it enabled us to see how much grass cut by termites would regenerate over a year, but it missed the fundamental movement of ecology.

Our fascination with the track—those denuded patches of grass and little termite mounds—was an enactment of an obsession with holding things still to produce an object of knowledge, when indeed those sets of relations were more nuanced. They were situated but did not hold still. They were mobile and social. The termites walked away despite our fences, and my tracking interlocutors told us as much. We were able to measure some things, but in between the tracks, the world was happening.

Grass is ecologically, economically, and politically important to the Kalahari. Though perhaps it receives less attention than other more charismatic species or economically influential industries as a major actor in Kalahari landscapes, it is a central component to the lives and livelihoods of all variety of Kalahari plants and animals (wild and domesticated), human cattle farmers, Remote Area Dwellers (RADs), conservationists, and others. That is not to say that Kalahari grasses are more exceptional than elsewhere in the world. Grass species account for some of the most important and most productive food sources globally (rice, wheat, grain, etc are all grasses), with long histories of human use and domestication.

In the Kalahari, however, grass is often viewed as a secondary resource, with mammalian grazers being primary. Sometimes characterized as a large, empty desert, grass disrupts such narratives of the Kalahari Desert and in many ways can be seen to be at the root of the contestations over these landscapes. While territories are enacted as static, controllable, and well-defined spaces that are valued for their resources, grasses, as a resource for cattle farmers for example, are mobile. At times, how grasses move in and out of particular landscapes may underlie not only the migratory routes of animals but also how and what land is deemed desirable, valuable, and worth acquiring for livestock and game ranches. That is to say the economic and ecological role of grass in the desert and how this space, despite sometimes being characterized as open and empty, draws attention to ways in which this desert, teeming with life, minerals, and ecological richness, is highly contested by different political and economic interests in Botswana and beyond. In practice, far from empty and static, the Kalahari Desert is sometimes viewed as an underutilized resource because of its grasses and their mobilities. Cattle owners argue that there is so much unused space to grow their herds.

Domesticated livestock and wildlife are both extremely important to the economy of Botswana. These economies are directly dependent on the well-being of nonhuman species and, though the species that may immediately come to mind or that are most commonly referred to in public discourse are large charismatic mammals such as the Big 5 (elephant, rhino, buffalo, lion, leopard) or cattle that are both culturally, politically, and economically important to Botswana, vegetal species (and

water) are ultimately what these other species and their associated economies depend on. An attention to grass reveals some ways that competing interests and perspectives in Botswana's political economy infer ecological process differently and that, much like Charis Thompson (2002) has shown with elephants in Kenya, those inferences may stand for competing philosophies of nature. Furthermore, through an attention to grass and its specificities, we may begin to get a better grasp of the complexities of how ecologies and economies of the Kalahari are materially intertwined with each other. How those things are intertwined carry with them various assumptions that tend to look differently from different vantage points but also become materially evident in the morphology of grass and their habitats.

One of the things that drives the territorialization of the Kalahari—that is the parceling out of land—is that vast rangelands are considered underutilized resources by many cattle owners. These vast rangelands were once too far from permanent water sources to support cattle in significant numbers, but with the proliferation of boreholes, and new technologies that aid pumping of water, such as solar powered setups, bovine colonization of rangelands has become increasingly common. These features—watering points and fences—create concentrated zones of cattle grazing that potentially remove grass from their immediate radius and the effects of these grazing centers radiate outwards with the expansion of herds seeking forage, following the grass. In other words, with regard to the cattle economy, water points and fences establish property regimes (or regimes of land tenure) by creating and controlling access to grass. While the political economy of cattle in Botswana has received much

attention from scholars, particularly with regards to how cattle accumulation and clientelism has been deployed to consolidate power among Tswana elites under colonial rule, the formalization of which has been central to the political economy of the post-colonial state, grass has received less attention in these analyses as a driver of economic competition and the territorialization of the Kalahari. Grass ecologies, by and large, have been left to environmental and agricultural scientists as a focus of study.

Through this exploration into grass I found myself engaged in unexpected activities in unexpected places: meeting with cattle syndicates, walking the landscape with rangeland ecologists, building fences, catching ants and termites, counting grass tillers, meeting with several entomologists, and of course on hands and knees digging into the sand. This attention to Kalahari grasses helps to illuminate the different stakes and lived, ontological realities at work in the political economy and ecology of Botswana. How ecological process is inferred differently, and the knowledge histories from which these inferences emerge can be read through grass, while the grass itself reflects the material traces of those histories in their own biographies, unfolding onto other ecological, and perhaps, geological actors that together make and unmake the Kalahari in particular ways.

Following the open-ended relationship from truffle to grass, and eventually to termites and their movements, led me to reflect on the ways that certain kinds of boundaries are enacted in Kalahari landscapes that seek to contain and control certain movements while allowing for others. Notions of enclosure and containment

fundamentally misunderstand the movements of landscapes. They promise to contain movements but in actuality they rely on, exacerbate, and even intensify movements, much of which escapes the promised boundaries of containment. Rangeland ecologists and many of the farmers they work with are aware of this. They often move their livestock around their enclosures, or from one enclosure to another, so as to not deplete their farms of grass, allowing for a time during which grass can recover. To do this, however they need fences. Pastoralists, too, despite assumptions to the contrary, know this too, which is why they often practice continuous grazing in unfenced areas, allowing for their livestock to keep moving. For them, when fences are put up, those movements become so concentrated that grasslands quickly become depleted. Others concerned with livestock diseases, as John Law has shown, know that things move, flow, and often escape the apparatuses meant to contain viral contagion (Law 2006). Yet, they simultaneously require the boundaries and fences to establish things like foot-and-mouth free zones to facilitate the movement of animal products free of the virus. Somethings travel in spite of the boundaries, and even when they don't, the boundaries have ripple effects that move out from them. Boundaries approached in the terms of enclosure operate within the frame of claiming territory. While this closes things in, what it often leads to is expansion, desires and attempts to claim more territory. This promise of containment, the making of boundaries and territories, and their failures bring to light the unfolding violences of (the failed promises of) holding things still. What do I mean by this and how do grass and termites get me there?

The first point here is simply staying with the trouble. In tracking truffle
relata, getting to grass, I wound up with termites cutting grass because grass is lively
and gathers together with many different actors. This piqued my curiosity because the
termites clear patches of grass that might at first glance appear as a form of
degradation. In some ways, their denuded patches looked similar to over-grazed
areas. In others, they looked like grass burned by fire. Neither one signal exclusively
degraded nor healthy rangelands. Those are normative assumptions about rangelands
that fail to grasp the complexity of how grass gathers. Some disturbance, as Anna
Tsing (2015) shows with Satoyama, encourages growth and regeneration. Controlled
burning is an example of this, too. Termites may be another. In agricultural fields,
buildings, the things of human plans, termites are normatively derided as pests. In
rangelands, they cycle nutrients, encourage new growth, and can be important
decomposers, much like fungi and even sometimes with fungi. Actual landscape
patterns matter. They tell us things that guide ways of noticing that may cross all
variety of categorical boundaries and assumptions.

Chapter 4. Finding Haly: Towards Pan-Gatherings and their

Storied Geologies

Pan: n. 5. A natural or excavated depression in the ground. *S. Afr.:* A shallow natural depression containing water or mud in the rainy season; a dried-up salt marsh or pool bed. Also: a periodic lake formed by rainwater in such a depression.

Gathering: n. 1. The act of a person or thing that gathers. 2. something that is gathered together. 3. An assembly or meeting. Syn. Assemblage 4. An assemblage of people; crowd. Syn. Congregation, company, throng.



Pans are important and changing landscape features in the Kalahari, both in their material and social arrangements. Pans are places that hold water and attract wind and where minerals precipitate and animals gather to drink and lick those minerals. A diversity of plants locate themselves on pan edges. For these reasons and more, pans have historically been favored *places* for people to dwell. These movements and their trails are also part of the process through which pans are made. This chapter describes the efforts of my interlocutors and myself to find a storied pan

called *Haly*. While our own trails are not confined to the pan (as if it were some kind of closed entity), they too become entangled in the making, or doing, of the pan.

Importantly, while my interlocutors knew about Haly from stories, they had never seen it or been to it. Some were recent stories, and others spoke of a primordial time. Like other pan names, Haly was, my interlocutors told me, named by a god-like person, somewhat of a trickster figure called Pisa Boro, in the “olden days,” a primordial time when people and animals were still the same. After being bitten by his sister, Pisa Boro began calling out the names of all plants, animals, and people, which resulted in their differentiation. As he moved through the landscape in agony dragging his leg, he formed the valleys and his teardrops made the pans. Haly’s specific name however was just that: my interlocutors did not discuss the specific meaning of the pan’s name.

Stories about Haly gathered together descriptions of the landscape that in turn guided us towards the pan. In this way, the stories were tracks, and the tracks were descriptions. As David Turnbull has argued, from the perspective of performativity, “[knowledge] is a form of travelling, of moving through space; and travelling, like knowledge, is also a form of narrative,” and “[t]he act of tracking, of moving through the environment, following prey, and reading the signs, creates a complex of intellectual and cognitive connections and, at the same time, a physical trail” (Turnbull 2007:142). That is, to elaborate on tracking as an attention to travel and extend Turnbull’s point towards landscape doings, the signs and relations that gather with tracks, reaching into the landscape, can themselves be approached as material

descriptions, or stories. Tracks and gatherings simultaneously are landscape relations and describe those relations. They *do* description and tell stories—if only the time is taken to notice them.

Here, I start with the stories about the pan before drawing out the material tracks to which the stories lead. I argue that the trails my interlocutors and I made looking for Haly became folded into the stories of the pan *and the pan itself* as part of this pan-gathering. In this sense, stories are both figures in the chapter that motivate our efforts to find the pan—a kind of guide and a reflection of historically shifting landscape relations—and the actual process of finding and making that pan.

The stories did not offer a specific route to Haly as much as they afforded an opportunity to speculatively wayfind the pan. Here, I approach wayfinding as a relational, emergent, more-than-human endeavor, constitutive of, or folded into, the geologies of the landscapes and their histories. Wayfinding is a lively, dynamic, and, at times a risky, human practice of making one's way through and becoming-with landscapes. Landscapes-in-motion and the multiplicity of biotic and abiotic movements through which certain places are made and unmade also sediment together in how they find their ways towards each other. Thus, rather than giving primacy to wayfinding as a human endeavor, whether cognitive or phenomenological, I begin with the material trails (including those of humans and stories) that come to constitute landscapes in general and pans in particular, in this case. By attending to more-than-human movements together with human navigational practices,

wayfinding is a useful heuristic for tracking and tracing landscape emergence and doings.

I do this in two ways. First, because the stories guided my and my interlocutors' attention to specific clues about landscapes formations, I elaborate how material movements and their sedimentations are key to understanding the geomorphology of the Kalahari. I show how such features are not fixed entities but rather emergent entanglements of the trails of abiotic and biotic movements. Here I focus on the material flows and disturbances through which pans arise as a kind of gathering of trails, mineral precipitations, water drainage, wind currents, and animal churning that come together in the formation and maintenance of these lively features. These movements, I argue, are part and parcel of the practice of wayfinding as a more-than-human endeavor that is not only about making one's way through landscapes but also about making landscapes—much the same way that tracking attends to landscapes-in-motion rather than just following things across landscapes.

Second, I suggest that how landscapes change and how people relate to their landscapes is also deeply connected to historical, political, economic, and social processes that too can be read into landscapes. These are their stories too. At first, this might seem obvious. However, I argue that it is critical to think about how such processes and changes traditionally ascribed to human conceptual worlds themselves create material trails, and make cuts, that become evident in the morphologies of landscapes as places, and are thus necessary for engaging with varied landscapes livabilities. As Deborah Bird Rose writes: “Contrasts between the concreteness of

place and the elusive quality of the signatures of our lives become provocatively vivid as we learn to understand our lives as tracks...[t]hese tracks are always located”

(Rose 2004:163).

Stories of a Pan Called Haly

“Paths, tracks and trails are inherently performative; the cognitive connections, the social interactions, and the relationships that they bring into existence, are themselves marked by trails and movements and actions along them. For this reason they are deeply intertwined with songs, stories and narratives” (Turnbull 2007:143).

I first learned about Haly from Two Days when he came to visit Gustel on his farm on a cold day in June. He arrived earlier in the day with his donkey from Bere. Gustel, !Nate, Njoxlau, Karoha, and I had been out exploring the bush and collecting plants, and we returned late in the afternoon to find Two Days waiting for us. It was my first time to meet Two Days, an older man who, I later noticed, seemed to be permanently clad in sunglasses and a wool hat, no matter the time of day or season. Two Days was curious about what we had been doing and, as was often the case after long days of walking, gathering plants or honey, and tracking animals, the discussion of our work together erupted into laughter. We recounted the adventures of the day, including what I had been taught about edible tubers, the toothbrush plant, and truffles; where we looked for honey; and my frequent mistakes (the primary source of amusement).

Two Days sat back quietly listening while he smoked his raw leaf-tobacco cigarette rolled in an old piece of newspaper. He began to ask questions about what it was we were looking for. !Nate and Njoxlau explained that they were teaching me about the bush, especially plants and truffles, and how to track. They wanted to show

me places that had different plant and animal communities by walking through the bush so they could teach me new things about how the ecological patches come together. They were showing me the pans and the fossil valleys, how certain plants lived close to specific landscape features, and the places they used to camp when hunting. “There are not so many pans here, only valleys, and we have seen the few pans,” Gustel said.

“All of the pans? But you didn’t see Haly,” Two Days said.

“No, we haven’t gone to Haly,” Njoxlau responded.

At this point, Two Days, !Nate, Njoxlau, and Gustel broke into an animated discussion about Haly. It was difficult to follow as they spoke rapidly in !Xoo, but Haly was most certainly the topic. Gustel translated for me intermittently.

“They are saying Haly was the best pan for hunting. It still is. It is far from the roads and the animals can lick the salt and be safe.”

Njoxlau interjected, “It is a small pan, but it is beautiful. It only has one dune. It is not big like the Zutshwa pans, but all of the animals go there. The animals are plenty! I want to see Haly. Let us go to Haly!”

“Its stones are many,” !Nate explained, “this is why the animals go there. They go to lick the stones.” Njoxlau and !Nate often spoke about the stones at the pans as things that animals liked, referring to the mineral deposits that they lick, but I had never been to one of these stony pans with them.

“How do we get there?” I asked.

“We will drive, and then we will walk. It is that side near to Ranyane, but not so near. It is near here, but also it is not so near,” Gustel said.

“Have you been there before?” I asked.

“We have never been to Haly,” Njoxlau responded, “but we want to see Haly for its stones. Even Two Days wants to go to Haly. He has told us stories about Haly. Even our fathers told us stories about Haly. It has one big, big dune. We can find it. We will climb trees and see it.”

Though none of my interlocutors had been there, they knew the pan well from stories. It was not a specific story that I can recount, but rather an accumulation of discussions about a place that came together like so many trails that gathered into story. Landscape changes, land-use policies, settlement programs, hunting bans, and a variety of other social-political factors contributed to why my interlocutors has only heard about this pan but had never been there. Yet, in a sense, they had been there before through the stories that motivated their curiosity about, and interest in, finding the pan. The more they discussed the pan, the more they emphasized that this is where all of the animals were. Most of the stories focused on how to find Haly, its large solitary dune, and its calcareous stones. Months later, other researchers conducting wildlife surveys in the area would tell me they had also heard about Haly and shared their anecdotes about this place that didn't exist on their maps. They had looked for Haly using GPS as an aid, but they never found it. Ultimately, they doubted that the pan was real. They were even more skeptical about the claims of abundant wildlife at the pan. It seemed unlikely to them that such a pan existed,

especially one that attracted so much wildlife. My interlocutors explained to me, however, that because Haly is quite far off the beaten track and is quite small, it is not an easy place to find if you don't know what to look for: the large solitary dune, when noticed from a distance, would reveal the location of the small pan to us. We would first have to locate this dune from afar and recognize it as standing apart, or different, from other dunes.

What began with a story of a place none of my interlocutors had ever visited turned into a series of adventures, navigational experiments, discoveries, failures, debates, speculations, and lots and lots of walking. At first it seemed too good to be true. It was a pan in an area not especially well known for its pans that my interlocutors spoke about but had never seen. Unlike parts of the Kalahari to the southwest and northeast where spectacular pans speckle the Kalahari grasslands, thick shrubby woodlands dominate Wildlife Management Area (WMA) GH11. Though there are fossil rivers and tributaries, there are comparatively few pans.¹ Wildlife populations in the area have also been dwindling, largely because of intensified human activity over the last fifty or so years: growing settlements, the subsequent explosion of livestock (especially cattle), roads, and even distant veterinary fences to the north that cut off migratory routes for huge numbers of ungulates. But this pan called “Haly”—that I learned about from the stories of my friends who had never been there, that seemed to be made of legend—lay in the middle of GH11, away from

¹ Most pans in the area have become centers of human settlements and, more often than not, cattle posts.

settlements, cattle, roads, and fences and was described as attracting all of the region's animals.

It is still unclear to me whether Two Days had ever been to Haly before or whether he was also recalling stories. We had hoped that Two Days might be able to guide us, but he had to return to the village. Armed with only stories and descriptions of the pan, !Nate, Njoxlau, Karoha, Gustel, and I set out to find Haly the next day, with its lone dune and all of the animals. We did not find Haly that day. Finding Haly became a pursuit that occupied our thoughts, discussions, and much of our time over the next year. Along the way we encountered all sorts of trails—animal, plant, fungi, water, and even wind—that guided us in new directions, as we made our own trails. These trails revealed themselves to us and beckoned us towards them, and rather than following in hot pursuit, our own trails became entangled with those that would manifest as a knot in this pan-gathering called Haly.

If we were to find Haly, it would be within northwestern parts of GH11. As described in previous chapters, GH11 is a designated Wildlife Management Area that encompasses several settlements, including Bere, in the Ghanzi District, and includes part of the wildlife corridor between Central Kalahari Game Reserve (CKGR) to the Kgalagadi Transfrontier Park (KTP). The northerly parts of this region, however, are being rezoned for cattle ranching, and could potentially include Haly and all of its wildlife.

The formalization of permanent human settlements, wildlife management, and cattle rearing have all affected how different Kalahari actors can and do move about the Kalahari landscapes. Settlements created centers of human activity² that, combined with the various iterations of hunting bans and land-use rights policies, limited the extent to which people can practically and legally move about their environments. The WMA designation instantiated a zone of movement for migrating wildlife within the corridor that limited the ways in which human inhabitants can legally interact with and move through these spaces, and was meant to limit the range of grazing livestock. Livestock, in turn, would be based closer to settlements and their satellite cattleposts within a zone of sacrifice that provide an economic livelihood for people in settlements. But livestock too require rangelands to graze and eventually, as populations grew, moved into the bush in more expansive ways that deterred wildlife movements, and shifted human mobilities.

There could have been any number of reasons why my interlocutors had never been to Haly but nevertheless seemed to know where it was. Movement through the bush has become less feasible, less practical, and less legal for many people due to settlement policies, hunting bans, wildlife management and conservation policies, and the privatization of the commons. Other movements have intensified around boreholes, cattleposts, and settlements. In many cases, livestock in particular have degraded the landscape to the extent that it is often no longer a worthwhile pursuit to

² In many ways, settlements came to replace pans as centers of habitation or human gatherings.

seek out places like Haly. Many pans do not host as much wildlife anymore: some are overrun by cattle and their surroundings have been overgrazed, and others are too far to reach from permanent bases in settlements like Bere where stable supplies of water are available. However, my interlocutors stated that they had never been to Haly simply because they tended to travel to other pans in the past.

Haly, people and their settlements, livestock, wildlife, and the region in general are embedded in, and enact, multi-layered politics and political histories of the landscape and its inhabitants; human and otherwise. These politics center on various kinds of movement, albeit with different scales of enactment and variously motivated logics. Landscapes are active and emergent, carrying stories with them that are not present on maps, GPS, remote sensing imagery, but involve an important politics of the entangled lifeworlds of humans and nonhumans. That environmental researchers doubted the existence of Haly, or deemed it of little significance, is emblematic of the way in which certain kinds of object realities diminish, or invisibilize, the significance of other realities, places of becoming, and the relational ways in which such things become known.

In short, to better understand why finding a pan like Haly is of any significance, we first need to know a bit about what pans are and why they are important in the Kalahari Desert.

Pan Geologies: What are Pans?

Dotting the landscape in the thousands, pans are important features in the Kalahari. They are of both geological and ecological significance with intertwined

histories of emergent formation. They have been important places for people living in the Kalahari because of the water they sometimes hold and the variety of gatherable plants found near them. From aerial and satellite imagery, pans appear as points amidst a desert of sand and bush, “which break the monotony of this otherwise almost featureless sand plain” (Lancaster 1978:81)³. And it is easy to view pans as such: static points that interfere with a monotonous, or even featureless, landscape. But pans are much more than the points they appear to be from above, as much as the Kalahari is more than a featureless landscape when one walks through it.

³ The historical situatedness of hypotheses of pan geomorphology are also important to the framing of particular images of the Kalahari that circulate in the popular and anthropological imaginations of the desert. It is no coincidence, for instance, that one of the earliest theories of pan geomorphology is attributed to Sigfried Passarge who is also considered one of the earliest Kalahari ethnographers of Bushmen (c.f. Passarge 1907; Passarge 1904).

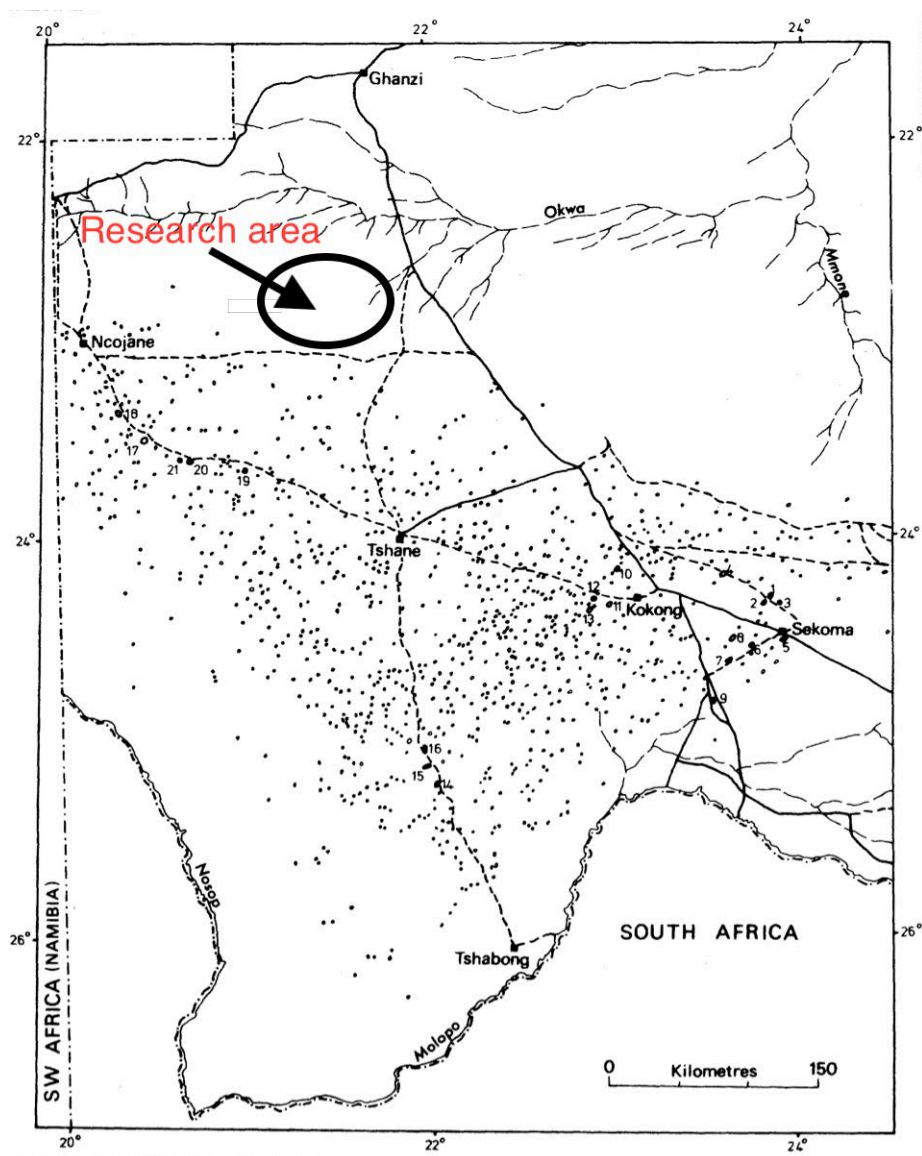


Figure 17. Map of Pans (Lancaster 1978). The black dots indicate pans. My primary research area is north of the Ncojane Road and South of Okwa Valley. As described in text, there are far fewer pans in this area.

Pans are shallow depressions in the surface of the Kalahari sands that form through a variety of geological, climatic, and ecological changes and processes over time. Some of these processes include the fracturing and leaching of sediments, mineral precipitation, wind deflation, groundwater flows, rain, and animal activity.

Emerging through these combined processes, pans are the ever-changing scars of the combined efforts of biotic and abiotic movement, the sedimented tracks of gathered landscape movements.

The “monotony” that Lancaster describes pans as breaking-up refers to the Kalahari Group sands—one of the most expansive uniform sand sheets on the world—and the vast, flat, but also consistently grassy or shrubby, semi-arid desert landscapes.⁴ Once a series of lakes and rivers in the Kalahari Basin some 30,000 years ago, pans are partly the dried remnants, or watermarks, of a wetter period when they permanently held water. Today they are primarily dry, saline and calcareous, elliptical or sub-circular openings in the desert bush that only periodically hold water for short periods after rain. Some of this water drains into underground aquifers, but the tufaceous floors allow pans to hold water longer than the porous Kalahari sands. Water is retained for relatively short periods of time—days to weeks—before evaporating under the hot Kalahari sun.

Nonetheless, in an otherwise waterless landscape, pans are an important source of water for wildlife, and even people after the rains (though not as much as they once were because of the abundance of boreholes). In addition to water, pans are a rich source of nutrients for animals, where they lick salt, calcium, and other mineral deposits that have precipitated into the pans’ clay surfaces. While mineral precipitation forms calcareous and saline clays, animals trample the surface of the

⁴ Though considered a uniform sand group, the sand is not a homogenous unit in that it varies markedly in color, thickness, and composition (Thomas and Shaw 1991:68)

sun-baked clays, churning them into a fine dust that wind displaces over time, forming dunes, called lunettes, usually on the southern or south-western margins of pans (indicating the directionality of the prevailing winds over time). The surfaces of pans, therefore, are in a constant state of change due to the combination of geochemical, alluvial, aeolian, and animal activity and movements, at different temporal scales.

The pans I focus on here are quite varied⁵ and can look quite different from one another even though they share many features. Some are big, open tufaceous clay, sub-circular or elliptical expanses, whose surface silts have been churned into fine dust by animals seeking nutrients and water. Others are grassy, especially in the wet season when the annual grass seeds that animals have dragged into the sun-baked cracks of the clay are watered. Some are partly grassed with small islands of trees or shrubs. Others still are smaller depressions at previous sites of fluvial pressure in now fossilized river tributaries that have more varied vegetation.

Over time, various processes have merged, shifted, and disentangled, such that there has been much uncertainty about the origin of pans. Sigfried Passarge, a German geological surveyor of the Kalahari in the late 19th century—and one of the

⁵ There are at least four kinds of pans described in the literature (Thomas and Shaw 1991), however the criteria for identifying different types of pans are not always straightforward. Or rather, pans themselves often do not appear to fit into distinct types, and their origins have been greatly debated. The most well-known pans in the Kalahari are the Makgadikgadi and Nxai Salt Pans. These, however, are not like the thousands of other pans that speckle the Kalahari. In fact, some geomorphologists argue that they are not pans at all (McFarlane, personal communication: 2015). Instead, they are fossilized mega-lakes that encompass many hundreds of square kilometers, and have clear shorelines demarcating the fluid boundaries of the inland seas. These fossil lakes are exceptional, but are a different, much larger, landscape feature than those attended to in this paper.

earliest Kalahari ethnographers—thought that pans were formed entirely by the churning of sand in places where animals repeatedly gathered, digging for water and nutrients (Passarge 1904). This was the predominant understanding for more than 60 years.

Today, geomorphologists argue that evidence does not support churning as the primary factor in originating pans, though they admit animals may play a role in maintaining pan depressions. Boocock and Van Straten (Boocock and Van Straten 1957) argue instead that pans are “ancient, sand-choked, drainage lines and lay in belts which could be related to a pattern of drainage lines and divides” from relic surface water systems, formed in conjunction with tectonic activity. But later, aerial photography found that no traces of such drainage lines were organized in any visibly systematic manner. However, the southern-southwestern patterning of dunes on pan margins was evident, which led to the suggestion that wind plays a prominent role in pan morphology and the formation of their associated dunes (Thomas and Shaw 1991:158–162). This process of Aeolian deflation is accepted as at least influencing pan morphology, but its role in pan formation is now thought to be more complicated than initially supposed (Thomas and Shaw 1991:163). More recent geophysical, geochemical, and 3D imagery analysis suggests that “weathering along groundwater flow paths following lineations,” has played a large role in pan formation and perhaps “that pans are even capable of migration over long periods of time” (Farr 1982 as cited in Thomas and Shaw 1991: 162). This argument is complimented by the notion that mineral precipitation, and mixing with ground water, further assists weathering.

“The Kalahari pans thus appear to be polygenetic features” (ibid). Pan formation and morphology may be, in part, the result of tectonic activity. Among geophysicists, the most important factors for pan formation include prevailing climatic conditions and drainage patterns, cycles of lacustrine deposition, Aeolian deflation, groundwater/fluvial movement, mineral precipitation, and the flushing of rain water through the drainage systems. “The pans may therefore be considered to be the local centers of an unorganized system, developed in an extensive watershed of low-relief.” (Lancaster 1978:86).

In short, pans form through a variety of geological factors that together create and maintain them as ever-changing landscape features, including their associated dunes, like the one we would use to find Haly.

Finding Haly

!Nate, Njoxlau, Karoha, Gustel, and I left in search of Haly the morning after our discussion with Two Days with only the stories and landscape to follow. In a deliberate move, we decided that we would not use GPS or even look at maps and satellite imagery to guide our search. My friends wanted to show me how to navigate the bush “without a computer.” We would find Haly from the stories alone. I found the proposition exciting because I thought that this would allow for me to learn and notice more along the way. Key to finding Haly would be locating its lone dune on the south-southwesterly edge of the pan.

We knew the general direction we needed to go and, though we knew we would have to walk, we first drove as far as we could to make the journey more

feasible. We drove to the Maitlo-a-Phuduhudu gravel road and turned west towards Ncojane, driving for about 20 km. On the way, we stopped briefly to look at the ruins of an old roads camp where /Uasi had told us he spent several months, almost twenty years ago, working to clear the bush for what would become the sand track on which we travelled. A few rusted tin cups, pots, and kettles offered a reminder of the labor that went into making the trail that we now moved along so quickly, another history read into the landscape.



We continued on for a ways, pulled off the road and found a nice tree under which we could park the vehicle out of view from other wayward travellers. Once parked, we made a fire, boiled water, and each had a cup of tea before setting out in a northwesterly direction, looking for a tall tree to climb that would give us a better view of the landscape, especially the distant dune rises. We hoped to spot Haly's

single dune from the top of a tree. Gustel climbed the first tall tree we encountered, an old fire-scarred, shepherd's tree (*Boscia albatrunca*).



Njoxlau and Karoha climbed as well, looking into the horizon for a large dune to guide us. From a distance, the rises were faint and hardly seemed to reach into the sky to interrupt the otherwise flat landscape. After the three of them discussed the various visible dune rises, gathering the various signs, they determined which would most likely belong to Haly based on its size and solitariness. They agreed that one dune stood out more than the rest and suggested we begin walking towards it. Even though this was not Haly's dune, it would provide a good vantage point from which to scan the landscape. This would bring us into close proximity of the area in GH11 that would be re-gazetted from WMA to privately owned cattle ranches.

We then began walking in the general direction towards the dune at a diagonal angle so that we moved into the wind, much like when tracking animals or even looking for truffles. Though it might have been more efficient to walk straight to the dune we always tried to walk into the wind to avoid unexpected run-ins with animals in front of us that had picked up our scent. While we tracking the pan, my interlocutors were aware that we too could be tracked at anytime, so along the way they paid attention to the wind.

Our walk began as a kind of speculatively goal-oriented navigation, similar to the speculative tracking described in Chapter One. We wanted to find the dune associated with Haly, so we looked for dunes that might fit the description from the stories. And if it was not the right dune, its height would give us a vantage point from which we might spot the next dune. I then learned that there was more than just the dune and the wind guiding us.

As we walked we encountered huge patches of Motsustujane bushes that slowed our walking, not because the bush was thick, but because they were bearing lots of fruit. Motsutujane, (*Grewia retinervis*), is a delicious, sour tasting berry bush, well adapted to growing in thick Kalahari sands, and one of the most favored berries in the area, second only to the more illustrious, and sweeter, Morethwa, (*Grewia flava*), a staple food and preferred ingredient for brewing “traditional” beer. Mostustujane has a small berry with little flesh and a large pip. Still, with several in your mouth, you can get quite a lot of the sweet and sour meat. The pits can also be mashed into a powder and eaten in dry powder form or made into a porridge. Its

branches are also used as a friction stick for making fire. Gathering Morethwa berries is a favorite activity of children, and I learned of at least two occasions during my year of fieldwork when groups of small children went berry gathering and got lost in the bush for several days. Following the berry patches they eventually lost their bearings and days wandering the bush and sleeping in trees, until they were eventually found by search parties. The second group had to be found by police helicopter because evening rains had washed away the children's tracks, making it impossible to find them on foot. While the berry bushes can guide one's activities, giving them too much attention can be dangerous if you become disoriented.



When we encountered the berry patch, my interlocutors and I fanned out, gathering as many berries as we could, stuffing our pockets with the tasty morsels. The gathering severely impeded the pace at which we moved towards the dune. At first I was a bit frustrated by this, wanting to reach the pan, but !Nate and Njoxlau reminded me, “When there is food, we must eat.” And these berry groves were especially prolific. This would not be the last time that a planned journey, or intended

activity, was redirected as we encountered plants or signs of animals on our way through the landscapes. In fact, it became the norm and my primary method for learning about Kalahari landscapes. This open-ended noticing and being available to be compelled by encounter, was perhaps one of my most important lessons. In the mornings (or the evening before), we would set out with a goal, but along the way we would engage with whatever we encountered. Instead of obsessing over a desired end point, the landscapes and their various actors guided our movement through the bush. In this way, our adventures in finding Haly were a series of unfolding encounters, a kind of stop-and-go multispecies contact improvisation. We did not follow a strict trail. Tracks called out to us in myriad ways as we engaged in ongoing practices of noticing and emergent engagements. Less than a treasure hunt, finding Haly was an improvised dance in which the lively bush was our partner with which we became entangled and gathered towards the pan.

As we walked on, the berry bushes eventually became less frequent and bore less fruit. We noticed several gemsbok trails crossing through the berry patches. Once our trail of berries came to an end, we moved on to a gemsbok path.⁶ The trail seemed to meander in the direction of our lonely dune, which Gustel surmised must be a frequently travelled route to a pan. After an hour or two we made our way up a little dune and then down into a small pan. The trail skirted the edge of the pan and carried

⁶ A large, beautiful antelope and one of the preferred game meats of my interlocutors. Its meat is naturally salty, in part from the animals' preference to lick the minerals in salt pans.

on around the edge of the dune. But this wasn't Haly: the dune was too small, and it resembled a clearing in a small fossil valley more than a pan.

We followed the trail until it took us into more bush where we climbed another tree, this time from the top of the dune, and noticed several more dune rises. !Nate said we should loop around to the right, while Njoxlau and Gustel thought we should go left. In the end, we went right, as !Nate, who had begun coughing and was having difficulty catching his breath, was quite insistent about our route. Njoxlau, Karoha, and Gustel soon realized that !Nate was indeed leading us straight back to the car. While we had been walking for more than three-hours, zigging and zagging along trails on our way to the valley and its dunes, my interlocutors kept track of our movements in relation to our starting point, the vehicle parked in the bush. Rather than following trails and making trails through emergent encounters with plants, animals, dunes, pans, and valleys, !Nate was now "dead-reckoning" a new, direct route back to the car.

The entangled trails had formed the spatial context of the landscape from which !Nate could differentiate a more efficient way back. He did not explicitly point out the direct route, but Njoxlau, Karoha, and Gustel quickly saw what he was doing and told me as much. Again, we stopped periodically to gather berries, but we had already eaten many and were now all intent on getting back. In all, it took only forty-five minutes before we arrived. We walked at a faster pace and !Nate lagged behind, coughing, and said that his "engine was very hot." !Nate often used this expression when he was tired, which was probably related to his later diagnosis with terminal

cancer. This was the last time !Nate walked with us to find Haly, though he continued to talk about the pan and helped us think about ways to find it for the next few months before he passed away.

On Wayfinding and Mapping

Most anthropological discussions about wayfinding fall into one of two camps. One emphasizes cognitive and mental processes as well as apparatuses involved in attaining spatial orientation (i.e. maps and mental maps), while the other emphasizes embodied phenomenological perception and experience (i.e. habits and familiarity). These two approaches, however, mostly begin with a defined territory or space that, at least when terrestrial, is implicitly static and unchanging. In other words, an *a priori* concern with human navigational practices, whether mental or experiential, implies a unidirectional relationship between the navigator and the navigated—of the knower and the known—such that wayfinding is simply a matter of coming to know a stable and given world “out there.” This tells us little about landscapes and especially little about human embeddedness in the emergence of place. If knowledge is travel, and space emerges from travel, decentering the human in wayfinding can potentially reveal much about landscape emergence.

Wayfinding in the Kalahari involves tracking more-than-human gatherings of plants and animals as well as abiotic processes and movements such as wind, rain, and the geological sedimentations of the desert itself precisely because these things move too: they wayfind. Together, these things create trails that gather varied configurations of landscapes, such that theories reliant on maps—or map concepts

that imply fixed coordinates in abstracted space—do not fully account for finding one's way when those coordinates are changing and unknown, much like tracking the moving animal. This is particularly pertinent, considering the types of landscape changes that have emerged out of specific political economic histories and how this has influenced the way things can engage with those landscapes. Human wayfinding, then, involves engaging with the wayfinding practices of more-than-human worlds.

Alfred Gell's (1985) discussion of wayfinding differentiates between the two theories of navigation but tries to think them together: practical mastery and mental maps. Practical mastery, drawing from Bourdieu, is embodied and has to do with familiarity and habit. The practical mastery theory argues that a subject's movement in space is linked to bodily perception and responds to everyday spatial situations in an unreflective, socially patterned way. This stands in contrast to mental map theories, which suggest that the individual is the carrier of a cognitive structure, a map of some sort, which provides models for all possible routes and which is independent of the bodily location of the subject. Gell argues that you need both. Both theories are true when together and both are false when alone.

First, a defined and unchanging territory is required in both scenarios. The subject needs coordinates in space that are true no matter where the subject's body is located: a map. Second, the subject also needs images to perceive where they are located in space during encounter in order to know whether they are on the right or wrong route. However, space, territory, and the processes of navigation may be more

unruly than Gell allows for. And conversely, this also presumes defined subject positions that may exceed the assumptions on which the logic of the argument is based.

Tim Ingold (2000) takes another approach in his emphasis on trails and *wayfaring* as movements critical to ways of being and of becoming with the landscape. In this view, territory, or rather country, is emergent. This gets towards a more workable theory that considers relations of landscape making and wayfinding together without presuming a pre-defined, static territory. Implicit here is a rather romantic notion that everything can come together and hang together nicely. It leaves little room for politics, economics, history, and other contingent relations through which landscapes and wayfinding might be configured, reconfigured, governed and disrupted. Fences, sedentarization schemes, cattle posts, and the hunting ban, for instance, influence the extent and way in which people and other mobile doings move through and shape these landscapes. I take a similar approach to Ingold, but hope to leave room for such processes that act with landscapes, humans, and nonhumans, and I hope to do so by emphasizing differentiation and historical transformations.

Wayfinding, I suggest, also necessarily involves processes of distentanglement and differentiation as a quality of finding one's way in particularly situated landscapes. As a kind of "becoming with" the landscape, wayfinding does not merely reflect the kinds of cuts that are made in trail making, the kinds of images processed in order to make those cuts, or other potential disruptions and risks to nicely interwoven trail-worlds. As much as trails navigate landscapes, they make

landscapes. This chapter points to specific ways in which the relationship between practices and landscapes configure each other and are together reconfigured through changing social, political, and historical contexts.

Pan Gatherings⁷

George Silberbauer, an environmental surveyor and anthropologist nicely describes pans of the central Kalahari:

“The pans are large, flat expanses of tufaceous soil, hard-baked and bare in the dry season but slippery and treacherous when wet. In the rainy season the softened tufa is easily trodden out by game animals, which favor the pans because the palatable kweek grass (*Sporobolus tenellus*) grows there and also because the clear field of view protects them against predators. The animals congregate in the center of the pan, scuffing up the mud in search of roots or carrying it away on their hooves, and eventually excavating small depressions. Rainwater gathers in these depressions, attracting yet more animals and, consequently, more mud is carried away. Eventually the depressions are consolidated into one large waterhole. Seeds carried by animals and on the wind lodge in cracks in the drying mud and, in time, a small shading grove grows up around the pool” (41).

Silberbauer’s description captures the liveliness of pans and pan related activity as gatherings of material relations. Pans afford movements, and they are full of movement. They themselves migrate slowly over time, and their surfaces are in a constant state of change due to mineral precipitation, churning, and wind deflation. As they move, things also move towards and away from them. Trails of these movements can be seen throughout parts of the Kalahari populated by pans, some of

⁷ Trails, particularly those made by animals and plants, are attracted to pans while at the same time contribute to the making of pans with other abiotic movements. Here, we can begin to see how trails bear a kind of materiality in them that is not dissimilar to Marilyn Strathern’s (1995) conceptualization of the “relation.” Strathern challenges notions of units in part-whole relationships to argue that the relation precedes the constitution of any fixed and bounded part or whole. Partial connections enable attention not to the fixity of units, but instead their mutual constitution. They are more than one, less than many. Trails in this section are the partial connections between animals, or plants, and pans. They, at least partially, come into being with each other. But, as wildlife populations decline, livestock graze, and Kalahari vegetation changes so do their trails and particular pans, but not all pans, take on amplified ecological significance for wildlife and vegetation.

which we walked on while looking for Haly. They afford movements through their own material flows and mobilities. And those movements they afford help to ensure their contingent, or shifting, maintenance.

As depressions, pans attract wind. One geomorphologist described wind to me as “opportunistic,” because it tends to move towards spaces that allow it to capture dust. Pans provide perfect sites of opportunity, in this sense, as bowls that contain fine dusts preferable for wind displacement⁸. The dunes of gathered sand and dust on the margins of pans are the cumulative tracks and trails of prevailing winds over the *longue duree*, remaining active in the present, like Haly’s lonely dune that we sought out as we search for the pan.

Wind, however, does not just transport dust out of pans, but also seeds and fungal spore as described in earlier chapters. Pan ecologies tend towards climax communities and “these areas have a greater biomass, offer a wider array of niches, and have a greater diversity of species” (Silberbauer. 1981: 41) and wind attracted to pans is one of the conduits for these gatherings. Different varieties of plants live in and near pans than in the sand plains where gradients and varying soil PH levels provide a more diverse array of soil habitats and greater concentrations of water are available. Large trees congregate around the peripheries of pans, growing taller and forming denser thickets than in the sandveld, thonveld and woodlands. They provide

⁸ The language of opportunism is troubling for me because it suggests a particular kind of logic that rests on competition and exploitation as the foundations of existence in the world. Perhaps a better way to think of wind is as relational. Pans and wind interact in relational ways. Pans and wind are inverses of each other.

shade and cover for animals migrating to pans for minerals and water, grazing and browsing on the different vegetation. And the delicate Kalahari desert truffle as described in Chapter 2, is also often found on pan and valley edges, where gathering activities involving these fungi often target areas surrounding pans.

Animals create visible trails along the way to pans, marking their own movement, and also carry seeds with them that emerge as another kind of residual animal trail in the form of vegetal gatherings. Wildlife populations in the semi-arid Kalahari require unrestricted mobility in order to track patchy water and forage resources. This means tracking pans, which are important sources of captured water, minerals, and nutrient-rich grasses. Selebatso's recent study of wildebeest in CKGR—one of the antelope species that migrates greatest distances—has shown that that while locating watering points are the most important factors in wildebeest migrations, their preference is for pan habitats that have nutritious short grasses and higher levels of “crude protein, calcium and phosphorus content” (Selebatso et al. 2017:7)⁹. Populated by antelope, pans, in turn, attract large predators and carcasses of their prey are often found in, or on the edges, of pans. As large open spaces, pans also provide a wide field of view that can help protect prey against predators, with escape routes also clearly marked as trails leaving pans.

For these similar reasons, pans have attracted humans. Historically in the

⁹ The irony is that because veterinary fences have inhibited the range of movement for animals like wildebeest, Selebatso also shows that creating permanent watering holes supplied by borehole pumps has been key to the remaining wildebeest populations in CKGR. As such the wildebeest have tended to concentrate their movements around those artificial watering holes for longer periods of time.

Kalahari, pans have been preferred locations for people to make camp. People have gravitated to these pans because of their simultaneous capacity to capture water, attract animals to be hunted, and the availability of gatherable plant foods in their vicinity. Heinz has suggested that San territoriality was often defined in relation to pans, and pan access (Heinz 1972),¹⁰ though, perhaps less than fixed ownership, that territoriality probably involved what Diane Rocheleau and David Edmunds have described as nested rights and relations “in multidimensional landscape niches [that] are continually subject to change” (Rocheleau and Edmunds 1997:1355). Pans have allowed people to move around the dry desert with access to water while looking for plants to gather at different times.

As Heinz notes, “[i]n years past the most important resource was water, especially that which collects in pans for long periods. Today with the sinking of government boreholes the significance of such pans has decreased. Yet, water in pans enable a band to stay away from the boreholes and to stay in the proximity of those fruits which are ripening” (Heinz 1972:408). A study in the field of ethnophysiology found that the word *n!au* in a variety of Taa spoken in Namibia is derived from the word for a pan to refer to a place with water where people can live and gather (Boden 2009:316). Taa is the same language spoken in GH11 in Botswana, though it is a different variety than in Namibia. Nonetheless, the correlation between the words for place to live and gather and pan points to the

¹⁰ Though it is important to note that the premise that San hunter-gatherers had defined territories is a hotly contested topic amongst Kalahari anthropologists.

significance of pans to people as places in the Kalahari. Furthermore, the study shows that the relation between these words has recently shifted as Namibian Taa speakers have settled as laborers on Afrikaans farms. The word *n!au*, Boden shows, is now most commonly associated with the Afrikaans word *plaas*, which means farm, a shift connected to the recent arrival of boreholes (Boden 2009:317), demonstrating the significance of political economic changes on how people relate to landscapes and places such as pans.

In addition to the pans themselves, you will sometimes find “sipwells” in or near pans. Groundwater tends to be more shallow in and near pans, so even when pans are empty, animals and people dig for water access at nearby springs. Sipwells are the springs made accessible by this digging. Animals keep sipwells active during periods of human absence. They are small depressions that resemble mini pans and could suggest an early stage of a developing pan. People would plan their travels, and sometimes still do, according to locations of pans and sipwells as rest or stopping points where they could rehydrate and restore their water supplies. Most sipwells are in pans, but some are actually located several hundred meters beyond the pan’s outermost dunes. In a forthcoming paper, Hitchcock et al are mapping sipwells in Kgalagadi and traditional use rights of !Xo families to assist in laying claim to land and water rights in the region (Hitchcock et al. Forthcoming).

I encountered several of these sipwells in the area surrounding Zutshwa when I was there with my interlocutors from GH11 for a tracking survey. Though they knew the area well from such surveys, they never lived in this area and were surprised

when we found several sipwells outside of pans. Karoha was especially perplexed. “I have only seen sipwells in pans before,” he said, followed by a thoughtful pause. “How did they know to dig here for water?” He stood looking at the sipwell and all of the animal tracks in its depression. Karoha then pointed at the tracks and said confidently, “Animals. It was the animals. The animals showed them where the water is,” before turning and walking away, happy with this explanation. Karoha had not been happy with a purely anthropogenic geomorphological hypothesis about the origins of the sipwell. It was not enough for him to approach the sipwell as an artifact in the landscape, he wanted to know what brought people to this place, which he came to argue, necessarily involved more than just human practice; it required an attunement to animal practices in the environment. Karoha, much like Passarge and other early European surveyors hypothesizing about the origins of pans, suggested that animals digging and churning, while looking for water created these small depressions. As such, this sipwell emerged as a place, similar to a pan, through a kind of geological, human, and animal entanglement.

Pans capture water, attract wind, animals, plants, and people through variety of geological and ecological activity through time. But pans are also made by their relations to these things. Pans are the perfect storm of multispecies becomings, but just as importantly, they are multinatural/biotic-abiotic becomings that accentuate the ways in which life processes are entangled with geological doings and movements over time. Pans are not simply geological artifacts that people, plants, animals, and even the climate act on, but the geochemical, geophysical properties of pans are, and

have been, actively engaged with, and influenced by, the variety of Kalahari life processes. As such, they are not only points that stand out against a featureless Kalahari landscape but also manifestations of the landscape's diversity, as evinced by the intertwined trails and relational capacities of the desert's geologies and ecologies.

Debating Haly

We attempted to find Haly again the day after our first failed attempt. This time we approached from a different angle, wanting to begin closer to some of the dune clusters we noticed while walking the day before. We thought these gatherings of dunes might give us a better vantage point to spot Haly's lonely dune. Gustel, Njoxlau, and Karoha all had different ideas about which direction to approach from and which of the dunes we had spotted would give us the best chance of seeing Haly. Again we found a tall tree, this time a russet bush willow (*Combretum hereroense*) like the ones we gathered honey from on other occasions, climbed it, and we agreed on a direction based on the orientation of the dunes in relation to our current position and where we walked the previous day.

!Nate was still exhausted and decided to wait for us at the car, so we were able to walk at a much faster pace. We were determined to cover as much ground as possible in our search for Haly. Instead of fanning out, we walked single file. Gustel, Njoxlau, or Karoha periodically called out or signaled an animal track they spotted and broke formation to briefly follow its trail before returning to the group. In this fashion, the leader of the single file line rotated positions. Immersed in the pace of the group, I too walked in the front of the line without skipping a beat. As we walked, my

interlocutors scanned the ground and the horizon, intermittently gesturing towards our desired route.

We did not follow established animal trails or particular vegetal patches this time. We were guided by openings in the bush, or paths of least resistance. We hastily stepped between large tufts of truffle grass and around the edges of shrubs, just out of reach of any scratchy arms. In rhythm with our pace, these trails opened up to us, guiding our steps through the openings. It did not take long before I could see the paths we would take before reaching the gaps between grass and shrub, like lines woven through the bush. These lines are many, as one would expect, and my interlocutors reminded me that it is important to keep oneself oriented by remaining attentive to the edges of the horizon. This tacking back and forth between ground and horizon disentangled our desired trail from the multiplicity, while the gaps guided us.

After an hour or two, we climbed a dune and descended into a large, mostly open clearing. We stopped under the shade of a small tree for a few minutes to cool down and gather ourselves. We never stopped without at least some shade cover. I was scolded more than once for stopping in my tracks under the hot sun to take sips of water or catch my breath. “P! Let us move to the shade and you can drink your water slowly,”¹¹ Njoxlau shouted at me on many occasions. Even when there weren’t big trees, we squatted in the little shade found next to shrubs.

¹¹ I was also taught that I should drink lots of water in the mornings and not too much throughout the day because I would sweat out that water before my body could absorb the moisture. “Only take small sips. You can drink your water before we walk or when we finish. But even when we finish, you must drink tea, not water,” !Nate told me on several occasions.

From inside the pan, we saw a series of dune ridges surrounding us, indicating that we were more likely in a valley than a pan, even though it looked like a small grass and shrub pan. There was a large solitary tree in the middle with dense shrub thickets scattered around the margins of the clearing. The ground was flat, hard, and calcareous, making it much easier to walk through than the bushveld and soft sands of the dunes. We paced our way to the tree to seek out the extra shade. It was another large russet bushwilow with low-lying branches, a perfect tree for climbing. A variety of ungulate tracks led to the tree and the ground beneath the tree was littered with their pellet shaped droppings. This was a favored resting place for antelope, but also their predators. The lower branches of the tree were scratched, which Gustel told me indicated that a leopard frequents this tree, likely dragging the carcasses of its prey into the upper branches for safe keeping and eating.



Figure 18. Gustel standing under the tree in the valley

There were no animals at the tree, so we took advantage of its shade to discuss our location. There seemed to be agreement that this most certainly wasn't Haly. Njoxlau and Gustel pointed towards another dune in the southwestern distance. "That must be Haly. It is too far for us to go now. It's late and our water is nearly finished," Gustel said. As we started to walk back to the car Njoxlau wondered out loud, "But, maybe this is Haly?" Gustel and Karoha quickly responded that it wasn't.

Njoxlau's question sparked a debate that would continue into the evening, and ultimately the rest of the year. How close had we come to Haly? And how did we know that the pan with the lone tree was not Haly? How would we know when, and if, we ever did find Haly? From that day on, whenever the topic of Haly was mentioned, my teachers erupted into an animated debate. What exactly was the best way to get to Haly? Had we come very close when we arrived in the pan-valley with the tree, or were we still far off? Was Haly on the other side of the pan-valley's most distant dune?

We tried to find Haly a few more times throughout the year, and we talked about Haly at least several times a week. Haly stayed with us. When we encountered other pans, we talked about Haly. In the evenings, Haly would frequently come up as a topic of conversation and turn into a huge debate. My interlocutors spoke with their friends about where we had been and how to find Haly. We learned that we definitely had not found it because others informed Gustel that the pan with the large tree (pictured above) was well known and named after that very tree.

We went on tracking surveys with other researchers and recounted our adventures whilst seeking out the pan. They doubted that we would ever find it, especially without GPS. This sparked further debate. If nothing else, they argued, we needed a GPS not only in case we got lost but also, and more importantly, to take coordinates if we did find Haly. My interlocutors engaged in friendly arguments with Derek Keeping when he came to visit our camp, suggesting that he hadn't found Haly before because he was only seeing the big pans on his GPS. Derek erupted into a roaring laughter whenever Njoxlau, Karoha, and Gustel argued about where and when we would find Haly. All three told me that they knew we could find the pan, even if they couldn't agree on the best approach, and now they were determined to prove it to Derek as well.

For the next few months we explored other pans to the southwest where large, spectacular pans are more numerous. We excavated old sipwells and found carcasses of antelopes in the bush between pans where predators had tackled their quarry. We climbed large dunes and looked into the distance, observing how other dunes were situated in relation to one another. We followed the tracks of industrial vehicles into the bush and found them drilling for coalbed methane near pans. The miners were forced to give up because the porous Kalahari sands didn't retain enough water to lubricate the drill. Kalahari geology proved too resistant to their efforts, and so they moved on.

Navigating with Pans

Pans materially facilitate journeys for people and nonhumans by mapping the landscape. The cumulative coordinated gatherings of many trails sedimented in geological and ecological time that *make* pans also act as guides for travel towards them and away from them to other places. The locations of pans are often well-known, particularly in terms of how they are oriented in relation to one another, such that knowing where pans are is a way to navigate the spaces between pans. In an otherwise-flat landscape, pans are recognizable from far distances, owing to the big dunes that rise into the horizon on pan edges. Flatness, however, should not be confused with homogeneity. It is precisely because there is so much going on at ground level that dunes offer a way of disentangling one's desired route from the many trails that a person could be pulled into. Visible from long distances, pans' dunes are navigational tools or landmarks that guide human movement through the bush. But in this sense, pans and dunes are indexical of the bush, not external to it, which is why we climbed trees to look for Haly's dune.

Climbing trees to see dunes while looking for Haly revealed the importance of using dunes to navigate. I didn't really begin to understand how people were able to orient themselves and places with pans, however, until I climbed an extremely tall dune on the edge of Towe pan near Zutshwa with !Nate and Njoxlau. From the top of the dune, the Kalahari opened up like a flat sea below us, offering up a 360 degree panoramic view of the landscape. We had an uninterrupted view to furthest reaches of the horizon, and I thought I might have even been able to make out the curvature of

the planet. The landscape appeared completely flat, except for several other distant dunes that gently reached into the sky, providing a bit of texture through which we could differentiate the flatness.



Figure 19. !Nate and Njoxlau on top of Towe Dune

!Nate and Njoxlau pointed towards several dunes to the southeast, telling me that they belonged to Zonye Pan, where we would make our camp that night. They only knew these dunes from times when they passed through the area on tracking surveys or as trackers for commercial safaris. Neither of them had grown up in the area, and so, familiarizing themselves with each dune and their placement in relation to one another, !Nate and Njoxlau oriented themselves in relation to the dunes as adults. A few months later, I climbed Towe dune again, but this time with Stocks, an old friend and tracking colleague of mine from the Zutshwa. From the top of Towe, he pointed out all of the visible dune rises in the distance, calling out their pan names

and explaining which were preferred sites for camping and which had sand tracks connecting them. He then began telling the names of other pans that could be seen from each of the distant dune rises. For instance, from the top of Towe we could see Zonye's dune rise, and from Zonye we could then see the dune rise of Peach pan. By the time Stocks finished he had mapped out a network of pans and their dunes, explaining how people used the dunes to find more than their associated pans, but as guides through the flat landscape even when they were going to other places. Importantly, Stocks described pans not only as desired locations or places but also as guiding nodes entangled within the many possible routes one may take through the bush and as sites where the many trails of people, plants, animals, and geological processes are knotted and unknotted.

The biotic and abiotic trails that make pans and that pans afford are precisely why pans have been important to people as both places and navigational reference points. However, as socio-economic and political contexts have changed, so has the significance of pans to people in the Kalahari, as well as pans themselves. Once places for gathering, camping, and retrieving water, pans have taken on different sorts of roles due to development settlement schemes, borehole water supplies, legal restrictions to hunting and gathering practices, and increased livestock holding. Some pans have become villages and cattle posts. Other pans that are more remote have become gathering sites for animals where poachers can hunt out of sight from authorities, while others have become stories of places once visited. These

transformations, as much as the biotic and abiotic movements with which pans come into being, are inscribed into pans and their associated wayfinding practices.

Haly Found

On the last week of my fieldwork, my interlocutors and I sat around the fire discussing all that they had taught me and what were the most important things to accomplish in our remaining days together. “We must find Haly,” Karoha said. It had been several months since we had last attempted to find Haly, and in the intervening time a lot had happened. Nate had passed away. We had found a team of drillers prospecting for coalbed methane, conducted our grass experiment with Eddie, explored trees to gather honey, and even went on another tracking survey with Derek, but we hadn’t yet found Haly. Everyone agreed that it was the last thing we should do. Gustel insisted that we should be prepared to spend a few days and that we should plan our approach carefully. We slaughtered a goat so we could bring fresh meat with us and packed 75 liters of water, plenty of tea and coffee, and a food box with rice and maize meal. We loaded it all into our vehicle with our tents and tools. We would take as much time as needed until we found Haly.

This time we approached from a different direction than on our first few attempts. After consulting with friends we determined that we could drive closer to Haly if we followed an old scar of a 1980s surveying cutline¹² that slices through

¹² In the 1980s, the Botswana government, often in conjunction with DeBeers mining company, surveyed large swaths of land, sinking boreholes and prospecting for minerals, especially diamonds. Along the way they made cutlines through the bush for their vehicles to travel, many of which remain in use today. Other cutlines were also made to create boundaries between districts, fire breaks, and

Gustel's farm. With more than twenty years of growth and disturbance, the cutline is barely visible if looking for a track in the ground. It is visible, however, in the growth of the vegetation. Looking into the distance, a slight parting of trees and bushes reveals itself. This straight line would guide us through the bush to a place where we could look for Haly. It would not be easy going, as *moselesele* thorn shrubs, infamously known for puncturing tires, frequently occupied the recovering cuts together along with tall grass stands that could get caught in the undercarriage of the vehicle with the potential to catch fire. Even worse, frequent holes and stumps hid behind bushes and under grass.

It was slow going. After more than four hours of driving we had barely travelled twenty kilometers. We climbed a few trees but saw no dunes. As dusk approached, about 30km in, we climbed another tree but still no dunes. We pitched camp, roasted some goat meat, and then strategized for the next day.

We drove 6km further in the morning. The grass was very thick from the recent rains and started to cause the vehicle to overheat. Fine seeds burst out of the spikelets on the grass inflorescence as we pushed through the bush and lodged themselves into the breathing holes of the radiator. As the seeds travelled with us they slowed the circulation of air through the radiator that prevents the vehicle from overheating. This was the same cause of the vehicle breakdown several years ago when

roads to link settlements to one another. These cutlines have remained more active than most of the old surveying tracks.

Njoxlau and Eddie got lost in the bush without water. We had driven far enough and decided to walk in search of Haly rather than risk the vehicle breaking down.

About an hour into our walk we spotted a single dune when we climbed a tall *motlopi* tree (*Boscia albatrunca*). We went straight for it, climbed the steep dune, and surveyed its surroundings. We didn't see much that resembled a pan that could be Haly, but there were lots of animal tracks. In fact, we almost walked all the way over the dune before we looked back and saw a small depression with a few glimmering specks of white. Gustel stopped in his tracks and asked, "Is it a gemsbok? No, it's not. It's something white. Let's go see." Could those be the famous calcareous stones from the stories of Haly? A brief but heated exchange immediately followed: "This is Haly!" Gustel shouted.

"No its not! Let us go check for the stones," Njoxlau retorted. All of our doubts, debates and heated discussion about Haly were about to be tested.

We walked down, and a small pan opened up. It had been difficult to see from the dune because of a few islands of trees and shrubs. It was small, as the stories said, and we could see the trails of a wide variety of wildlife. A little ways in, we spotted a few white stones. Still, Njoxlau wasn't convinced. But then we rounded a little thicket, and we saw beautiful white stones that had been eroded by water and clearly licked by animals. They bore the scars of teeth where animals had scraped for minerals. But they were more than individual stones. The mineral deposits had formed an expanse of calcrete bedrock. The small peaks in the bedrock were pock-marked, and between the peaks, there were small channel like depressions,

presumably etched out by moving water. It was a small but gorgeous site that bore the trails of geologic and climatic processes, as well as trails of wayward animal tracks scratching their way into the stones' surface.

We paused at the calcareous expanse for several minutes to take in the site. Njoxlau turned to me and said, with a sense of relief, "It has taken us a long time, but now we have found Haly. Its stones are beautiful." He gestured towards the expanse.

Gustel sat in the shade, smiling with /Uasi. Gustel shouted, "It has taken us one year, but we have found it! You see all of the tracks of the animals? This is Haly!" He and /Uasi then got up and walked around a thicket. While still taking pictures of the stones, I heard a shout. "Oy! Oy! Come here," I walked around the thicket and almost fell into a watering hole, the first I had seen in the area that could actually hold water. The stones and the watering hole, together, were the small pan, connected by the thicket. It was a small pan like the stories say, and it did not disappoint. There were tons of tracks: wildebeest, hartebeest, gemsbok, brown hyena, cheetah, and even a few wild dogs. It was not a large open pan, but the entangled trails of years of mineral precipitation in the form of calcrete, water from the recent rains, animals that came to drink and lick the stones, very lush grass, wind that sat in the shape of dune on the southwest corner, and our year-long adventure sat in this pan called Haly, a testament to the subtlety of the Kalahari.

We walked back to the car. On our way out of the pan, we saw horse tracks. People had been here recently, most likely hunting. Haly was just far enough into the WMA that it still attracted animals, and even hunters out of sight from authorities.

But where we found Haly lay less than 6 kilometers from southern boundaries of soon to be formed cattle ranches, and perhaps the pan and its constituent gatherings will be transformed by the new land-use policies.



A few days later I sent an email to my ecologist friends who doubted the existence of Haly, to tell them that we had found this small pan from the stories. They

both responded quickly, asking if I had taken GPS coordinates, which I did in hopes of finding the pan again and perhaps sharing the location with interested ecologists. Months after I concluded my research Derek Keeping called me to say that Njoxlau and Karoha took him to see Haly. It was a pan like he had never seen. Describing the pan, he wrote:

Haly seemed unique to me, or at least different than most others, because of the hardness of the calcrete exposures there, more like rock than in other places where it crumbles into rock easily. Clearly it's an important source of minerals as the gnawing lower incisor marks of antelope indicate. It is different too, in that this hard rock in one spot seems to form a water hole that I assume holds water for longer periods than other pans. Geographically it is in an area without other prominent pans, rather more linear pan/molapo features that are covered in vegetation, lacking the exposed calcrete like at Haly. Lots of tracks and trails radiating from Haly (Personal communication).

There was so much more wildlife activity around the pan than he had expected based on his tracking surveys in GH11. So close to the area soon to become cattle ranches, he realized this too is an important part of the wildlife corridor between CKGR and KTP.

Towards Conclusions

While most anthropological literature on navigation and orientation attends to human cognitive and/or phenomenological processes through which wayfinding is enabled or enacted, this chapter has tried emphasize the relations between different trails in our attempts to find Haly, and how they become entangled, with the pan. Rather than taking navigation and orientation as the object of inquiry, I take these processes as part of the entangled trails through which landscapes are made. Furthermore, what is not elaborated on as much in the literature is how this kind of navigation does not involve as much an of an engagement with static points as it does

emergent landscape movements that may even hang together long enough to become features like pans.

Widlock suggests that this would be a socially-oriented navigation that is both mental and nonmental, and indexical and nonindexical (Widlok 1997). What all of these approaches assume is that the place precedes the navigation. Though we didn't arrive at Haly until the very end of my fieldwork, in some ways, the stories and our navigation towards it preceded the place. In this way, navigation, or wayfinding, simultaneously made us navigators and navigated us, such that places emerged with our wayfinding. This wayfinding is not simply a human cognitive process, and in fact, it is not exclusively human at all. The pan, in this case Haly, is made out of the joint navigational trails of water, wind, mineral precipitation, plant and animal migration, and human movement. Time solidified these spaces as gathering points in the material form of pans and dunes. But even these are gatherings themselves: knots, not points.

I argued that wayfinding involves more than moving through a fixed, or entirely mapped, environment. In part, I showed this by emphasizing how my interlocutors and I made our way through the bush by encountering trails of other animals, plants, and dunes, and also by following the tracks of the stories about Haly. I highlighted how pans are themselves formed through cumulative processes of trail-making by more than just humans. The way my interlocutors made their way through the bush to find the pan and how animals, plants, wind, rain, and minerals, move in, out, and towards pans are part of how pans come into being as features in the

landscape, and as such they are anything but static. And it is thanks to this world in motion that we were never lost. Though we didn't immediately find Haly, we deduced our way there through various encounters and processes of differentiation, not just with gatherings, but also the gaps. In this way, the landscape also navigated us, and pans helped do mapping as gatherings of trails.

With a focus on pans, I showed how the geomorphology of the Kalahari, its ecologies, and human movements, together form lively and dynamic landscapes. The key to seeing and understanding this liveliness is an attention to movement across different temporal and spatial scales in the making of place. I have argued that place is never exclusively exterior or interior to human perception and experience. Human perception and experience are deeply entangled with ecologies and geologies that make place emergent. Places, pans in this case, both make and are made by their actants, human and nonhuman. Haly, a place that we had never been to, worked on us as we navigated in search of it, but simultaneously made Haly into a place in our search for it. Our movement and travels through the bush pulled us into all sorts of relations with other species, plant and animal.

The actual act of wayfinding to the pan involved not so much a mapping of the landscape, as following the trails of others who had made their way there. We followed trails of berry patches, animals, wind, and dunes as we tracked Haly. The pan wasn't a point in space, but a gathering. Thus, I suggest that a different theory of navigation can help in understanding multispecies and multinatural practices of landscape making, which, in turn, moves towards a re-conceptualization of

wayfinding as an analytic device in anthropology for landscape emergence. Such a reconceptualization can account for, or at least engage with the political economic and historical forces that are exerted upon landscapes, change landscapes, and reconfigure the ways in which people, and even nonhumans, move about without reducing landscapes to abstract or rationalized, space.

One of the problems with many theories of navigation is that they are too reliant on a preceding distinction between the knowing subject and a static landscape, that hides the liveliness of the various actors through which landscape are known, as well as the all too common forces that disrupt them, changing their very materialities. While theories of navigation and wayfinding are usually about human practices of being in and knowing the world, they necessarily involve more than just humans. Wayfinding pulls people not only into an engagement with the material semiotics of the landscape—of reading the signs of the landscape—but also involves responses to what these things do and the different kinds of entanglements are pulled into and can pull people into, including policies and histories that reconfigure these material relationships. Wayfinding requires differentiation in order to choose a path out of the multiplicity of available possible routes, while engaging with contingency and change. So rather than relying on territory, mental or artifactual maps, or images to sort out routes that precede wayfinding, perhaps *gatherings* might be approached as the starting point, and wayfinding as a process of moving and relating to those gatherings.

Conclusion

For all intents and purposes, large parts of the Kalahari Desert might at first seem to be relatively undisturbed landscapes, resembling a “Holocene refuge” (Tsing 2017) or what Zachary Caple (2017) has been calling “Holocene fragments:” the kinds of more-than-human social landscapes that have not yet been obliterated by the onslaught of industrial capitalism. The Kalahari still encompasses one of the largest intact wildlife dispersal areas in Africa, including the world’s second-largest game reserve, and it is populated by relatively low densities of human populations. Yet, as we have seen, Kalahari landscapes are increasingly fragmented by “infrastructures of self-devouring growth,” (Livingston Forthcoming) and face erasures as developmental growth logics and their infrastructures proliferate. The Kalahari already faces significant environmental challenges, and those challenges will only be exacerbated by the continued growth of industry and the national economy.

Indeed, it is unfortunate that growth has so normatively come to be understood as an unquestionable good. Growth is important to lifeways, perhaps as the defining feature of life itself, but in economics, growth has become synonymous with the combination of production, proliferation, and accumulation that destroy ecologies and privilege certain lifeways over others, human and nonhuman. The kinds of heterogeneous relations and entanglements so critical to landscape ecologies and their lifeways are too often replaced by homogenous proliferations that devour all else. This is growth of a different kind, and it too needs to be tracked: those that don’t

see cattle lives but beef and dairy industries; those that don't see forest ecologies but timber, plantations, and potential sites of mineral, gas, and rare earth metal extraction, throughways for oil pipelines, and carbon credits that can be purchased to balance out the associated environmental violences. In these times of growing ecological crises, it is, however, just as important to track the movements of landscapes, their sedimentations, lifeways and the gatherings that violent proliferations eat up. The actual practices of tracking and gathering are ways of doing that, much like natural history methods as arts of noticing, but they are also useful concepts through which to think about landscape movements and their relations. The stories of heterogeneous more-than-human practices of relating, tracking, gathering, and coordinating are critical to the well-being of landscapes, humans, and nonhumans.

This dissertation has focused on moving away from tracking and gathering as anthropological objects of study and towards a consideration of their virtues as methodological practices for ethnographic and practical engagement with the liveliness of landscapes and their transformations. The aim has been to draw attention to the ways that landscapes emerge through, with, and as relational gatherings of movement, beginning with the track of an animal and travelling through space and time to geological landscape features such as pans. Landscapes, rather than the static backgrounds developers want them to be, are gatherings in motion of human and nonhuman lifeways, and biotic and abiotic relationalities. In making this move, tracking and gathering have also been put forth as heuristic analytics. Though, perhaps better put: the distinction between method and analytic has been blurred in an

attempt to build an approach for the study of more-than-human landscapes and worlds.

At its core, at the center of this dissertation are the landscapes of the Kalahari, particularly those in the corridor between two parks that are increasingly encroached upon by a variety of forces of growth. These are more-than-human landscapes, though critically I insist that they include people and human socialities. People, however, are not foregrounded or privileged here. This raises a series of challenges regarding how to best address human sociopolitical issues, as they might be framed within a more conventionally humanist framework or approach, especially in landscapes in which certain kinds of people have been privileged over others and in which subjugation, dispossession, and discrimination have been historical mainstays for Kalahari peoples. I have tried to engage with these issues in a rather round about and indirect way: by following landscape practices to describe landscapes instead of accounting for particular interpretations of landscapes or explorations of meaning making.

The dissertation draws on one of Kalahari anthropology's most significant contributions: the overturning of "Man the Hunter," the patriarchal centering of Man in human subsistence practices. Rather than re-engaging with hunting and gathering for their economic virtues, however, the conceptual potentialities of tracking and gathering are explored as modes of attending to and engaging with landscapes at a time when hunting is no longer allowed. In this context, tracking is a skill not for overcoming a single animal, but of noticing and gathering together various landscape

movements. It is, in other words, a way of noticing landscapes, however directed or purposive. In this way, tracking is pushed conceptually towards gathering, in its multiple meanings, to emphasize and center relational collectives and how they come together rather than the tendency towards glorifying heroic individuals and prioritizing singular entities or units.

That “tracking after hunting” provides the context is important to this reconsideration of tracking as more than an autopoeitic relationship between tracker and animal. Freed from that association, it emerges as much more: a practice of noticing open-ended gatherings of bundles of relations, their movements, and their signs. Gathering these signs is what is involved in how one *comes to know* as a tracker—perhaps along the way adding the third meaning of the word gathering, in the way one might say, “from what I can gather...” to introduce a speculative claim. But, tracking as a philosophical mode of attention is attentive to landscape phenomenology, not just singular animals. In actuality, the only thing that came “after hunting” is the timing of the research. Tracking is also more than another practice for describing human perception. The movements the tracker attends to and the trackers’ own movements are relational and mutually constitutive, not just of each other, but in the ways they gather as part of emerging multispecies landscapes.

Though certainly the ban on hunting in Botswana has had many different effects, it is, in a way, useful as a foil to show how tracking is much more than a skill for hunting and overcoming prey. One effect, and another application of the skill, is its development as an empirical tool employed by conservation and environmental

scientists for wildlife monitoring. Tracking here is only applied in a limited way, as a tool for data capture and job creation, though these jobs are limited. This very limited, constrained, and rationalized application of tracking makes and has the potential to make significant contributions to wildlife monitoring. Nonetheless the limits are real and at times even reproduce the autopoietic relation presumed in the hunt in the act of data capture. Data capture, for all its attention to animal movement, treats the landscape as static. All other movements and relationalities are evacuated from the data set. Thus, while conservation work has its merits, the aspects of tracking that it erases do landscapes little justice.

Knowledge practices, their histories, and their politics are also evacuated, or purified, when rendered only as abstract data points. I have engaged with implications of these knowledge politics in greater depth elsewhere (Du Plessis 2010). Here, I note that the exchanges of knowledge between trackers and scientists are more than unidirectional, even if data sets and the resulting scientific conclusions exhibit a power over knowledge that threatens to subsume and decontextualize. Furthermore as Latour (1999) has argued, the material networks of relations, practices, and histories through which data objects emerge, to a certain extent, as “immutable mobiles,” cannot and should not be emptied of their politics and subjective relations: they have material subject-object attachments. Nonetheless, tracking as a mode of attunement, like with the hunt, exceeds its application as a tool for data collection. It is an ongoing practice of engaging with and being engaged by landscape movements without the trappings of predetermined or fixed positionalities.

Attunement to movements and to movement itself are central to making the case for landscapes-in-motion. This attunement and movement is not limited to the human, nor even nonliving things, but is a responsive quality of landscape emergence in which multiple movements come to hang together and hold. The Kalahari Desert Truffle (Chapter 2) helps to exemplify this as a symbiotic organism that moves through sand and season and whose emergence is always more than itself. Truffles gather and *are* gathered relations—living and nonliving—together in its life processes. Truffles track and are tracked. But a truffle is not limited to its becoming as a fruiting body, that thing that people gather to eat; this is but a fragment of its relational lifeways. Truffles track and gather together mineral nutrients and plants through seasons, whether fruiting or not. Like the carrier bag, they are not closed containers, yet they are not entirely random either. Without a necessary plan, things gather with and towards each other with some tendency towards patterning. These patternings, or the morphologies of movement, can too be tracked, often leading to expected places or findings that tell stories of the world otherwise.

Considering these gatherings as relational, it then becomes possible to track them outward to further explore the ways that gatherings unfold. Truffles, for instance, led to grass, which in turn led to a series of other gatherings with termites, cattle, and grass; human settlements and histories; and diverse ways of knowing and perceiving. Here, grass also gathers, and its gatherings offer a reflection on histories of sedentarization, the politics of knowledge, enactments of diverse ontological

realities, and some of the violences that emerge when landscapes are help still or treated exclusively as resource.

Tracking and gathering are ways of engaging with landscapes-in-motion and how those movements come together, but tracking as a method and analysis cannot be limited only to biotic lifeways. Landscapes are filled with abiotic movements which gather through time and with which lifeways inevitably become entangled. This can be seen in the ways that particular landscape features like pans and dunes emerge through movements over time that are both biotic and abiotic, and even include the travels of humans, including myself in the process of walking to a pan with the trails that are followed and the trails that are made. Importantly, being compelled to and availing oneself to indeterminacy and redirection, to slowing down and remembering, “when there is food we must eat,” is perhaps the most important lesson. “When there is food we must eat,” is an approach that reflects a kind of attunement and responsive temporality that stands against “self-devouring growth.” It is a kind of responsive engagement that is not based upon an unending plan for and of accumulation, consumption, and growth and its terrible effects. It is the ultimate digression that stops you in your tracks through an entanglement with, and attention to, nonhuman others and landscapes in motion that defy singular plans.

I returned to Zutshwa a few days after !Nate’s funeral to see if the prospectors had advanced their activities. I learned from one of the contractors camped in the settlement that they had indeed begun drilling and that they were using bowser trucks

to transport water from Zutshwa to their drill site close to a pan several kilometers away. They were drawing 10,000 liters per trip from Zutshwa's sole water-tank, the settlement's only reserve, which is refilled weekly at most. When I made it to the exploration site, I was told that the team planned to drill to a target depth of 1000 meters but that they were running into problems because the porous Kalahari sands were quickly absorbing the water-chemical mix used to lubricate the drill bit. They had also already broken one coring tube and had to start over. They were allowed to retrieve "only 30,000 liters" of water per day, and since none of it was being retained as it seeped into the sand, they were only able to advance their drilling depth ten meters a day. The porosity of the sand, water-scarcity, and the geomorphology of this particular area combined to make gas exploration unexpectedly challenging. If they were to reach their target depth it would take one hundred days and at least three million liters of water.

A month later, I learned that the Zutshwa community officially told Botswana's Water Utility Corporation (the government owned corporation that provides water, and whose board is appointed by the Ministry of Minerals, Energy, and Water Resources) and the CBM prospectors that they would not give permission to use community water for the drilling. By March 2016, the frustrated prospectors, who had not been able to secure another practical water source, packed up and moved to a different exploratory site, leaving a trail of destruction in their wake. Bulldozed tracks, an abandoned camp, and coring pipes littered the site, but it was the thirsty drill that caused the most damage and would have the longest effects. By the time the

prospectors left, the water supply in Zutshwa had been exhausted, and water was being only periodically trucked in. When I returned a year later for a short visit in January 2017, there still no water supply in Zutshwa. Its roughly 600 residents' only recourse was to purchase drums of water from entrepreneurs in the nearest village, Hukuntsi, some 60 kilometers away. Though prospecting was relatively short-lived, the mass-consumption of local water supplies had the effect of exaggerating a landscape of water scarcity and transforming regional water into an over-priced commodity for some the region's most dispossessed. Even though prospecting has not yet turned into a full-scale extraction operation, the attempts to drill just one core sample drank Zutshwa dry and scarred the landscapes, effects of which are still felt today and may continue on into the foreseeable future. And all this was simply from looking.

There was very little rain during my research year, and by most accounts, Botswana was in the midst of a multi-year drought. This was one of the reasons I was not able to find many truffles in 2015. Water rationing was initiated in Gaborone, the capital city, and officials worried that this populated center would soon be entirely waterless. But 2016–17 brought heavy rains, and there were many truffles in the Kalahari. One friend found many near his farm, which is ironically named for its abundance of grass but has now been almost entirely denuded. It rained so much that back in Gaborone, the dam that had been holding only 1% of its water carrying capacity and had been rendered obsolete in March 2016 when my fieldwork ended, was overflowing after heavy downpours between December 2016 and February 2017.

It was such a remarkable turn-around that the President of Botswana, Ian Khama, called for a national day of prayer and thanks giving on March 5, 2017. While the water was much needed, the storms gave rise to floods that washed out roads, led to several deaths, and created a slew of other infrastructural problems. Unfortunately, in the Anthropocene, extreme weather events (or seasonal patterns), storms, droughts, and heat waves, are becoming the norm. And though it is easy to praise the rains after a period of extended drought—with good reason—there is also reason to be weary.

The Kalahari is a good place to start learning (and remembering) how to track the movements of landscapes, landscape sedimentations, and their doings—those gathered ecologies of the Holocene—because, in its expanses of landscapes that have not been entirely affected by human disturbances, it has not yet entirely succumbed to the Anthropocene, Capitalocene, or Plantationocene. But it is still embedded within the planetary shifts towards a new geological epoch that is seeing the rise of species extinctions, climate change, and increasing levels of inequality on an overpopulated planet. Still, given the historical importance of tracking and gathering in human and more-than-human worldings in these landscapes, the Kalahari is an especially good place to start empirically, for developing methods of engaging with and theorizing landscapes. But tracking landscapes movements and their gatherings is important beyond the Kalahari.

A marker called the “golden spike” that scientists have proposed to signal the shift into this new geological epoch being call the “Anthropocene” is the dramatic increase in radioisotopes in the planet’s strata that followed the onset of nuclear

testing towards the end of World War 2. While initiated by weapons testing, this increase has by no means been limited to the making of bombs. Disturbed, radioactive landscapes are one example of places where tracking and gathering might help to follow and tell the stories of “the arts of living on a damaged planet” (Tsing et al. 2017).

The April 26, 1986 explosion of reactor number four at the Chernobyl nuclear power plant, for example, resulted in the release of human-made radioactive material into the environment. In Chernobyl, Soviet engineers had “created isotopes not found in nature—strontium, cesium, plutonium—these isotopes once born continued living their own ‘life,’ following the ‘natural’ properties of radioactive decay, as observed by humans” (Brown in Tsing et al. 2017: G36). These materials spread through wind currents over large areas of Europe and rained down on swaths of the continent’s landscapes, where they then settled into soil profiles. These human-made radioactive isotopes continue to live their own lives, entangled with the lives and bodies of others, haunting landscapes and their ecologies. But isotopes like Cesium-137 are only perceivable through their traces and relations, where they become evident in the effects they have on bodies. They move through and with landscapes, emerging in the effects they have on the relations with which they gather. Though cesium is not visible to the naked eye, it can now be tracked in the way it gathers in the radioactive bodies of wild boars in Europe and the false-truffles that those animals eat, which reflect landscapes-in-motion, however disturbed. These are scary stories, but they are important to tell and even more important to follow.

Scary stories, however, are not the only ones to tell in the Anthropocene. We can also track stories of landscape gatherings to read histories and imagine different futures. In his research about forest histories in Italy, Andrew Mathews writes about the ghostly forms of trees. His natural history approach has much in common with tracking. “Through my practices of walking, looking and wondering, I have been tracing the ghostly forms that have emerged from past encounters between people, plants, animals, and soils. These ghostly forms are traces of past cultivation, but they also provide ways of imagining and perhaps bringing into being positive environmental futures” (in Tsing et al. 2017:145). Mathews speculatively tracks pasts to imagine futures. Through his attention to material forms he tracks the partial relations of more-than-human encounters in trees, “to multiply our ways of thinking and acting in the face of overwhelming environmental change” (:G154). Importantly, these trees tell stories of abandonment, disease, and economic change, but they also tell of relations of care. The more stories we have like these, the better.

Gan and Tsing remind us that Evans-Pritchard’s description of Nuer tracking giraffes is really the culmination of an attention to temporal coordinations: “The coordination of drinking water, early-rainy-season-mud, and the hooves of giants reverberates to the attention of hunters” (Tsing et al. 2017).

Tracking is not new, and it is not a new way of thinking, but perhaps the movements it attends to have been overshadowed, and the practices of noticing those movements have been forgotten. It is a mundane everyday practice of noticing worldly coordinations, those gathering we are too often tempted to hold still. We

must keep tracking in these troubling times to develop our collective thinking about the politics of landscapes (and nature) in a decolonial Anthropocene. Though not new, I have presented tracking and gathering as renewed approaches for becoming-with landscapes, attending to the liveliness of their movements, and as an ethnographic approach for doing landscape.

!Nate's funeral lasted through the night and into the morning. When Njoxlau spotted me crying in the morning, he told me that it was time to stop. If I kept crying, !Nate would not be able to leave and would start visiting me in my dreams. I didn't ask where !Nate was going or why he would visit my dreams, but I understood Njoxlau's message: let him go so I could keep going. I was not the only person Njoxlau said this to, nor was he the only one who reminded people that it was time to move on. A few months later, when Derek Keeping and I managed to get a short article published in a local newspaper to commemorate !Nate's life, I brought copies to give to his family. When !Nate's mother saw his printed picture in the paper, she grew furious and shouted something in no particular direction, but I knew I had done something wrong. Karoha, who was with me, told me that she was upset because she had stopped dreaming about !Nate but that now she had seen him again he would come back. !Nate has continued to haunt me, and others, through the influence he has had on our work. His son saved a copy of the newspaper article and has started spending time learning to track with /Uasi, Karoha, and Njoxlau. He looks forward to working with Louis Liebenberg and Derek Keeping too if the opportunity arises.

Louis Liebenberg also arrived too late to say goodbye. When I told him about !Nate's terminal diagnosis, he planned a trip to visit him in Bere but had to coordinate it with a series of tracking assessments and other research activities he had committed to that would fund the trip. Louis has built a career out of his work with !Nate, who he considered one of his closest friends, and he had long been planning to begin a wildlife monitoring and tracking school with !Nate, Karoha, /Uasi, and Njoxlau. Louis arrived a few days after the funeral and called Derek and me to meet him. !Nate's passing greatly affected him and he decided he needed to ramp up his plans to start the tracking school. It was a shame that !Nate would not be around for it, Louis said, but his death had reminded Louis that he too should keep on tracking and so should we all.

Bibliography

Abrahamsson, Sebastian, Filippo Bertoni, Annemarie Mol, and Rebeca Ibáñez Martín. 2015. "Living with Omega-3: New Materialism and Enduring Concerns". *Environment and Planning D: Society and Space* 33(1): 4–19.

Agrawal, Arun. 1995. "Dismantling the Divide Between Indigenous and Scientific Knowledge". *Development and Change* 26(3): 413–439.

Albertson, Arthur. 2000. "Traditional Land-Use Systems of Selected Traditional Territories in the Central Kalahari Game Reserve". *Report to First People of the Kalahari and the Department of Wildlife and National Parks, Gaborone, Botswana*.

Albertson, Arthur. 2002. "Sustainable Use of the Central Kalahari Game Reserve". In *DITSHWANELO*. Central Kalahari Game Reserve. Focus Seminar Series. Gaborone: Pyramid Publishing Pp. 12–24.

Albertson, Arthur. 2017. WILDLIFE AREA MAPS. Kalahari Wildland Trust. <http://www.kalahariwildlandtrust.com/wildlife-area-maps.html>, accessed January 15, 2018.

Bakhtin, Michail M. 1987. *The Dialogic Imagination 4 Essays*. Austin: Univ. of Texas Press.

Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Second Printing edition. Durham: Duke University Press Books.

Barbee, Jeffrey. 2015. "Botswana Sells Fracking Rights in National Park". *The Guardian*, December 2. <https://www.theguardian.com/environment/2015/dec/02/botswana-sells-fracking-rights-in-national-park>, accessed January 15, 2018.

Barnard, Alan. 2007. *Anthropology and the Bushman*. Oxford ; New York: Berg.

Basso, Keith H. 1996. *Wisdom Sits in Places: Landscape and Language among the Western Apache*. Albuquerque: University of New Mexico Press.

Bennett, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press Books.

Biesele, Megan. 1993. *Women like Meat: The Folklore and Foraging Ideology of the Kalahari Ju/'hoan*.

Biesele, Megan, and Steve Barclay. 2001. "Ju/'Hoan Women's Tracking Knowledge And Its Contribution To Their Husbands' Hunting Success". *African Study Monographs*. Ary Issue(26): 67–84.

Biesele, Megan, Robert H. Hitchcock, and Peter P. Schweitzer eds. 2000. *Hunters and Gatherers in the Modern World: Conflict, Resistance, and Self-Determination*. Berghahn Books.

Boden, Gertrud. 2009. "From Utility to Perceptual Salience: Cultural, Lexical, and Conceptual Change in the Southern Kalahari Landscape". *Anthropological Linguistics* 51(3): 303–327.

Bonifacio, Eleonora, and Asunción Morte. 2014. "Soil Properties". In *Desert Truffles* Pp. 57–67. Soil Biology. Springer, Berlin, Heidelberg.
https://link.springer.com/chapter/10.1007/978-3-642-40096-4_4, accessed February 4, 2018.

Boocock, C., and O. J. Van Straten. 1957. "A Note on the Development of Potable Water Supplies at Depth in the Central Kalahari". *Rec. Geol. Surv. Bechuanaland Prot* 58.

Brody, Hugh. 1981. *Maps and Dreams: Indians and the British Columbia Frontier*. Waveland Press Inc.

Brody, Hugh. 2012. *Tracks Across Sand. Documentary*. DER.

Callon, Michel. 1984. "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay". *The Sociological Review* 32(1_suppl): 196–233.

Caple, Zachary. 2017. *Holocene in Fragments: A Critical Landscape Ecology of Phosphorus in Florida*. A dissertation submitted in partial satisfaction of the requirements for the degree of DOCTOR OF PHILOSOPHY in ANTHROPOLOGY, UNIVERSITY OF CALIFORNIA SANTA CRUZ.

Cornell, Maraya. 2015. "OPINION: Botswana's Hunting Ban Deserves Better from the New York Times" – *National Geographic Blog*.
<https://blog.nationalgeographic.org/2015/10/13/opinion-botswanas-hunting-ban-deserves-better-from-the-new-york-times/>, accessed February 3, 2018.

- Darkoh, Michael BK. 1999. "Desertification in Botswana. Case Studies of Rangeland Desertification". *Agricultural Research Institute, Reykjavik*: 61–74.
- Deleuze, Gilles, and Felix Guattari. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Brian Massumi, tran. 1st edition. University of Minnesota Press.
- Du Plessis, Pierre. 2010. *Tracking Knowledge : Science, Tracking and Technology*. Thesis, University of Cape Town. <https://open.uct.ac.za/handle/11427/14263>, accessed February 3, 2018.
- Gan, Elaine, and Anna Tsing. 2017. "How Things Hold". In *Elusive Anthropology*, Matsutake Worlds Research Group.
- Gell, Alfred. 1985. "How to Read a Map: Remarks on the Practical Logic of Navigation". *Man*: 271–286.
- Goldberg, Jeffrey. 2010. "The Hunted". *The New Yorker*, March 29. <https://www.newyorker.com/magazine/2010/04/05/the-hunted>, accessed January 12, 2018.
- Green, Lesley. 2008. "'Indigenous Knowledge' and 'Science': Reframing the Debate on Knowledge Diversity". *Archaeologies* 4(1): 144–163.
- Green, Lesley. 2012. "Beyond South Africa's 'Indigenous Knowledge-Science' wars". *South African Journal of Science* 108(7–8): 44–54.
- Green, Lesley, ed. 2013. *Contested Ecologies: Dialogues in the South on Nature and Knowledge*. Cape Town: HSRC Press.
- Guenther, Mathias. 1999. *Tricksters and Trancers: Bushman Religion and Society*. First Edition. Bloomington: Indiana University Press.
- Gulbrandsen, Ørnulf. 2012. *The State and the Social: State Formation in Botswana and Its Pre-Colonial and Colonial Genealogies*. New York: Berghahn Books.
- Haraway, Donna J. 1991. *Simians, Cyborgs, and Women: The Reinvention of Nature*. First Edition. Routledge.
- Haraway, Donna J. 2003. *The Companion Species Manifesto: Dogs, People, and Significant Otherness*. Chicago, Ill. : Bristol: Prickly Paradigm ; UniversityPresses Marketing.
- Haraway, Donna J. 2007. *When Species Meet*. Univ Of Minnesota Press.

- Haraway, Donna J. 2016. *Staying with the Trouble: Making Kin in the Chthulucene*. First Edition edition. Durham: Duke University Press Books.
- Heidegger, Martin. 1995. *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*. Indiana University Press.
- Heinz, Hans-Joachim. 1972. "Territoriality among the Bushmen in General and the! Ko in Particular". *Anthropos*(H. 3./4): 405–416.
- Heinz, Hans-Joachim, and Marshall Lee. 1979. *Namkwa: Life among the Bushmen*. Boston: Houghton Mifflin.
- Hitchcock, Robert K. 2002. "'We Are the First People': Land, Natural Resources and Identity in the Central Kalahari, Botswana". *Journal of Southern African Studies* 28(4): 797–824.
- Hitchcock, Robert Karl, Megan Biesele, and Wayne Babchuk. 2009. "Environmental Anthropology in the Kalahari: Development, Resettlement, and Ecological Change among the San of Southern Africa". *Vis-à-Vis: Explorations in Anthropology* 9(2).
- Hitchcock, Robert, Axel Thoma, Pierre Du Plessis, and Derek Keeping. Forthcoming. "Sip-Wells: A Labor-Intensive Method of Water Collection in the South Western Kalahari, Botswana".
- Houle, Karen. 2015. "Animal, Vegetable, Mineral: Ethics as Extension or Becoming?" *Symposium* 19(2): 37–56.
- Hustak, Carla, and Natasha Myers. 2012. "Involutionary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters." *Differences* 23(3): 74–118.
- IMAMURA-HAYAKI, Kaoru. 1996. "Gathering Activity among the Central Kalahari San". *African Study Monographs. Supplementary Issue. 22*: 47–66.
- Ingold, Tim. 1980. *Hunters, Pastoralists, and Ranchers: Reindeer Economies and Their Transformations*. Cambridge University Press Cambridge.
<http://library.wur.nl/WebQuery/clc/173086>, accessed January 5, 2015.
- Ingold, Tim. 1987. *The Appropriation of Nature: Essays on Human Ecology and Social Relations*. Iowa City: University of Iowa Press.
- Ingold, Tim. 1993. "The Temporality of the Landscape". *World Archaeology* 25(2): 152–174.

- Ingold, Tim. 2000. *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. London ; New York: Routledge.
- Ingold, Tim. 2007. *Lines: A Brief History*. London; New York: Routledge.
- Ingold, Tim. 2011. *Being Alive: Essays on Movement, Knowledge and Description*. New York: Routledge.
- Janz, Bruce B. 2001. "The Territory Is Not Map: Place, Deleuze and Guattari, and African Philosophy". *Philosophy Today* 45(4): 392–405.
- Kagan-Zur, Varda, Jianbo Kuang, S. Tabak, Frank W. Taylor, and Nurit Roth-Bejerano. 1999. "Potential Verification of a Host Plant for the Desert Truffle *Terfezia Pfeilii* by Molecular Methods". *Mycological Research* 103(10): 1270–1274.
- Kagan-Zur, Varda, Nurit Roth-Bejerano, Yaron Sitrit, and Asunción Morte, eds. 2014. *Desert Truffles*, vol.38. *Soil Biology*. Berlin, Heidelberg: Springer Berlin Heidelberg. <http://link.springer.com/10.1007/978-3-642-40096-4>, accessed May 10, 2017.
- Kalahari Peoples Fund Newsletter. 2002.
- Keeping, D. 2014. "Rapid Assessment of Wildlife Abundance: Estimating Animal Density with Track Counts Using Body Mass-Day Range Scaling Rules: Rapid Assessment of Wildlife Abundance". *Animal Conservation* 17(5): 486–497.
- Kirksey, S. Eben, and Stefan Helmreich. 2010. "The Emergence of Multispecies Ethnography". *Cultural Anthropology* 25(4): 545–576.
- Kohn, Eduardo. 2013. *How Forests Think: Toward an Anthropology beyond the Human*. Univ of California Press.
- Lancaster, Ian Nicholas. 1978. "The Pans of the Southern Kalahari, Botswana". *Geographical Journal*: 81–98.
- Latour, Bruno. 1993a. *We Have Never Been Modern*. Cambridge, Mass.: Harvard University Press.
- Latour, Bruno. 1993b. *The Pasteurization of France*. Cambridge, Mass.; London: Harvard University Press.
- Latour, Bruno. 1999. *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge, Mass.: Harvard University Press.

- Latour, Bruno, and Steve Woolgar. 1986. *Laboratory Life: The Construction of Scientific Facts*. Princeton, N.J.: Princeton University Press.
- Law, John. 2002. *Aircraft Stories: Decentering the Object in Technoscience*. Durham, NC: Duke University Press.
- Law, John. 2006. "Disaster in Agriculture: Or Foot and Mouth Mobilities." *Environment and Planning A* 38(2): 227–239.
- Law, John. 2009. "Actor Network Theory and Material Semiotics." *The New Blackwell Companion to Social Theory*: 141–158.
- Le Guin, Ursula K. 1996. "The Carrier Bag Theory of Fiction." *The Ecocriticism Reader: Landmarks in Literary Ecology*: 149–54.
- Lee, Richard B. 1972. "! Kung Spatial Organization: An Ecological and Historical Perspective". *Human Ecology* 1(2): 125–147.
- Lee, Richard B. 1973 "Mongongo: The Ethnography of a Major Wild Food Resource". *Ecology of Food and Nutrition* 2(4): 307–321.
- Lee, Richard B. 1979. *The Kung San: Men, Women, and Work in a Foraging Society*. Cambridge, [Eng.]; New York: Cambridge University Press.
- Lee, Richard Barry, and Irven DeVore, eds. 1969. *Man the Hunter*. Transaction Publishers.
- Liebenberg, Louis. 1990. *The Art of Tracking: The Origin of Science*. Claremont, South Africa: D. Philip.
- Liebenberg, Louis. 2013. *The Origin of Science: On the Evolutionary Roots of Science and Its Implications for Self-Education and Citizen Science*. <http://www.cybertracker.org/downloads/tracking/Liebenberg-2013-The-Origin-of-Science.pdf>, accessed May 9, 2018.
- Livingston, Julie. Forthcoming. *Rainmaking and Other Forgotten Things*.
- Livingston, Julie. 2016. "Cattle/Beef – Health, Desire, and the Problem of Self-Consuming Growth in Botswana". Workshop paper, *Measures of Future Health Workshop*, Berlin.
- Main, Michael. 1987. *Kalahari: Life's Variety in Dune and Delta*. 1st edition. Johannesburg: Southern Book Publishers.

- Maps and Posters | UCT Libraries Digital Collections. N.d.
<http://www.digitalcollections.lib.uct.ac.za/khomani/posters>, accessed May 10, 2018.
- Marder, Michael, Gianni Vattimo, and Santiago Zabala. 2013. *Plant-Thinking: A Philosophy of Vegetal Life*. New York: Columbia University Press.
- Mavhunga, Clapperton Chakanetsa. 2014. *Transient Workspaces: Technologies of Everyday Innovation in Zimbabwe*. 1 edition. Cambridge, Massachusetts: The MIT Press.
- McCaffrey, Enda. 2013. "Paralyses: Literature, Travel, and Ethnography in French Modernity, by John Culbert". *Studies in Travel Writing* 17(1): 100–101.
- McDougall, Christopher. 2011. *Born to Run: A Hidden Tribe, Superathletes, and the Greatest Race the World Has Never Seen*. Reprint edition. New York: Vintage.
- Mol, Annemarie. 2002. *The Body Multiple: Ontology in Medical Practice*. Duke University Press.
- Mol, Annemarie. 2010. "Actor-Network Theory: Sensitive Terms and Enduring Tensions". *Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*. Sonderheft 50: 253–269.
- Moore, Jason W. 2015a. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. Verso Books.
- Moore, Jason W. 2015b. "Putting Nature to Work: Anthropocene, Capitalocene, and the Challenge of World-Ecology". in C Wade, J Schönenbach, O Arndt, eds. *Supramarkt: A Micro-Toolkit for Disobedient Consumers, or How to Frack the Fatal Forces of the Capitalocene*, Irene Books, Gothenburg: 69–117.
- Moore, Jason W. 2016. *The Rise of Cheap Nature*. Binghamton University.
- Moore, Jason W. 2017 "The Capitalocene, Part I: On the Nature and Origins of Our Ecological Crisis". *The Journal of Peasant Studies* 44(3): 594–630.
- Nadasdy, P. 2005. "Transcending the Debate over the Ecologically Noble Indian: Indigenous Peoples and Environmentalism". *Ethnohistory* 52(2): 291–331.
- Onishi, Norimitsu. 2015. "A Hunting Ban Saps a Village's Livelihood". *The New York Times*, September 12. <https://www.nytimes.com/2015/09/13/world/a-hunting-ban-saps-a-villages-livelihood.html>, accessed February 3, 2018.

- Owens, Mark, and Delia Owens. 1984. *Cry of the Kalahari*. Houghton Mifflin Harcourt.
- Parry, David C., and B. M. Campbell. 1990. "Wildlife Management Areas of Botswana". *Botswana Notes & Records* 22(1): 65–77.
- Passarge, Siegfried. 1904. *Die Kalahari, vol. I*. Рипол Классик.
- Passarge, Siegfried. 1907. *Die Buschmänner Der Kalahari*. D. Reimer (E. Vohsen).
- Peters, Pauline E. 1994. *Dividing The Commons: Politics, Policy, and Culture in Botswana*. University of Virginia Press.
- Povinelli, Elizabeth A. 1995. "Do Rocks Listen?" *American Anthropologist* 97(3): 505–518.
- Povinelli, Elizabeth A. 2002. *The Cunning of Recognition: Indigenous Alterities and the Making of Australian Multiculturalism*. Durham [N.C.]: Duke University Press.
- Povinelli, Elizabeth A. 2011. *Economies of Abandonment: Social Belonging and Endurance in Late Liberalism*. Duke University Press Books.
- Rocheleau, Dianne. 1995. "Maps, Numbers, Text, and Context: Mixing Methods in Feminist Political Ecology". *Professional Geographer* 47(4): 458.
- Rocheleau, Dianne, and David Edmunds. 1997. "Women, Men and Trees: Gender, Power and Property in Forest and Agrarian Landscapes". *World Development* 25(8): 1351.
- Rose, Deborah Bird. 2004. *Reports from a Wild Country: Ethics for Decolonisation*. Sydney, NSW: UNSW Press.
- Roth-Bejerano, Nurit, Alfonso Navarro-Ródenas, and Almudena Gutiérrez. 2014. "Types of Mycorrhizal Association". In *Desert Truffles* Pp. 69–80. Springer.
- Sahlins, Marshall David. 1972. *Stone Age Economics*. Transaction Publishers.
- Samatar, Abdi I. 1999. *An African Miracle: State and Class Leadership and Colonial Legacy in Botswana Development*. Portsmouth, NH: Heinemann.
- Selebatso, Moses, Emily Bennitt, Glyn Maude, and Richard W. S. Fynn. 2017. "Water Provision Alters Wildebeest Adaptive Habitat Selection and Resilience in the Central Kalahari". *African Journal of Ecology*.

<http://onlinelibrary.wiley.com/doi/10.1111/aje.12439/full>, accessed December 11, 2017.

Shostak, Marjorie, and Nisa. 2000. *Nisa, the Life and Words of a !Kung Woman*. Cambridge, Mass.: Harvard University Press.

Silberbauer, George B. 1965. *Report To The Government Of Bechuanaland On The Bushman Survey*. Bechuanaland Government.

Silberbauer, George B. 1980. *Hunter and Habitat in the Central Kalahari Desert*. Cambridge [Eng.]; New York: Cambridge University Press.

Sitrit, Yaron, Nurit Roth-Bejerano, Varda Kagan-Zur, and Tidhar Turgeman. 2014. "Pre-Symbiotic Interactions Between the Desert Truffle *Terfezia Boudieri* and Its Host Plant *Helianthemum Sessiliflorum*". In *Desert Truffles*. Varda Kagan-Zur, Nurit Roth-Bejerano, Yaron Sitrit, and Asunción Morte, eds. Pp. 81–92. Berlin, Heidelberg: Springer Berlin Heidelberg. http://link.springer.com/10.1007/978-3-642-40096-4_6, accessed January 30, 2018.

Škrabáková, Ludmila. 2014. "Amerindian Perspectivism and the Life of Plants in Amazonia". *Non-Humans in Social Science: Ontologies, Theories and Case Studies*: 165–186.

Solway, Jacqueline S., Richard B. Lee, Alan Barnard, et al. 1990. "Foragers, Genuine or Spurious?: Situating the Kalahari San in History [and Comments and Reply]". *Current Anthropology*: 109–146.

Strathern, Marilyn. 1995. *The Relation: Issues in Complexity and Scale*. Prickly Pear Pamphlets (North America).

Strathern, Marilyn. 1996. "Cutting the Network". *Journal of the Royal Anthropological Institute*: 517–535.

Strathern, Marilyn. 2002. "On Space and Depth". *Complexities: Social Studies of Knowledge Practices*: 88–115.

Strathern, Marilyn. 2005. *Partial Connections*. Updated Edition. AltaMira Press.

Survival International Press Release. 2003. Press Release.

Sylvain, Renée. 2014. "Essentialism and the Indigenous Politics of Recognition in Southern Africa". *American Anthropologist* 116(2): 251–264.

- Tanaka, Jiro. 1974. *The Central Kalahari Bushmen: A Study of Ecological Anthropology*. Dissertation, Kyoto University.
- Tanaka, Jiro. 1980. *The San, Hunter-Gatherers of the Kalahari: A Study in Ecological Anthropology*. Tokyo: University of Tokyo Press.
- Tanaka, Jiro. 1996. "The World of Animals Viewed by the San Hunter-Gatherers in Kalahari". *African Study Monographs*. Supplementary Issue. 22: 11–28.
- Taylor, F. W., D. M. Thamage, N. Baker, N. Roth-Bejerano, and V. Kagan-Zur. 1995. "Notes on the Kalahari Desert Truffle, *Terfezia Pfeilii*". *Mycological Research* 99(7): 874–878.
- Thomas, David, and Paul A. Shaw. 1991. *The Kalahari Environment*. Cambridge University Press.
- Thomas, Elizabeth Marshall. 1959. *The Harmless People*. 1st ed. New York: Knopf.
- Trappe, James M., Andrew W. Claridge, David Arora, and W. Adriaan Smit. 2008. "Desert Truffles of the African Kalahari: Ecology, Ethnomycology, and Taxonomy". *Economic Botany* 62(3): 521–529.
- Tsing, Anna Lowenhaupt. 2012. "Unruly Edges: Mushrooms as Companion Species". *Environmental Humanities* 1: 141–154.
- Tsing, Anna Lowenhaupt. 2013. "More Than Human Sociality". *Anthropology and Nature*. Routledge, London: 27–42.
- Tsing, Anna Lowenhaupt. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton: Princeton University Press.
- Tsing, Anna Lowenhaupt. 2017. "A Threat to Holocene Resurgence Is a Threat to Livability". In *The Anthropology of Sustainability* Pp. 51–65. Palgrave Studies in Anthropology of Sustainability. Palgrave Macmillan, New York.
- Tsing, Anna Lowenhaupt, Nils Bubandt, Elaine Gan, and Heather Anne Swanson, eds. 2017. *Arts of Living on a Damaged Planet: Ghosts and Monsters of the Anthropocene*. Minneapolis: Univ Of Minnesota Press.
- Turnbull, David. 1997. "Reframing Science and Other Local Knowledge Traditions". *Futures* 29(6): 551–562.

- Turnbull, David. 2007. "Maps Narratives and Trails: Performativity, Hodology and Distributed Knowledges in Complex Adaptive Systems ? An Approach to Emergent Mapping". *Geographical Research* 45(2): 140–149.
- Twyman, Chasca. 2001. "Natural Resource Use and Livelihoods in Botswana's Wildlife Management Areas". *Applied Geography* 21(1): 45–68.
- VanderPost, Arthur. 2003. "Mapping Traditional Territories in the Central Kalahari Game Reserve". *Botswana Notes & Records* 34(1): 113–122.
- Verran, Helen. 2001. *Science and an African Logic*. University of Chicago Press.
- Verran, Helen. 2013. "Engagements between Disparate Knowledge Traditions: Toward Doing Difference Generatively and in Good Faith". *Contested Ecologies: Dialogues in the South on Nature and Knowledge*: 141–61.
- Viveiros de Castro, Eduardo. 1998. "Cosmological Deixis and Amerindian Perspectivism". *The Journal of the Royal Anthropological Institute* 4(3): 469–488.
- Viveiros de Castro, Eduardo. 2004a. "Perspectival Anthropology and the Method of Controlled Equivocation". *Tipiti: Journal of the Society for the Anthropology of Lowland South America* 2(1).
- Viveiros de Castro, Eduardo. 2004b. "Exchanging Perspectives: The Transformation of Objects into Subjects in Amerindian Ontologies". *Common Knowledge* 10(3): 463–484.
- Watson-Veran, H., and David Turnbull. 1994. "Science and Other Indigenous Knowledge Systems". *Knowledge: Critical Concepts*: 345–346.
- West, Harry G. 2007. *Ethnographic Sorcery*. Chicago: University of Chicago Press.
- Wicksteed, Richard, dir. 2006. *A Kalahari Journey*. One Time Films.
- Widlok, Thomas. 1997. "Orientation in the Wild: The Shared Cognition of Hai||om Bushpeople". *The Journal of the Royal Anthropological Institute* 3(2): 317–332.
- Willerslev, Rane. 2004. "Not Animal, Not Not-Animal: Hunting, Imitation and Empathetic Knowledge Among the Siberian Yukaghirs". *Royal Anthropological Institute* 10(3): 629–652.
- Willerslev, Rane. 2007. *Soul Hunters: Hunting, Animism, and Personhood among The Siberian Yukaghirs*. Berkeley: University of California Press.

Wilmsen, Edwin N. 1989. *Land Filled with Flies: A Political Economy of the Kalahari*. 1st edition. University Of Chicago Press.

Wilmsen, Edwin N., James R. Denbow, M. G. Bicchieri, et al. 1990. "Paradigmatic History of San-Speaking Peoples and Current Attempts at Revision [and Comments and Replies]". *Current Anthropology*: 489–524.