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Sinkhole Politics: The Hydrogeology of Power in the Dead Sea Basin

DISSERTATION

submitted in partial satisfaction of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

in Anthropology

by

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Dissertation Committee:
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DEDICATION

To

Vivienne and Franz Popperl, who raised me to try to do hard things

And to Sean Larabee, who makes every challenge joyful

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ACKNOWLEDGMENTS

This research does not belong to me. It would have been impossible for me to complete on my own. I owe an impossible intellectual and personal debt to the many scholars, friends, and interlocutors who have humbled me with their generous gifts of time, energy, support, and professional expertise. I can never properly articulate how and how many people have kept me and this project alive through thick and thin, but I will try to name a few of them with the caveat that all errors in this manuscript are mine.

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I began exploring a dissertation project based in the Dead Sea's borderlands at the suggestion of Dr. Julia Elyachar, who picked up on a half-baked idea about Dead Sea cosmetics I wrote in a research paper for her course Alternative Economies in 2012. Dr. Elyachar has had on outsized effect on this project from the beginning, training me in fieldwork and ethnography, in research ethics and writing, in economic and political anthropology, in pedagogy and the politics of academe, and in the trickier arts of self-confidence and cheerful failure. Dr. Elyachar drew on her own network on my behalf over and over, and facilitate my blissful year as a visiting graduate student in the Princeton Department of Anthropology during the 2017–2018 academic year. She has given me more of herself than I could ever have expected or asked for. I will always be proud to have been one of her students.

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inspiring work has shown me the full effect of what qualitative research can do. I am equally proud to be one of her students and aspire to live up to that designation for the rest of my career.

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ABSTRACT OF THE DISSERTATION

Sinkhole Politics: Towards a Hydrogeology of Power at the Dead Sea

By

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Doctor of Philosophy in Anthropology

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Associate Professor Julia Elyachar, Co-Chair

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In this dissertation, I explore the political geologies of sinkholes in and around the Dead Sea. These sinkholes are formed when rising groundwater dissolves underground salt deposits, forming caverns that eventually collapse. These widespread and largely unpredictable events damage buildings and infrastructure and cause disruptions in global commodity chains, agricultural practices, and security regimes. Scholars of the region have analyzed pipelines, oil concessions, and refineries when they articulate how geology in the Middle East has shaped the region's contemporary crises, borders, and societies, but they have not analyzed sinkholes and the politics they engender. Moreover, there have been few ethnographic studies of the communities affected by sinkholes and of the contested spheres of scientific knowledge that emerge around them, both of which are shaped by colonial and settler-colonial processes of exclusion—what I call *geologies of erasure.* I conducted fieldwork for this dissertation at universities, government offices, academic conferences, Dead Sea tourist sites, public bus stops, community meetings in Dead Sea settlements, Dead Sea factories, and farms and homes of the

seasonal workers between 2012 and 2015. In all, I carried out twelve months of participant observation and forty-four formal, extended interviews with Palestinians, Israelis, and Jordanians who interact with sinkholes in a variety of ways and at a variety of scales. I also undertook archival research in the Jordanian National Library and the Israeli State Archives. Drawing on this fieldwork, I argue that sinkholes—the stories they tell and the plans they disrupt—have an important place in the history of geological politics in the Middle East. They reconfigure alliances, reorder political hierarchies, and alter cooperative arrangements across borders, sectors, and communities. Contributing to current debates in anthropology science and technology studies, settler colonialism, materiality, and political geography, I show how a political geology of Dead Sea sinkholes help us make sense of human-nonhuman relations in settler-colonial contexts around the world.

Preface

As I write this in late May 2018, the Israel Defense Forces (IDF) is poised to demolish an entire village in the West Bank called Khan al-Ahmar, or "the Red Inn." Khan al-Ahmar is populated by about 180 Bedouin of the Jahalin tribe. It is wedged between two huge Israeli settlements, Ma'ale Adumim and Kfar Adumim, on land that has been deemed "strategically important" by the Israeli Ministry of Defense. I passed the village almost every day during fieldwork for this project. The families of Khan al-Ahmar have withstood forced transfer twice since they fled their ancestral homes in the Naqab (known also by its Hebrew name, "Negev") Desert during the violence of the Nakba in 1948.[1] In the 1950s, the Israeli government forcibly settled them in a new village, from which they were displaced in 1979 to make room for the settlement of Kfar Adumim. As a result, these Jahalin families were again forcibly resettled in 1979, this time in Khan al-Ahmar. Demolition orders for Khan al-Ahmar have existed for over a decade. A lawsuit filed on behalf of Khan al-Ahmar's residents in 2009 to stop the demolition finally arrived on the docket of the Israeli Supreme Court in 2018. The court found in favor of the Defense Ministry's demolition orders, authorizing the IDF to carry them out beginning on June 1, 2018.[2] Khan al-

[1] B'tselem, "Communities Facing Expulsion: The Khan al-Ahmar area," B'tselem.com, 10 October 2017. https://www.btselem.org/communities_facing_expulsion/khan_al_ahmar (Accessed 1 May 2018). *Nakba* is the Arabic word for "catastrophe." It is used by Palestinians to refer to the ethnic cleansing and displacement they experienced at the hands of Israel brushed aside by Israelis when they use the phrase "the 1948 War of Independence." Since this project is deeply concerned with different types of colonial erasure, I am using the indigenous terms for such events and places, except for when quoting a person or text. For more, see Ahmad Sa'di and Lila Abu Lughod, eds., *Nakba: Palestine, 1948, and the Claims of Memory* (New York: Columbia University Press, 2007). The term "on-going Nakba" has gained momentum as a way to articulate the way the same forces of displacement that traumatized Palestinian communities in 1948 remain in use by the Israeli government and its allies. In this framework, the Nakba is not a series of events with an end, but rather a set of colonial ideologies, policies, and practices that continue to act on Palestinians around the world. The demolition of Khan al-Ahmar is an example of this temporal continuity. Amjad Alqasis, "The On-Going Nakba: the Forced Displacement of the Palestinian People," Jadaliyya.com, 15 May 2013. http://www.jadaliyya.com/Details/28629/The-Ongoing-Nakba-The-Forcible-Displacement-of-the-Palestinian-People (Accessed 30 May 2018).

[2] Amira Hass, "Israel to Demolish Entire West Bank Village, Ending Year-Long Legal Battle," Haaretz.com, 25 May 2018. https://www.haaretz.com/israel-news/.premium-israel-to-demolish-entire-west-bank-bedouin-village-1.6116488. (Accessed 26 May 2018).

Ahmar will not be alone in meeting this fate. The village of Sussiya, near Hebron, is also currently under demolition orders. Within Israel, Umm al-Hiran was demolished in January 2017 to make way for a new town for Israeli Jews to be called simply "Hiran." The Bedouin village of Al-Araqib, in the Naqab Desert near Beersheba, has been completely demolished an astonishing 127 times since July 2000, as of March 2018.[3] Al-Araqib, whose residents are Israeli citizens, will soon be replaced by a new Jewish National Fund forest, to make the desert bloom.[4]

In this context, settler colonialism marks the very ground of people's social worlds. It leaves its traces underground as well. Legal proceedings have not stopped these demolitions, nor has condemnation by the European Union, nor have strongly worded letters from Barak Obama, and nor will my research project. The need for enhancements to the area's natural landscapes has been used as a pretext to expropriate Palestinian land and remove Palestinian people since the United Nations declared Israel's independence in 1948.[5]

I have rarely felt more confused and uncertain than during my longest stretch of fieldwork for this project, in 2015. It was all I could do to hold on, to make the best decisions I could make for my research in the tense and complex social world of the Jordan Rift Valley. From the moment I bought a one-way airline ticket to Tel Aviv to the day I left Amman to come back to California, I was wracked with paranoia. I was afraid of being found out by Israelis, by Palestinians, by Jordanians. I was afraid of being found out as anti-Zionist, an atheist half-Jew,

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[3] Zochrot, "al-'Araqib," Zochrot.com, https://zochrot.org/en/village/52884 (Accessed 1 May 2018); Farah Najjar, "Israel Destroys Bedouin Village for the 119th Time," Al-Jazeera.com, 3 October 2017, https://www.aljazeera.com/news/2017/10/israel-destroys-bedouin-village-119th-time-171003135958243.html (Accessed 29 October 2017); The Palestinian Information Center, "Israeli Authorities Demolish Araqib Village for 127th Time," 17 April 2018, https://english.palinfo.com/news/2018/04/17/Israeli-authorities-demolish-Araqib-village-for-127th-time (Accessed 1 May 2018).

[4] Saree Makdisi, "Apartheid / ~~Apartheid~~ [ ]," *Critical Inquiry* 44 no 2 (Winter 2018): 304–330.

[5] Eitan Bronstein Aparicio, "Most JNF-KKL Forests and Sites are Located on the Ruins of the Palestinian Villages," Zochrot.com, April 2014, https://www.zochrot.org/en/article/55963 (Accessed December 2, 2015); Noga Kadman, *Erased from Space and Consciousness: Israel and Depopulated Palestinian Villages of 1948* (Bloomington: Indiana University Press, 2015).

an American, a student on a tourist visa, an Arabic speaker, a Hebrew speaker, a young woman who sometimes enjoyed sitting in the cafes of Tel Aviv, but only while lamenting the way colonialism poisons everything, even the Mediterranean sun.

Geological instability in the occupied Palestinian territories (oPt) as a result of drought, irrigation, and industrial evaporation may perversely be the only hope for unsettling the settler-colonial projects that have been remaking this landscape for decades. Dead Sea sinkholes, the subject of my ethnographic research, destroy Israeli-owned date plantations in the West Bank, force settlement-owned tourist beaches to close, swallow military installations, and shift Israeli and Jordanian minefields, uprooting settler colonies in the process. Sinkholes unbloom the desert, and this process fascinated me. This dissertation is the result of my efforts to understand, document, and analyze them.

I thought often during my fieldwork year about the time I first read Sara Roy's comprehensive study of Gaza*, Failing Peace: Gaza and the Palestinian-Israeli Conflict*, during my last year of college.[6] In her preface and introduction, rather than focusing exclusively on methodologies, generalizable research questions, or statistical background, Roy relays details about the story of her family. It is a Holocaust story, and both her parents were survivors. She ruminates extensively on "objectivity, partisanship, process, and dissent," concluding that "the commitment, fundamentally, is to be as close to knowledge as possible rather than to truth with a capital 'T.'"[7] While this move would not have been out of the ordinary for an anthropologist during the reflexive turn, it struck me as an odd way for a development economist to introduce a piece of mixed-methods research. Roy's point was to provide an aggressive rebuttal of the idea that she was a self-hating Jew who had chosen to side with Palestinians and against her fellow

[6] Sara Roy, *Failing Peace: Gaza and the Palestinian-Israeli Conflict* (London: Pluto Press, 2006).
[7] Roy, *Failing Peace*, xi.

Jews in the Palestinian-Israeli conflict out of some kind of internalized anti-Semitism, an accusation that had already been leveled at her many times, often by academics, in order to delegitimize her scholarship. As Jessica Winegar and Lara Deeb have recently documented,[8] this kind of invocation of personal histories is one of the many strategies academics who work in the Middle East—and in Palestine, in particular—have used to try to defend themselves against critics who try to destroy their careers by accusing them of racism and partisanship. Sitting at Georgetown University's student-run coffee shop, turning the pages of *Failing Peace* as the smell of burned coffee leached into my clothes, I began to imagine that I might one day carry out my own research in the Jordan Valley. I realized that writing well about Palestine is an act that requires the writer to let go of any hope of being widely perceived as ethical and honest, and any hope of doing things unimpeachably "right." That knowledge did not make my fieldwork year easier, but it did help me remember to what I had to hold myself accountable: to try to come as close to knowledge as possible by writing what I saw and representing interactions among my interlocutors accurately.

During fieldwork and after, I carefully catalogued my own list of possible sins from the perspective of the phantom critics who would inevitably emerge to try to tear down the work. In revealing my catalogue of worries to you here, I suppose I am humbly attempting my version of Roy's family history. I am defending myself by putting everything on the table from the beginning. I worried I was hiding behind my Internal Review Board protocol to assuage my own discomfort about what interlocutors were sharing with me. I worried I was allowing people I worked with to assume things about who I am and what my politics are based on what language I chose to speak, or my politeness, or my looks. I chose a topic that gave me a lateral view on

[8] Lara Deeb and Jessica Winegar, *Anthropology's Politics: Disciplining the Middle East* (Stanford, CA: Stanford University Press, 2015).

settler colonialism, and I thought of the context as colonial before I started my fieldwork, but is that not the point of developing expertise in the history of one's field site? I was appalled when some interlocutors performed that singular act of rhetorical violence, erasing Palestinians from their past, present, and future social worlds, and I even liked these very same people personally at times. I knew my American passport, Franco-German name, and look of wide-eyed confusion (which I came to think of as my "I'm nervous face") would protect me when I chose to venture into places that were officially closed, forbidden, or off-limits. In doing so, I knowingly drew on my white privilege, though I hope I did this to the benefit of people who cannot. At times, I prioritized my own safety, security, and ability to continue my fieldwork over other possible courses of action—for example, on rare occasions I cut interviews or participant observation short when I worried about my own safety. I wonder if my analysis will deeply offend people who were kind to me, and I worry about what it will say about my own self-censorship if it does not.

But I must also be clear about what I did not do. I did not collect identifiers for my informants. I did not hesitate to be honest when they asked me about my background or my views, even if I delivered these truths in a gentle way. I did not record, whether by hand or electronically, any interactions with interlocutors without their knowledge or consent. To this end, I asked whether it would be alright to use a small digital audio recorder during interviews, which I placed conspicuously on the table in direct sight of my interviewee. I did not ask leading questions and I did not make any of this up. I did not allow my myriad anxieties to stop me from interacting with the essential characters in this story, both human and hydrogeological. I will present them to you here in an effort to help us all better understand what it means when

“making the desert bloom” destroys that same desert, when settler colonialism folds in on itself and renders landscapes unlivable.

CHAPTER 1

TERRA INFIRMA:[9] A POLITICAL GEOLOGY OF THE MIDDLE EAST

I. Introduction

I am sitting in an elegantly upholstered easy chair under the cool stone portico of the American Colony Hotel in the East Jerusalem neighborhood of Sheikh Jarrah, a Palestinian area in which religious Jewish Israeli settlers are occupying more and more houses and apartments, marking each with a new Israeli flag. We are just a few minutes' walk north of the Old City and its holy sites. As I avoid the gaze of the crisply dressed, statuesque Palestinian waiter who has already asked twice what I want to order to drink, I describe yesterday's adventures to my Arabic tutor and friend, Amina.

Articulating to Amina what I saw for the first time yesterday at one of my regular field sites in the West Bank proves difficult. A new sinkhole, irregularly oval, had appeared since my last visit two days before. It gapes in the parking lot, at least seven meters deep and ten meters wide at its widest point. The new sinkhole opened beneath the sizzling asphalt and two shipping container buildings that used to serve as rooms for pricey mineral spa treatments. The buildings stick out of the hole at odd angles, along with several discombobulated palm trees. The tarmac cracked in a strange ripple pattern; it looks like the earth is in the process of falling away, but has frozen mid-collapse in some kind of living freeze-frame. This otherworldly sight led me to ask: What futures are brought into being by these geological phenomena in one of the world's most hostile natural environments? What histories animate them?

[9] *Infirma* means infirm, weak, or not strong in Latin. I am playing here with *terra firma*, *terra incognita,* and the territorial instability rendered by networks of Dead Sea sinkholes.

I know the Arabic word for "hole," and three words for "decline," and several verbs for "to fall." I can say "earth" and "land" and "sea," the verb "to open," and the verb "to collapse," which has been so famously used for despotic regimes and dictatorships across the Arab world since 2011. I also try describing the sinkhole to my friend using the word used by a Palestinian interlocutor I regularly visit at the Dead Sea site where the hole has opened—*bulan* (pl. *bulanim*). I know this word must be borrowed from Hebrew because of its plural. Amina remains incredulous. "A hole? That big?? Where do they come from?" Though the proximate geological causes of these sinkholes are already clear to scientists of sinkholes, who are also among my interlocutors, Amina's question pointed to the larger problem of attributing responsibility for this distributed catastrophe, a geological phenomenon with what I have come to recognize as its own agency: How do sinkholes reconfigure alliances, reorder political hierarchies, and alter cooperative arrangements across borders, sectors, and communities?

Figure 1. The new sinkhole. Photo by author, 2015.

Amina and I settled on the phrase *hufur kabīra*, or "big holes," to describe these sinkholes. As I would learn a few days later, the Arabic-language term for sinkholes is *hufur al-bālū'a*, a direct translation of the words "sink" and "holes" (in contrast to other geologic terms, which have been absorbed directly from English, like *jīūmūrfūlūjīā,*[10] *kūnjlūmīrāt*,[11] and *dīnāmīkā)*.[12] This phrase prevails in the scientific literature, but not in the utterances of Arabic speakers living among sinkholes. In Jordan, villagers living in the agricultural towns of the Lisan Peninsula who have been losing tomato fields, buildings, roads, and donkeys to the sinkholes since the 1980s call them *ḥufur al-njūm*, or "star holes," because the holes seem to appear instantaneously, as if formed by the impact of some celestial object. Palestinian interlocutors working in Dead Sea settlements call them by their Hebrew name, *bulan*, (pl. *bulanim*), placing the term "sinkhole" in the category of Hebrew phrases used by Palestinian Arabic speakers but not recognized as Hebrew, including "stop light," (*rams or* in Hebrew and Palestinian Arabic, *ishāra* in Jordanian and many other dialects of Arabic). Back in the American Colony Hotel that day, Amina expressed shock that the Dead Sea was dying so quickly, and that its death would be hastened by these strange "big holes." She found it hard to imagine the massive networks of sinkholes devouring the Dead Sea's shores only forty kilometers away from where we sat together in East Jerusalem. What are the scientific and social processes by which sinkholes are perceived as meaningful, predictable, dangerous, human-made, and/or spontaneous?

More immediate violent realities of occupation can easily obscure the "slow violence"[13] of settler colonialism manifest in Dead Sea sinkholes, the object of my research in this

[10] Geomorphology.
[11] Conglomerates.
[12] Dynamics.
[13] Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2013).

dissertation. The Palestinian press has its hands full reporting on young people arrested in their beds by the IDF late each night,[14] unarmed Palestinian demonstrators shot with rubber bullets and live ammunition,[15] checkpoint closures,[16] Palestinian adults and minors in administrative detention without charge for months at a time,[17] homes demolished to rubble when Palestinians make needed structural repairs or additions without permits from a municipality that refuses to grant them,[18] and Israeli government plans to expand West Bank settlements illegal under international law.[19] On top of all this, the open and arid desert landscape of the Dead Sea can feel so distant, so alien, from the Ottoman citadels of West Bank towns, the cookie-cutter stone apartment blocks of their suburbs, or the crowded vertical cement buildings constructed on the footprints of United Nations Relief Works Administration (UNRWA) tents of its seventy-year-

[14] Some articles reference this policy explicitly, like Ma'an News Agency, "Israeli Analyst: Night Raids Should 'Continue for Years' After Peace," Maannews.com, 23 December 2013. http://www.maannews.com/Content.aspx?id=658766 (Accessed 21 August 2017). On a daily basis, the Palestinian press reports the names of those detained overnight, both in print and on the radio. A typical article in this vein can be found here: Ma'an News Agency, "Israeli Forces Detain 9 Palestinians, Interrogate Children in West Bank Raids," Maannews.com, 5 January 2017, https://www.maannews.com/Content.aspx?id=774761 (Accessed 21 August 2017). The names and ages of those detained during night raids become a regular part of the Arabic-language newscast on stations like Radio Angham which broadcasts all over the West Bank. Night raids, particularly those that detain children under eighteen, are often spoken about as "training exercises" by IDF soldiers themselves, including two who spoke informally with me during a visit to a tourist site in the West Bank.

[15] For an example, see Ma'an News Agency, "Over 50 injured, 9 with live ammunition, in clashes across Palestinian Territory," Maannews.com, 7 December 2017, https://www.maannews.com/Content.aspx?id=779587 (Accessed 21 August 2017).

[16] Ma'an News Agency, "Israeli Forces Close Several Checkpoints, Village Entrances Across Ramallah District," Maannews.com, 7 November 2016, https://www.maannews.com/Content.aspx?id=773857 (Accessed 21 August 2017).

[17] 16-year-old Ahed al-Tamimi's case received a great deal of press coverage in Europe and North America, as well as in Palestine (al-Quds, "*ʿahd altamīmī tarūī tafāsīl ḥaīāa alāusr*," AlQuds.com, 31 July 2018 http://www.alquds.com/articles/1533016373320222500/ (Accessed 21 August 2018). Articles with a long list of the names of those whose detention has been renewed are more typical: al-Quds, "*aliḥtilāl īuṣdar 49 āmr āʿatiqāl āidārī bḥaq āusrā bīunhum tfl,*" AlQuds.com, 5 August 2018, http://www.alquds.com/articles/1533470403652325300/ (Accessed 21 August 2018).

[18] See for example, This Week in Palestine, "Living with the Demolition of Your Home: An Interview with Nureddin Amro," ThisweekinPalestine.com, 30 January 2016, http://thisweekinpalestine.com/living-with-the-demolition-of-your-home/ (Accessed 21 August 2018).

[19] See, for example, Al-Ayyam, "*almuṣādqa ʿalay banāʾ650 ūaḥda āustīṭāniyya jadīda fī baīt āīl*," Al-Ayyam.com, 21 August 2018, http://www.al-ayyam.com/ar_page.php?id=12d25b02y315775746Y12d25b02 (Accessed 21 August 2018).

old refugee camps.[20] At the edge of the Dead Sea, the wind howls year-round and the air tastes different. In a landscape so different from the one that usually serves as a backdrop to colonialism's most telegenic moments, do sinkholes open new avenues for international cooperation? Or do they further engender a system of totalized authority in contested borderlands? How, why, and by whom are sinkholes operationalized to overstep boundaries between public and private space, or between Israeli, Palestinian, and Jordanian territory, and to what effect?

Figure 2. Al-Manara Square, downtown Ramallah. Photo by author, 2013.

[20] For more on UNRWA, see Ilana Feldman, "The Challenge of Categories: UNRWA and the Definition of a 'Palestinian Refugee,'" *Journal of Refugee Studies* 25 no 3 (2012): 387–406.

Figure 3. A main street in Bethlehem. Photo by author, 2013.

Figure 4. Qalandiya checkpoint, seen from the West Bank side. Photo by author, 2013.

Figure 5. View of the Dead Sea with Jordan in the background and a string of sinkholes in the foreground at dusk, taken from the occupied West Bank. Photo by author, 2015.

Well-to-do Jerusalemite and Ramallahwi families keep winter homes near the Dead Sea in Jericho, escaping the cold winter rains of their unheated highland homes in the year-round warmth of what is likely the world's oldest continuously inhabited city (archaeologists have determined that some ruins in Jericho are 11,000 years old). Even so, most Palestinians visit the Dead Sea rarely, unless they work for an Israeli-settlement-owned tourist or chemical manufacturing company. Though the Dead Sea and its environs play an essential role in Palestinian history, and a full third of the Dead Sea's minerals fall in the West Bank, the sinkhole problem was virtually unknown to almost every Palestinian person I talked to through the end of my fieldwork in 2015, except for those trained as geologists or hydrologists or those working in affected Dead Sea industries.

Although it was essentially unfamiliar territory to my Palestinian, Jordanian, and Israeli friends, the Dead Sea sinkhole problem reveals that colonial violence is not just enacted against

people but also against landscapes—and sometimes underground. Analyzing it requires engaging the settler-colonial interpretive frame, which has seen a resurgence in recent social scientific work about Palestine forty-four years after the publication of Ibrahim Abu-Lughod and Baha Abu Laban's *Settler Regimes in Africa and the Arab World: the Illusion of Endurance*.[21] I engage that theoretical frame here to analyze human-nonhuman relations in the occupied Palestinian territories (oPt), Israel, and Jordan. Around the world, other subterranean geopolitical phenomena are upending settler-colonial projects. The Dakota Access Pipeline deep under Sioux treaty lands has been repeatedly threatened by Indigenous activism. Peruvian corporate mining campaigns have created a mountain politics of pollution and containment.[22] In the oPt, more than 6,000 sinkholes are disrupting global commodity chains, settler-colonial infrastructures, agricultural practices, and security regimes. These sinkholes and the multiple disruptions they create are the focus of this dissertation.

II. Primary Arguments of the Dissertation

Anomalous and illegible as they may seem, sinkholes are key agents in ongoing contestations for control over the Dead Sea and its natural resources. They tend to elude discussion in public discourse because of the myriad catastrophes unfolding nearby, both ecological and humanitarian. I will argue in this dissertation that sinkholes are generative, agentive, and disruptive—additive as well as subtractive.[23] They exert influence on the motion of particular peoples' bodies in particular ways, on the productive capacities of industrial machinery, on the

[21] Ibrahim Abu-Lughod and Baha Abu Laban, *Settler Regimes in Africa and the Arab World: The Illusion of Endurance* (Willmette, Ill: Medina University Press, 1974).
[22] Fabiana Li, *Unearthing Conflict: Corporate Mining, Activism, and Expertise in Peru* (Durham, NC: Duke University Press, 2015).
[23] Nick Enfield and Paul Kockelman, eds., *Distributed Agency* (New York: Oxford University Press, 2015).

way scientists understand the Jordan River watershed, and on borders between nation-states, public and private land, and hydrologic and geologic worlds. They create opportunities for marginalized communities of Bedouin to assert their presence on lands from which central governments want them removed. They undermine biblical claims to the landscape by altering it in ways that sever ties between contemporary settlements and their ancient progenitors. As one interlocutor observed, they change the calculus upon which territorial conquest takes place: they form in a place where new land emerges from the sea at an alarming rate, in a geographic location where everyone seems to constantly be fighting for every square inch of land; when the sinkholes appear, though, no one can control that parcel of territory.

I make two main arguments. First, I argue that in this and other settler-colonial contexts, we cannot take for granted the *terra* of *terra nullius*, nor the extraordinary amount of work that goes into fixing what counts as "territory."[24] This rendering of *terra* takes place in the labs of state-run scientific agencies, in international scientific journals, on school trips, in town meetings, and on Israel's public buses as they careen through the West Bank. It is performed by scientists, politicians, tourists, pilgrims, settlers, entrepreneurs, and farmers from every political and national affiliation, even those in direct conflict in other domains. Second, I draw attention to the way settler-colonial orientations to territory are embedded not only in *terra* itself but also in hydrogeologic research, which I place as one among the "multiple and diverse forms" of colonial knowledge Nadia Abu el-Haj identified in her work *Facts on the Ground.*[25]

Contributing to current work in anthropology, science and technology studies, settler colonialism, materiality, and political geography, I propose that a *political geology* of Dead Sea

[24] Here, "fixing" indexes both stabilization (or emplacement) and repair.
[25] Nadia Abu El-Haj, *Facts on the Ground: Archaeological Practice and Territorial Self-Fashioning in Israeli Society*, 6; Tim Mitchell, *Rule of Experts: Egypt Techno-Politics, Modernity* (Berkeley, CA: University of California Press, 2002).

sinkholes can help us make sense of human-nonhuman relations in settler-colonial contexts around the world. I take these sinkholes as objects of study through which to analyze the politics of technoscientific knowledge production across international borders in a conflict zone where land, water, and even the underground vacuums that precipitate sinkholes are constantly contested. In doing so, I frame Dead Sea sinkholes as phenomena that both produce and are produced by scientific knowledge, environmental politics, and waves of settler colonialization.

III. Sinkhole Formation Across Hydrogeologic and Political Borders

The hydrogeologic literature is clear on how Dead Sea sinkholes form.[26] As the Dead Sea's hypersaline waters recede by more than a meter per year as a result of Israeli and Jordanian agricultural diversions in the Jordan River and rapid industrial evaporation in the Dead Sea's southern section,[27] the underground boundary between waters of different salinity moves toward the receding shoreline. This subterranean border is called "the freshwater-saltwater interface" by hydrologists who study sinkholes.[28] When groundwater saturates new underground spaces, it dissolves salt karst left from the late Pleistocene, forming networks of buried caverns of unknowable size. When the tops of these caverns collapse, sinkholes appear along the sea's

[26] These karst formations occur in many other places around the world, where they have different catalysts and effects. Most of these catalysts are also anthropogenic.
[27] ʿAwad al-Nawasra, *dirāsāt al-āghūār al-jnūbiyya: al-ārḍ ū-al-insān* (Amman: Fadha'at, 2013); Tina Niemi, Zvi Ben-Avraham, and Joel Gat, *The Dead Sea: The Lake and its Setting* (Oxford: Oxford University Press, 1997).
[28] Meir Abelson, Yoseph Yechieli, Onn Crouvi, Gidon Baer, Daniel Wachs, Amos Bein, and Vladimir Shtivelman, "Evolution of the Dead Sea Sinkholes," In *New Frontiers in Dead Sea Paleoenvironmental Research*, edited by Yehouda Enzel, Amotz Agnon, and Mordechai Stein (Boulder, CO: The Geological Society of America, 2006).

edge.[29] As new land emerges with the Dead Sea's recession, previously stable ground starts to fall away.

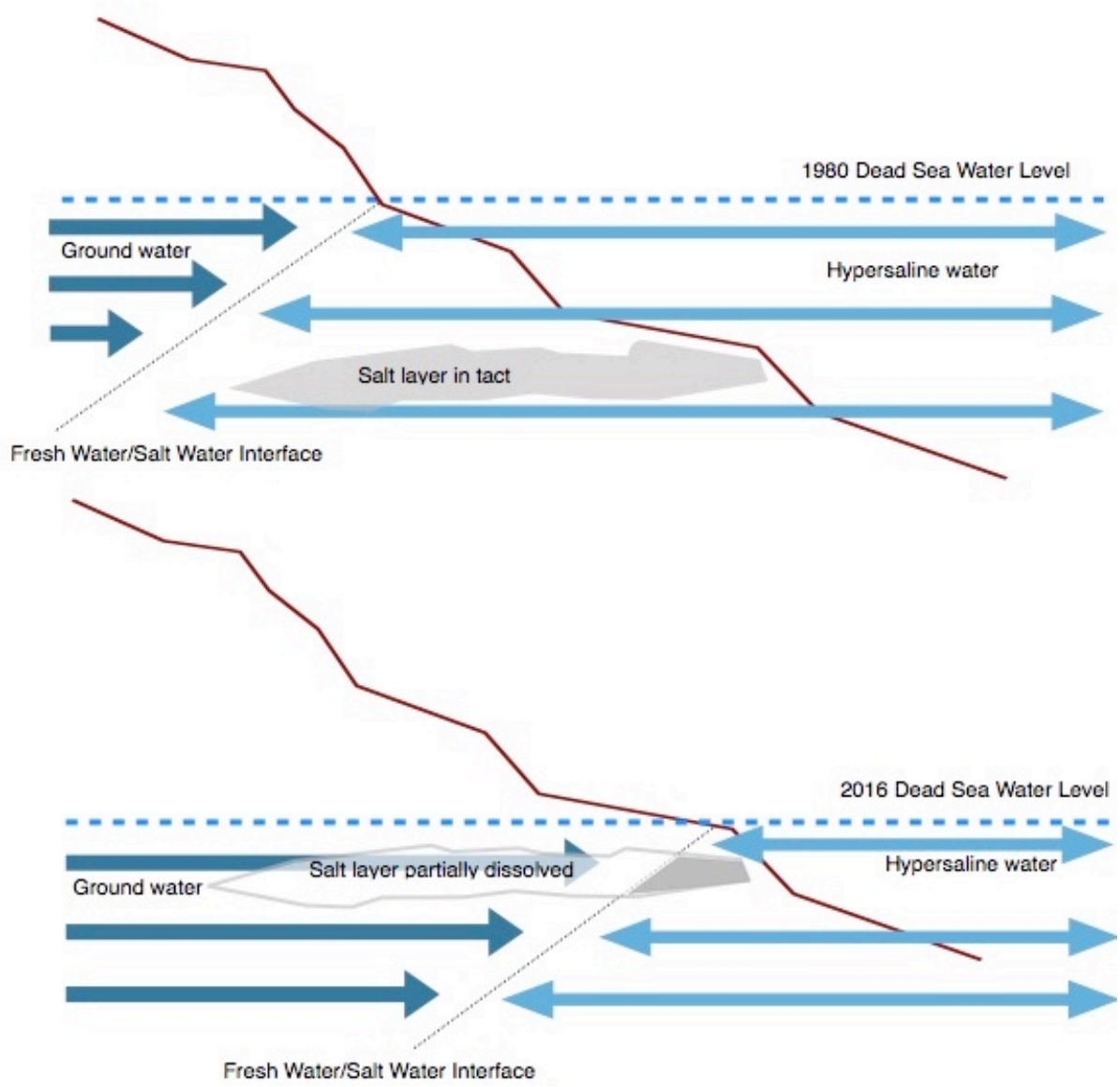

Figure 6. Sinkhole Formation. Graphic by author.

[29] Damien Closson and Najib Abou Karaki, "Salt karst and tectonics: Sinkholes development along tension cracks between parallel strike-slip faults, Dead Sea, Jordan," *Earth Surface Processes and Landforms* 34 no 10 (2009): 1408–1421; Yoseph Yechieli, Daniel Wachs, Meir Abelson, Onn Crouvi, Vladimir Shtivelman, Eli Raz, and Gideon Baer, "Formation of sinkholes along the shore of the Dead Sea: Summary of the first stage of investigation," *GSI Current Research* 1 (2003): 1–6.

Hydrogeologic research portrays Dead Sea sinkholes as irreversibly destructive, portending the end of habitability and economic viability for one of the world's natural wonders, the location of key biblical sites, and a major source of potassium-based potash fertilizers used in agriculture worldwide. Through the lens of science and technology studies (STS) and the anthropology of settler colonialism, however, the social effects of this hydrogeologic disaster prove much more complex. An ethnographic approach to communities affected by this problem reveals the agentive, productive power of Dead Sea sinkholes (themselves outcomes of settler colonization, though not all karst phenomena are) to reformulate political alliances and challenge settler-colonial projects on the Dead Sea's shores.

Dead Sea sinkholes have also destabilized the political boundary between Israel and Jordan, as well as the more contested and less widely recognized border between the West Bank and Israel. Mobility around the Dead Sea is severely restricted depending on a person's identity documents; the Israel-Jordan border at its middle is surveilled and patrolled by Israeli and Jordanian militaries.[30] Sinkholes defy these borders and destabilize parts of the militarized apparatuses that help maintain borders (minefields, for instance). They open in Israeli-government-designated nature parks and settlement-owned beaches in the contested border zone of the occupied West Bank. They open in the massive evaporation ponds of the Israeli industrial juggernaut called Dead Sea Works Limited and its Jordanian counterpart, the Arab Potash Company. They open in the tomato fields of the small agrarian communities of the Jordanian

[30] During my fieldwork year in 2015, a pair of Iraqi siblings, refugees in Jordan who went for a leisurely day out at the Dead Sea with their family were swept across the sea in a strong wind and current. Along with the Jordanian soldier who floated across with them after a failed attempt at retrieving them, they were rescued by the Palestinian manager of Biankini Beach, an Israeli-settlement-owned tourist facility in the occupied West Bank. They were then immediately picked up by the Israeli army and returned to the Jordanian side. The Times of Israel, "Three Jordanians Swept to the Israeli Side of the Dead Sea," 28 March 2015, https://www.timesofisrael.com/three-jordanians-wash-up-on-israeli-side-of-dead-sea/ (Accessed 28 March 2015).

Lisan Peninsula. At stake here are not only the boundaries of political control but also distinctions between private and public lands and natural resources.

Dead Sea sinkholes are subterranean traces of settler colonization. Salt-karst deposits have existed underground for more than 50,000 years and are in themselves not a source of instability. Rather, at issue is overuse of the Dead Sea's feeder waters and mineral resources to serve settler colonies from the Naqab Desert to the Jordan Valley.[31] Through a settler-colonial analytic framework, Dead Sea sinkholes evidence the conflation of indigenous/native populations with their natural environments, both of which become constructed as resources to be extracted and exploited for the benefit of the settler colony.

Figure 7. Dead Sea Works factory and evaporation ponds. Photo by author, 2015.

[31] The Naqab Desert is called the Negev Desert in English and Hebrew. Naqab is the indigenous name for the desert, and I have chosen wherever possible to use these rather than colonial place names. Especially in the context of the Middle East, the dominance of colonial place names has helped remake landscapes. When I am quoting from an interlocutor, I will quote the place name they used.

IV. In Excess of Political Geography: The Political Geology of the Contemporary Middle East

What I call "political geology" emphasizes that land is not just territory; it is geology as well. Minerals and other objects are also political. While political geographers frame land, water, and air as resources, the politics of geologic processes outside of fossil fuels have been explored only marginally, and largely outside of the Middle East. I propose a political geology of the region to draw attention to the politics of subterranean worlds that, rather than being outside the realm of human intervention, are crucially implicated in the social and political contestations of settler colonialism.

Historians have already written about how geology figures into the contemporary history of the Middle East, especially in regards to oil, and more recently, water. Crucial political and social developments of the last two centuries are steeped in a singular geological phenomenon: fossil fuel deposits. For example, in *A History of the Modern Middle East*, William Cleveland and Martin Bunton make the case that oil and gas have played a significant role in major historical events in the region, from the Iranian Revolution to the shift in US foreign policy toward a posture of unconditional support of Israel, to the rise of the Gulf oil monarchies' ruling families, to both Gulf Wars, to the Kurdish national struggle for independence.[32] This is all in addition to the considerations that went into the drawing of the post–World War I European Mandate borders, most of which map onto contemporary national borders in the region. In *History of the Arab Peoples* famed historian Albert Hourani, for whom the Middle East Studies Association's annual award for best historical text is named, has even more to add, including the

[32] William Cleveland and Martin Bunton, *A History of the Modern Middle East*, fifth edition (Boulder, CO: Westview Press, 2012).

Algerian War of Independence, the rise of Arab Nationalism and Political Islam, and the proxy wars that have ripped apart Yemen since the middle of the twentieth century.[33]

Most other well-known historical texts feature similar entries under the index terms "oil" or "petroleum" or "fossil fuels" or "geology." Doubtless, this *charismatic chemical*, as I would call it, has come to dominate the way we think about the region's history and future.[34] The Dead Sea—and competition for its chemical resources, forms of property invented to deal with its wealth, and its rapid and irreversible depletion—never even appear in regional histories. It has been left out of the way we understand human–environment relations in the region, drowned out by conversations about oil and gas. Sinkholes, the stories they tell, and the plans they end must have a place in this official history of the geological politics of the Middle East. Even more importantly, I propose, we must think about sinkholes to understand the geological politics of colonialism long after European powers officially liquidated their colonial holdings. Scholars of the region have analyzed pipelines, oil concessions, and refineries when they articulate how geology in the Middle East has shaped the region's contemporary crises, borders, and societies, but not sinkholes, chemical deposits, and the politics they engender.

In an oil-centric view of the region's political geology, violence and crisis tend to be thought of in quick and purposeful terms. For example, Cleveland and Burton describe an instance of devastating "environmental warfare" carried out by Saddam Husayn's retreating military forces who unleashed "on the Northern Persian Gulf two of the largest oil spills ever recorded" by blowing up more than 800 of Kuwait's 950 oil wells, "leaving them blazing infernos pouring acrid black smoke into the air. As the equivalent of two million barrels of oil a

[33] Albert Hourani, *History of the Arab Peoples* (New York: Warner, 1992).
[34] I am taking this notion from ideas about aesthetics and ecology, particularly from notions of "charismatic fauna." See Cheryl Lousley, "Charismatic Life: Spectacular Biodiversity and Biophilic Life Writing," *Environmental Communication* 10 (2016): 704–718.

day burned, the sky above Kuwait darkened, and the entire country was turned into an environmental catastrophe."[35] Some of these fires were still burning more than a year later. An ethnographic study of Dead Sea sinkholes helps us think in a more nuanced fashion about what environmental violence looks like.

As Emily Brooks's recent work on California groundwater and drought has made clear,[36] ecological disasters often unfold on a long timescale and are thus made invisible to those who look for images like these to understand environmental crisis. Sinkholes are similarly slow moving in that their damage accrues over time and their anthropogenic origins stretch back a century into the past. The sinkhole catastrophe is certainly violent, but its violence is not visible in its moment of initiation. In writing about Dead Sea sinkholes and the way people study, live with, and instrumentalize them for their own political ends, I aim to broaden what is understood as the Middle East's political geology so that slowly spreading "environmental warfare," in Cleveland and Bundon's terms, is not erased from the region's history. An understanding of human–environment relations in the Middle East that goes beyond the well-tread terrain of oil extraction and water wars will enrich the way scholars understand environmental politics and their attendant forms of violence under colonial regimes. If we are to understand recent forms of indigenous protest like the ones that took place at Standing Rock or in the Peruvian Andes, we will need to think more carefully about the social and political worlds brought into being by seemingly marginal geological phenomena that unfold over time.

[35] Cleveland and Bundon, *A History*, 491.
[36] Emily Brooks, "The Slow Disaster," *Anthropology News* 55 no 4 (2014).

Figure 8. Map of Israel, occupied Palestinian territories, and Jordan. Image courtesy of Open Street Map, © OpenStreetMap contributors, openstreetmap.org.

A field site that straddles three international recognized borders, only one of which looks like a border in the Weberian sense, will require some specific historical explanation. I will address how Jordanian, Israeli, and Palestinian mobility regimes have come to exist the way they are now, cognizant of the fact that a full contemporary history of Palestine, Israel, and Jordan is far beyond the scope of this chapter. In chapter 2, I will look more specifically at the historical events that brought sinkholes into being, but for now I will focus on all the things that have helped determine flows of people, objects, and ideas across the borders that define social life in the Jordan Rift Valley. This history is long and well-reviewed, and I include it only in brief here for readers who are unfamiliar with the geographic context of Israel/Palestine to establish some of the salient facts as they structured the ethnographic present of my fieldwork.

The "holiness" of the "Holy Land" dates back many thousands of years, transcending Abrahamic religions and contemporary national borders. On both sides of the Jordan River Valley, holy sites abound: the 9,000-year-old walled city and Mount of Temptation in Jericho, the tombs of the Abraham, Sarah, Isaac, Jacob and other "patriarchs" in Hebron/al-Khalil, Mt. Nebo in Jordan where Moses is said to have died and the mosque of al-Nabi Musa in the West Bank where he is said to be buried, the well down which Joseph was thrown by his jealous brothers in Nablus, Jesus' birthplace and the stations of the cross in Bethlehem and Jerusalem, Jesus' baptismal site on the Jordan River, the Kotel or Western Wall of the Second Jewish Temple in Jerusalem, and the Temple Mount or Haram al-Sharif where the Prophet Mohammed ascended to heaven right above the Kotel are all such significant holy sites for Jews, Christians, and Muslims that they draw pilgrims from all over the world in vast crowds all year round. These holy sites and many other minor ones besides are all located within a ninety-minute drive of the Dead Sea (if you have the correct passport and visa, that is). The religious significance of these

places has made them sites of imperial expansion and contestation from their beginning. For the purposes of this study, I will begin my brief history of this area with the Ottoman Empire's conquest of the region.

The Ottoman Empire under Selim I took the provinces of Palestine and Syria over in 1512–1520 from the Mamluk Empire of Egypt and ruled them until the Ottoman Empire's collapse at the end of World War I. During the period of bureaucratic reforms known as the Tanzimat in the second half of the nineteenth century, the Ottoman Empire created a special administrative district to separate the area encompassing Jerusalem, Jaffa, Bir Saba' (Beersheva), al-Khalil (Hebron), and Gaza from Damascus in 1872. This administrative unit, called the Sanjak of Jerusalem or Mutasarrifat al-Quds al-Sharif, was not granted the semi-autonomous status of other Ottoman regions nearby. Instead, it was placed under direct authority of Constantinople, in part to guard against European interest in conquering it. Under the Tanzimat, Ottoman bureaucrats also undertook new centralized property mapping projects, which were greatly mistrusted by local residents. Many Ottoman subjects in the Sanjak of Jerusalem refused to register their property with the official authorities for fear of having their sons conscripted and their taxes raised. As a result, official Ottoman Empire maps of the area reflected much more "empty" or unclaimed land available for purchase to outside interests than actually existed. The seeming availability of land for a Jewish State of Israel inside the ailing Ottoman Empire coupled with the area's potent religious significance drew the attention of leaders of the Zionist Movement gaining ground among Jews in Europe.

While the Zionist Movement had not yet reached any consensus on where to try to establish a Jewish state, groups of Jewish immigrants from Europe began moving to Ottoman Palestine, sometimes with the assistance of wealthy backers who bought land deeds from the

Ottoman Empire based on the incomplete maps created under the Tanzimat. In Israel, these early arrivals are known as "pioneers." The harrowing stories of their difficulties in establishing permanent towns, growing their own food, interacting with the predominantly Christian and Muslim Arab populations that already lived in the area are dramatized and retold by Israelis through small museums, films, novels, skits, and historical texts. By the fall of the Ottoman Empire at the end of World War I, the first two distinct waves of contemporary Jewish migration to Ottoman Palestine had taken place. In Hebrew, these are called *aliyot*, from the verb "to ascend." Jewish immigration to Israel is still known as "making aliyyah."

The fall of the Ottoman Empire at the end of World War I gave way to the League of Nations Mandate System in the region, and the establishment of the British Mandates of Palestine and Transjordan. This was the first time that anything resembling the contemporary nation of Jordan appeared on a map. Ein Gedi and other Jordan Valley settlements of newly arrived Jews started to spring up, including Beit HaArava, a short-lived kibbutz on the Jordan River at the northern end of the Dead Sea which will become important in chapter 2. Under the British Mandate, British authorities were officially charged with helping local populations become self-governing, though their economic and political interest in maintaining strong client relationships with the governments of these new self-governing states led to a wave of popular uprisings throughout the region from 1930 through the 1960s. At the beginning of this upheaval, the British Mandates of Palestine and Transjordan granted the Dead Sea Concession, the main subject of chapter 2, to Moshe Novomeysky, a Russian Jew who immigrated to Mandate Palestine at the beginning of the Mandate period. Simultaneously, British Mandate governments granted oil concessions to English and American companies all over the region.

In the mid-1940s, the British installed Hashemite monarchies in Jordan and Iraq under the sons of a World War II British ally on the Arabian Peninsula, the Sharif of Mecca. Though the monarchy was quickly overthrown in Iraq, descendants of the Sharif of Mecca still rule the Hashemite Kingdom of Jordan today. The British did not set up an enduring government in Palestine. British forces withdrew from the Mandate of Palestine as Arab popular uprisings against British authorities grew and violence between the newly arrived Jewish pioneers and pre-existing Arab communities escalated. Fearing a power vacuum, mindful of the horrors of the Holocaust, and facing the large population of Jewish refugees freed from Concentration Camps with nowhere to go which resulted from Nazi ethnic cleaning, the United Nations created the State of Israel in May of 1948. Over the objections of Arab states and India and Pakistan, the UN passed Resolution 181 in November of 1947 to take effect the following May, divided the British Mandate of Palestine which stretched from the Jordan Valley to the Mediterranean Sea into a Jewish State and Arab State. The idea of partition was rejected by Arab governments, Palestinians, and Jewish paramilitary forces in Palestine alike.[37] Leading up to the day that Resolution 181 took effect on May 14, 1948, violence continued to escalate alarmingly on the ground. Martin Bunton summarized what followed:

> At midnight on 14 May 1948, the moment of the final withdrawal of British troops, Israel declared its independence and neighbouring Arab states sent battalions from their armies into Palestine. The regional war that followed quickly developed into what Avi Shlaim describes as "a land grab." The Jewish state extended its borders beyond the UN lines so that it came to possess 78% of Palestine. Transjordan's Arab Legion, the most effective of the Arab armies, captured the central mountainous region (which came to be known as the West Bank), while the Egyptian army maintained control over a thin strip of land around the coastal city of Gaza. By the end of the fighting, some 700,000 Palestinian Arabs had become refugees and were not allowed to return to their homes which had then came under Jewish control.[38]

[37] Benny Morris, *Righteous Victims: A History of the Zionist-Arab Conflict, 1881–1998* (New York: Vintage Books, 1999)

[38] Martin Bunton, "Après nous le déluge: Britain, the United Nations, and the 1947 Partition Plan," *Journal of Modern Hellenism* 30 (2014): 11–24.

Because of the massive expulsion of Palestinians–unresolved to this day—as well as the violence Palestinian communities endured in the lead up to the war, Palestinians refer to the conflict as the Nakba, "the catastrophe," while most Israelis call it "the War of Independence." At the war's conclusion refugees camps for Palestinians emerged in Lebanon, Syrian, Jordan, and Egyptian–controlled Gaza. These camps, now run by the specially formed United Nations Relief Works Administration (UNRWA) endure and will continue to do so into the future.[39]

From 1948 to1967, the Jordanian government occupied the West Bank. A Palestinian national movement in exile began to emerge, and as a result, an alliance formed between Jordan and Israel over border issues and the need to contain the Palestinians national movement. The Hashemite Kingdom of Jordan tried to convince Palestinian refugees under their jurisdiction to accept Jordanian citizenship as a way to contain the Palestinian national movement, but failed. To increase its Jewish population, Israel implemented a rule automatically granting any Jew anywhere in the world Israeli citizenship if they make aliyyah by moving to Israel. Other wars that took place in the region during this period did not impact the borders of Israel, Jordan, and the West Bank.

During the 1967 Six-Day War between Israel, the United Arab Republic (as Syria and Egypt were collectively known at the time), and Jordan, the Israeli army took the West Bank, from Jordan, the Golan Heights from Syria, and Gaza and the Sinai Peninsula from Egypt. To hold on to these newly occupied territories in perpetuity, Israeli officials enacted policies to "make the desert bloom" by funding settlements in newly occupied lands to make future withdrawal impossible. Except for Ein Gedi, the settlements where I worked were all built in the early 1970s as part of this policy. My interlocutors who participated in the founding of these

[39] See Khaldun Bshara, "Spatial Memories: The Palestinian Refugee Camps as Time Machines," *Jerusalem Quarterly* 60 (2014): 14–30.

Jewish Dead Sea settlements almost all did so at the conclusion of their army service in the late 1960s or early 1970s. They all referred verbatim to the goal of "making the desert bloom" when they talked about what drew them to be among the first Jews establishing new colonies along the Dead Sea. After the 1967 War, Israel "reunified" Jerusalem and started trying to displace Jerusalemite Palestinian families. They did this by granting contingent identity documents called *laissez-passer* in lieu of Israeli passports to Palestinians who were present in Jerusalem at the time, and refusing to grant *laissez-passer* to Jerusalemite Palestinians who were away from Jerusalem on the day Israeli authorities issued them. *Laissez-passer* continue to allow Jerusalemite Palestinians freedom of movement across West Bank checkpoints and the ability to work in Israel, but they can be easily revoked if Israeli authorities decide the bearer is not making Jerusalem their "center of life" or if the bearer moves out of the country. The ability to revoke *laissez-passer* from Jerusalemite Palestinians essentially at will continues to be a tool the Israeli government uses to try to diminish and dispossess the Palestinian population of Jerusalem.

Figure 9. Photo of a Jerusalemite Palestinian interlocutor's *laissez–passer*. Photo by author with bearer's permission, 2013.

Skipping again over several more wars that did not impact borders, we arrive at last at the first *intifada* (or uprising), a Palestinian protest movement for statehood that started in the Gaza Strip in 1989, and the Oslo Peace Process that followed. In consultation with Palestinian Liberation Organization (PLO) chairman Yasir Arafat and Israeli Prime Minister Yitzak Rabin, US President Bill Clinton brokered a series of interim agreements under which the PLO became the Palestinian Authority (PA) and the contours of a state-like entity in Palestine began to emerge.

The West Bank and Gaza remained occupied by the IDF, but a new regime of fragmented sovereignty came into being in which the West Bank was broken into three jurisdictional zones which remain in place today: A, in which the Palestinian Authority has military and civil control; B, in which the Israeli army has military authority and the PA has civil authority; and C, in which the Israeli government has military and civil authority. Israeli civilians are not supposed to enter Area A, though they do so regularly. Palestinian Authority ID card holders are barred from entering parts of Area C and Israel unless they are granted a visa, or *tasreeh*. These zones can change without notice and vary from one side of the street to the other. Except on paper, they are essentially all under Israeli military control since Israel controls all borders. Even in Area A, IDF soldiers regularly raid homes at night and make arrests. Refugee campus, at this point seventy years old, have their own jurisdictional status under UNRWA, but the IDF raids them anyway. Checkpoints are everywhere and the Palestinian economy, once integrated with Israel and dependent on Israeli capital holders, has been decimated because Palestinians who used to work in Israel were suddenly trapped behind newly fortified borders. Though the Oslo Process designated borders, Jerusalem, and the status of Palestinian refugees “final status issues” to be

negotiated at the end of a lengthy process, this ultimately failed to ever come to pass due to numerous bad faith actions on everyone's part.

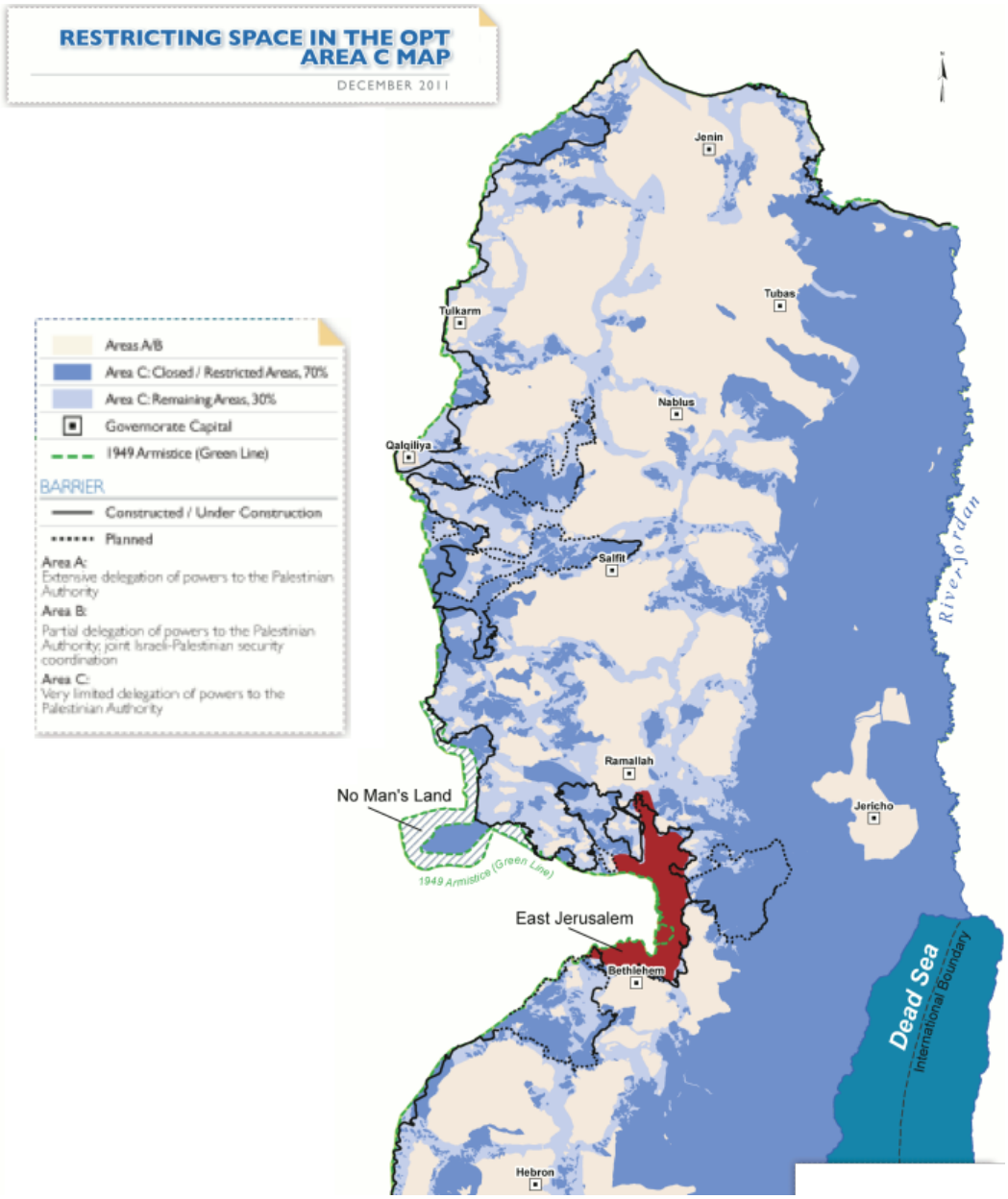

Figure 10. 2011 Map of Areas A, B, and C in the West Bank. Image courtesy of UNOCHA.

In September of 2000, after Israeli Prime Minister Ariel Sharon—among the worst of these bad faith actors—led a group of settlers up to the Temple Mount, a second and more violent *intifada* broke out among Palestinians frustrated by the failures of Oslo. Palestinians,

especially those affiliated with the Islamist Palestinian opposition party Hamas, carried out bus bombings on Israeli buses throughout Israel and the West Bank. As the death toll of Israeli and Palestinian militants and civilians mounted, the Sharon government tried to put an end to the bus bombings by withdrawing Israeli settlements from Gaza and building the Separation Barrier to block off Israeli settlements in the West Bank and Israeli territory from Palestinian population centers. The barrier's route has famously bisected Palestinian towns in the West Bank, in some cases requiring children to pass through heavily militarized checkpoints on their way to and from school, or walling villages off from their agricultural lands or cemeteries. Weekly protests against the barrier's proposed route continue to take place in Palestinian villages across the West Bank. The Separation Barrier and mobile checkpoints barred Palestinian Authority ID holders from the Dead Sea altogether until the end of the second *intifada*. Though those particular checkpoints are now gone and Palestinian ID holders can once again access parts of the Dead Sea, most West Bank Palestinians and nearly all Gazan Palestinians have become nearly totally estranged from the West Bank section of the Jordan Valley, all of which is classified as Area C.

This contentious and fragmentary history has produced a dizzyingly complex system of place names for the area where I did my research. Israeli settlers and those who want the West Bank to remain entirely under Israeli control refer to it as "Judea and Samaria," the name of the area in the Hebrew Bible. Some Israeli use the English term "Occupied Territories" or a version of thereof to denote some combination of Gaza, the West Bank, and the Golan Heights. Some Palestinians reject the permanence of the occupation by refusing to capitalize the "O" of "occupation," referring variously to the occupied Palestinian territories (oPt) or occupied West Bank. I have chosen terminology along these lines as a reflection of my scholarly commitment to a just future for my interlocutors. I also use "Palestine," as a shorthand in places, to refer to an

entity whose borders have expanded and contracted over its history of colonization, an entity that may exist only speculatively in the legal sense right now, but nevertheless has important effects on the ground.

VI. Methods

I gathered data for this project between 2012 and 2015 during twelve months of participant observation and forty-four extended interviews with Palestinians, Israelis, and Jordanians who interact with sinkholes in a variety of ways and at a variety of scales. I also undertook archival research in the Jordanian National Library and the Israeli State Archives. I conducted supplementary fieldwork with Syrian, Egyptian, and Sri Lankan seasonal workers doing agricultural labor among sinkholes in the Jordanian villages known collectively as the *aghowar*. My field sites included universities, government offices, academic conferences, Dead Sea tourist sites, public bus stops, community meetings in Dead Sea settlements, Dead Sea factories, and farms and homes of the *aghowar*. These sites provided key vantage points from which to observe the social relations enacted by sinkholes. I did not collect identifiers and am using appropriate pseudonyms for all interlocutors in this dissertation.

The stories people tell about Dead Sea sinkholes carry insights into how the communities they effect understand risk, heritage, science, and land rights. These stories underline the wide-reaching effect of the sinkholes. In Jordan, the sinkholes mediate labor relations.[1] In the West Bank and Israel, they make evident the center/periphery dynamic that characterizes the settler-colonial present of Israeli settlements along the Dead Sea. In Jordan, Palestine, and Israel, they indicate beliefs about the stability or instability of the very land these communities are built on, and of the borders that divide them.

This project builds on work in environmental anthropology that investigates human responses to environmental problems at a variety of scales.[40] Though anthropological approaches to human-environmental relations have diverged since the 1980s,[41] they share a "concern over one's ability to radically alter the world; the threat that such transformations may prove irrevocably damaging for all; and a foreboding sense that although this potential future is of our own making, we are paradoxically powerless to avoid it."[42] This sentiment has motivated scholars to engage the "Anthropocene" as both motivator and object of study in their research on human-environment relations. While literature on the Anthropocene has potential to contribute to investigations of human-environment relations in the Middle East, I do not explicitly interrogate it here.[43] My interlocutors easily reconcile the notion that sinkholes have a proximate human cause with their firm faith in the divine will that controls all things in this life. The Dead Sea's biblical and religious significance heightens this latter sense on all sides of the sea. Though they identify sinkholes as *anthropogenic*, my interlocutors do not talk of sinkholes in Anthropocenic terms. Much of the Anthropocene literature views modernity as the intensification of societies' effect on the environment,[44] but people living with and studying sinkholes do not tend to discuss them this way.

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[40] Cameron has criticized subsequent studies carried out at the scale of the ecosystem for their neglect of regional and global causes of climate change. Emilie S. Cameron, "Securing indigenous politics: a critique of the vulnerability and adaptation approach to the human dimension of climate change in the Canadian arctic," *Global Environmental Change* 22 no 1 (2012): 103–114.

[41] Yancey Orr, J. Stephen Lansing, and Michael R. Dove, "Environmental Anthropology: Systemic Perspectives," *Annual Review of Anthropology* 44:153–168. Recent lines of inquiry include systems ecology, political ecology, and cognitive and phenomenological ecology. Orr et al. "Environmental Anthropology," 155.

[42] Ibid., 155.

[43] Povinelli provides some fruitful avenues for thinking through the importance of geontologies in the Anthropocene. She writes that the very premise of Anthropocene takes for granted the ontological distinction between *bio* and *geo*. This is an epoch defined by fears that nonlife, geological and meteorological, will lead to mass extinctions and the end of all living things on Earth. This premise is itself, Povinelli writes, premised on an ontology that is culturally contingent. See Povinelli et al., 2017.

[44] See for example Bruno Latour, "Anthropology at the time of the Anthropocene: a personal view of what is to be studied," 113th Annual Meeting of the American Anthropological Association Annual Meeting, Washington, DC,

VII: Dissertation Outline

In chapter 2, "Sinkhole Histories: The Dead Sea Concession," I describe the contemporary history of Dead Sea sinkholes by articulating how the Dead Sea and the Jordan River became overdrawn. I draw on archival material and primary source documents from the nineteenth and twentieth centuries to track the history of Dead Sea industries through four successive waves of colonial governance: Ottoman, British, Jordanian, and Israeli. The resource-use protocols developed during these nineteenth- and twentieth-century periods of rapid political and geographic change astonishingly continue to regulate environmental interventions in the sinkhole problem. At the beginning of the 1967 Six-Day War between Israel and its Arab neighbors, Israel took control of the West Bank from Jordan. In doing so, Israel also took over the Dead Sea's eastern shore, its natural resources, and its unfolding environmental crisis. The companies established at the beginning of the twentieth century to extract Dead Sea minerals were nationalized in the 1950s and then privatized following the Israeli banking collapse of the 1980s (just as Dead Sea sinkholes began opening in industrial evaporation ponds, private beaches, and roads). I argue in chapter 2 that sinkholes disrupt the distinction between public and private space, as well as the project of privatizing natural resources.

In chapter 3, "Between Hydro and Geo: Amphibious Spaces of Social Exception," I use data gathered during site visits and participant observation at Jordanian, Palestinian, and Israeli locations affected by sinkholes to document the social relations brought into being by sinkholes as hydrogeologic phenomena formed by the very interaction of water (hypersaline and fresh) and land. In this chapter, I argue that the *terra* of *terra nullius* must be understood in hydrogeologic terms. The interaction of hydrologic and geologic forces destabilizes both territory and the social

2014; Anna Tsing, *The Mushroom at the End of the World: on the Possibility of Life in Capitalist Ruins* (Princeton: Princeton University Press, 2016).

and political systems of control that act on the land. Dead Sea sinkholes create new economic and social possibilities for some people who interact with them, even as they also represent the quagmire of global climate change as the result of system-wide resource overuse that no individual actor has the power to reverse. Rather than foreclose possibilities for human social life, Dead Sea sinkholes allow people to break social and religious conventions, to maintain settler-colonial control over occupied land, and to advocate for more government attention to rural concerns.

In chapter 4, "Geologies of Erasure: Science, Sinkholes, and Settler Colonialism," I bring together data from participant observation at water management conferences about the Dead Sea where the sinkholes were discussed, interviews with Israeli, Palestinian, and Jordanian scientists studying the problem, and an analysis of scientific knowledge production about Dead Sea sinkholes in international journals. I argue that the way hydrogeologic knowledge about these sinkholes is gathered and circulated helps define land around the Dead Sea as territory to be colonized. These scientific processes can nullify Palestinian claims to the Dead Sea, eliminate Palestinian people from Dead Sea landscapes, and marginalize Bedouin opposition to Jordanian government policies. I suggest that attention to *geologies of erasure* can help scholars understand the scientific and political impacts of settler colonialisms on the collection of knowledge about changing natural environments in the Middle East and beyond. A systems-level framing of infrastructural and environmental crises, such as Dead Sea sinkholes, makes sense from a geologic perspective, but only for parties with the power to transcend restrictive border control regimes.

In chapter 5, "Infrastructures of Exclusion: Sinkholes Fight Back," I investigate the way sinkholes have acted on infrastructures of Israeli settler colonialism in the Dead Sea area. In particular, I consider transportation infrastructures through which Palestinians are systematically slowed down and kept off the land around the Dead Sea rhetorically constructed as "new." I examine state responses to environmental disruptions like sinkholes to reveal the settler-colonial character of infrastructural expansion around the Dead Sea. With the concept of *infrastructural assemblages of exclusion*, I argue that state responses to environmental disruptions like sinkholes reveal the settler-colonial character of infrastructural expansion. Sinkholes can help us understand some of the limits of notions of infrastructure as inherently acceleratory and connective, and as failing only when they are disrupted.

Taken together, these chapters show that sinkholes—the stories they tell and the plans they disrupt—have an important place in the history of geological politics in the Middle East. They reconfigure alliances, reorder political hierarchies, and alter cooperative arrangements across borders, sectors, and communities. Contributing to current debates in anthropology science and technology studies, settler colonialism, materiality, and political geography, this dissertation demonstrates how a political geology of Dead Sea sinkholes help us make sense of human-nonhuman relations in settler-colonial contexts around the world.

CHAPTER 2

SINKHOLE HISTORIES: THE DEAD SEA CONCESSION

I. Introduction

Moshe Novomeysky (born Mikhail) haunted my research before I knew much about him. The name "Novomeysky" came up repeatedly in surprising places during my fieldwork between 2012 and 2015 in Jordan, the West Bank, and Israel. An elderly supervisor of a Dead Sea gift shop named Gidi recounted tales of Novomeysky's triumph during the quiet last hours of the workday after the fleet of air conditioned charter buses full of tourists had left for Jerusalem; Israeli geologists invoked Novomeyksy to explain why they were unable to study or stop the Dead Sea sinkholes opening in the evaporation ponds owned by Dead Sea Works; Walid, owner of the only Palestinian business allowed to extract and sell Dead Sea minerals, described the Israeli government's numerous slights against his small salt company with a weary sense of kinship with Novomeysky.

As the driving force behind the Dead Sea concession, Novomeysky had a leading role in establishing the system of property rights that still governs Dead Sea industries. Issued jointly in 1930 by the British Mandates of Palestine and Transjordan, the Dead Sea concession granted Novomeysky's company, Palestine Potash Limited (PPL), headquartered in London and Jerusalem, the exclusive and unchecked rights to extract the Dead Sea's mineral resources. Though the people and companies to which it initially pertained are gone, the language of the Dead Sea concession has been reincorporated in the company and state structures that govern extraction rights in Israel and Jordan, to the continued exclusion of Palestinians. The Palestinian rights group al-Haq estimates that Israeli occupation of the land around the Dead Sea deprives

the Palestinian Authority of $1 billion in revenue per year, largely due to the persistence of the Dead Sea concession.[45]

Novomeysky was a meticulous documentarian, in part because he needed historical and scientific evidence to secure and defend the Dead Sea concession. He was a bombastic and passionate writer, publishing two book-length memoirs: *My Siberian Life* (1956), about his adventures and exploits before his arrival in British Mandate Palestine, and *Given to Salt* (1958), a detailed accounting of how Novomeysky secured the Dead Sea concession.[46] Novomeysky was an unreliable narrator, obscuring and misrepresenting crucial pieces of the story surrounding Palestinian co-investors and Arab workers in his plants.[47] Novomeysky's story obscures the efforts, experiences, and contributions of nonwhite people. He is a self-interested, colonial, and prolific narrator who left an extremely detailed and yet extremely flawed history of the Dead Sea concession, and yet the legal frameworks he helped put in place still govern the Dead Sea's shores. These frameworks allow for unchecked industrial evaporation on a scale so large that the Dead Sea is disappearing, and sinkholes are taking the shoreline with it.

Novomeysky's memoirs, correspondence, and public statements reveal him to be what we might think of as a good capitalist rather than an ideological Zionist. In order to secure the concession for his mineral enterprise, which at one point in the 1930s represented the second largest export from Mandate Palestine after citrus,[48] he drew on contacts with major Jewish and Zionist personalities in Europe and the United States for political and financial support, including

[45] Claudia Nicoletti and Anne-Marie Hearne, *Pillage of the Dead Sea: Israeli's Unlawful Exploitation of Natural Resources in the Occupied Palestinian Territory* (Ramallah: al-Haq, 2012).
[46] Moshe Novomeysky, *Given to Salt: The Struggle for the Dead Sea Concession.* (Max Parrish: London, 1958); Moshe Novomeysky, *My Siberian Life* (Max Parrish: London, 1956).
[47] See Jacob Norris, "Toxic Waters: Ibrahim Hazboun and the Struggle for a Dead Sea concession 1913–1948," *Jerusalem Quarterly* 45 (2011): 25–42.
[48] Novomeysky, *Given to Salt.*

Chaim Weizmann and US Supreme Court Justice Louis Brandeis.[49] The history of the Dead Sea concession suggests that Zionism proved attractive to some early immigrants, including Novomeysky, from a financial standpoint.

Novomeysky's story has become mythology for a wide variety of people who make a profit from the Dead Sea's mineral wealth today, and who correspondingly contribute to its rapid depletion. As a firsthand account of a settler-colonial approach to the natural environment in Palestine, Novomeysky's writings give us a glimpse into the historical dynamics that have led to the Dead Sea's overuse, and to regional governments' unwillingness or inability to stop it. This is more than just a retelling of a forgotten history; to understand a settler-colonial approach to the environment, we need to historicize the crisis. Novomeysky is a folk hero, even as the legal regimes he put in the place are treated as the enemy. He set up the contours of the sinkhole crisis in the context of the British Mandate, and for this reason, he is the focus of this chapter.

II. Archives as Subject

Following Stoler's suggestion to "move from archive-as-source to archive-as-subject," I will describe the place in which I found what I came to think of as Novomeysky's archive before I turn to their content.[50] While Novomeysky's memoirs *Given to Salt* and *My Siberian Life* are available in university libraries around the world, the reports he collected, the correspondence he kept, and the hydrogeologic data he documented now exist only in large, tattered files in the Israeli State Archives (ISA).[51] Novomeysky's papers are an archive-within-an-archive, subject to

[49] Moshe Novomeysky, *The Truth About the Dead Sea Concession* (London: St. Clements Press, 1950), 4–5.
[50] Ann Stoler, "Colonial Archives and the Arts of Governance," *Archival Science* 2 (2002): 87.
[51] Novomeysky, *Given to Salt*; Novomeysky, *My Siberian Life*.

multiple layers of manipulation and obfuscation. I will turn first to the external archive—the ISA.

During my last stretch of fieldwork in 2015, getting Novomeysky's papers from the ISA was already complex; it has since gotten much more difficult. Two simultaneous transitions made things difficult at the time: the ISA's recent cross-town move, and the ISA's effort to begin digitizing its holdings, billed as a major victory for data democratization. The ISA had recently relocated to the third floor of a small nondescript building at the bottom of a steep hill in a business park only a few meters from the 1949 Armistice Line that denotes the internationally accepted post–1948 border between Israel and the West Bank. The official reason the ISA moved was that in 2012, state inspectors found that the old location featured egregious building code violations.[52] What was supposed to be a short three-month closure stretched into three years, and the ISA only reopened on the outskirts of Jerusalem in early 2015. I counted myself lucky to be in the field when this happened. Aside from the problem of restricted access to some ISA files on the basis of "security concerns," the search function of the new digital catalogue left much to be desired: files with English- or Arabic-language contents would be labeled in Hebrew or sometimes a combination of Hebrew and English. Inconsistent transliterations and an unreliable search algorithm meant it was possible to do ten searches for the same set of documents and turn up a different list of files each time. Luckily, a low-tech workaround existed in 2015: a kind archivist often took it upon herself to find out what patrons were working on and would furnish the occasional unrequested box of papers if she thought it might be pertinent.

Since 2015, the situation has changed completely. The reading room has been closed. The ISA at first offered digital copies of requested files, which could be e-mailed to researchers—a

[52] Nir Hasson, "Israel State Archives Close Due to Lack of Safety Permits," 31 October 2012, Haaretz.com, https://www.haaretz.com/.premium-lack-of-permit-shutters-state-archives-1.5195472 (Accessed 20 May 2015).

boon for people unable to access the reading room, whether for reasons of distance, money, or citizenship status. The downside is that the quality of the scans was relatively low, and the material experience of archival research was sharply disrupted. A stray doodle, a small note in pencil, the number of copies of each letter or report, the type of paper used, the way maps were folded: all these small things have the potential to upend existing historical narratives in a place where the ability to contest the minutia of a particular episode can mean a Palestinian family gets to keep their home or gets evicted.

The new digitization system lasted only a few months. The ISA is now embroiled in a legal dispute with Israel's attorney general about whether or not the ISA must obtain permission from the depositor of each file before sending a digital copy to the researcher who requested the file.[53] Not only are files no longer available at the discretion of the ISA, there is no longer an archivist to whom to appeal in person. The chief archivist has resigned in protest. This rapid closing down of access to an archive that contains not only the histories of its eponymous national group but also that of Jordanians and Palestinians took place under the guise of digital democratization and openness. The inconsistencies within Novomeysky's archive-within-the-archive are now nearly impossible to access. When it comes to the history of the Dead Sea concession, his official account has more power to dominate the narrative.

III. Novomeysky as Archivist

I turn now to the inner archive, composed of Novomeysky's collected papers. What to do with our document-obsessed, unreliable narrator and his self-contradictory files? In 2009, Anjali

[53] Ofer Aderet, "Historians Struggle as Israel State Archives Deadlocked by Legal Restrictions," 1 August 2017, Haaretz.com, https://www.haaretz.com/israel-news/.premium-israel-state-archives-deadlocked-1.5437955 (Accessed 1 October 2017).

Arondekar suggested a renewed archival turn enabled by "a reading practice that redirects attention from the frenzied 'finding' of new archival sources to an understanding of the process of subjectification made possible (and desirable) through the very idiom of the archive."[54] She argues "that the possibility of such readings lies in productively juxtaposing the archive's fiction effects (the archive as a system of representation) alongside its truth effects (the archive as material with 'real' consequence), not as incommensurate, but as agonistically co-constitutive of each other."[55] Following this proposal, I consider Novomeysky not only as a progenitor of the Dead Sea concession but also as archivist, building his own archive and deploying it strategically. His one-sided correspondence, company records, notes on telegrams made in pencil, and tables of industrial and geological data create both fiction and truth effects, as Arondekar put it. When considered together, these effects help us see the "process of subjectification," or, in my terms, the way territory around the Dead Sea gets constructed as territory to be settled by the right kind of people. The story of the Dead Sea concession unfolds in fits and starts even in Novomeysky's own retelling. When I finally was able to page carefully through them, the ISA boxes labeled "Novomeysky's Memos" held treasure troves of early twentieth-century maps, hydrological data, and surveyors' reports authored by British Mandate officials. These documents further complicate the story. They stretch back to a time when the Dead Sea concession was purely speculative for Novomeysky, before he had even been to the edge of the sea.

Mikhael Novomeysky was thirty-eight years old when he first set foot in Palestine in 1911. A Jewish Siberian-born mining engineer who studied at the Klausthal Mining Academy in

[54] Anjali Arondekar, *For the Record: on Sexuality and the Colonial Archive in India* (Durham, NC: Duke University Press, 2009), 3.
[55] Arondekar, *For the Record,* 4.

Germany, his interest in the Dead Sea was first piqued by a geologic report passed on to him in 1906 by German botanist Otto Warburg.[56] The report, preserved in Novomeysky's ISA files, was the work of another German scientist, a geologist named Max Blanckenhorn, who wrote about the Dead Sea after undertaking a study of the area sponsored by European Zionists with Ottoman permission in 1904. Blanckenhorn's study suggested to Novomeysky that "the salts contained in those waters very closely resembled that of the salts in Siberian lakes from which I had already commercially extracted chemicals necessary as raw materials for industry."[57] Novomeysky applied to the Ottoman Empire for permission to set up an extraction enterprise at the Dead Sea sight unseen in 1907, but his application was denied. He decided to visit the place anyway in 1911.

During his 1911 visit, Novomeysky traveled from Jerusalem to the Dead Sea via Bethlehem on horseback to procure a small sample of Dead Sea water. To gain a better sense of the industrial potential of the sea, he took the sample back to his Siberian laboratory on the shores of Lake Baikal, thus gathering the first piece of his own original archive of Dead Sea data. The sample convinced him of the profitability of a Dead Sea mineral extraction enterprise. Since he was both unwilling to take up a position in the Bolshevik-run mining sector of his motherland and fearful of the pogroms that followed the 1905 revolution, Novomeysky arrived in Palestine in 1920 as an immigrant determined to make a new life for himself and his family, changing his name to "Moshe" and setting his sights on gaining a Dead Sea concession from the British Mandate government.

To convince key British players that they could and should grant him a resource concession for the Dead Sea, Novomeysky pointed to the growing security and industrial need

[56] Novomeysky, *Given to Salt.*
[57] Novomeysky, *Given to Salt,* 11.

for potash in Britain and the fact that between 1871 and 1918, all of Europe's potash was harvested in Alsace and Prussia, areas controlled by Germany. Boxes at the ISA include clippings from newspaper reports on potash deposits and charts of potash prices during World War I. The sheer quantities of potassium and phosphate in the Dead Sea were another selling point Novomeysky pitched to the British. In an undated report from the early 1920s entitled "THE INDUSTRY OF PALESTINE: Its Present Conditions and its Prospects," an unknown author wrote, "the amount of potassium in the water of the Dead Sea would be sufficient to meet the world demand as it stands for the next 9,000 years. Another possibility is the exploitation of phosphates, which are found in great abundance in Palestine. This is another fertilizer, of which enormous quantities were exported in recent years from neighboring countries, in some instances no less backward than Palestine."[58] Novomeysky used reports like this to argue his case with Mandate officials including High Commissioner Herbert Samuels, as well as with prominent players in London, such as Brigadier General Sir Wyndham Deedes (in whom he found a non-Jewish ally who favored a Jewish national home in Mandate Palestine). Prior to this time, the Dead Sea functioned largely as a waterway, conveying people and goods between its banks, as Norris's account shows.[59] As Novomeysky compiled and made use of his archive of data on potash to sway British Mandate officials to his cause, he helped construct the Dead Sea as a mineral resource par excellence. This vision of the Dead Sea as an economic resource persisted among my interlocutors in Jordan, the oPt, and Israel, as well as in news reports about sinkholes.

Believing he needed more geological data to help make the importance of the concession clear to his British allies, Novomeysky undertook a range of tests and expeditions to the Dead Sea. He convinced Ibrahim Hazboun, a Bethlehemite Palestinian merchant to sell him a dock and

[58] ISA Kh 978/1: "Novomeysky's Memos About the Dead Sea."
[59] Norris, "Toxic Waters."

small boat on the sea's northern shores. He left this episode mostly out of his memoirs, but it is documented in deeds of sale preserved in his ISA files. He tracked everything from the density of the water's salinity at various strata in the sea to the basic meteorological information each day, all with an eye toward his future large-scale economic enterprise. His efforts greatly increased his standing in the eyes of Mandate officials, who came to consider Novomeysky the indisputable expert on the Dead Sea and its minerals.[60]

Just as Novomeysky seemed poised to at last receive the concession, the timing and methods of Novomeysky's hydrogeological data collection became a point of dispute amid a rising tide of nationalist and anti-Jewish sentiments in Britain. Jacob Norris observed that British colonial officials held "a mistrust of Jews as loyal colonial servants due to their perceived status as 'rootless cosmopolitans' whose international business connections could undermine British imperial interests."[61] On March 20, 1929, the House of Lords held the second of two debates regarding Novomeysky's application for a Dead Sea mineral concession, and Viscount Templeton proved Novomeysky's most fervent opposition. Viscount Templeton opened the discussion with a motion that "any group to whom the concession is granted shall be required to have British finance and British control and have no connection, direct or indirect, with the German potash monopoly."[62] This suited Novomeysky fine as he had already strategically partnered with Major Tulloch, and he had all along sought to convince the British that granting him a Dead Sea concession would allow them to procure the potash desperately needed for

[60] Jacob Norris, *Land of Progress: Palestine in the Age of Colonial De-Development, 1905–1948* (Oxford: Oxford University Press, 2013).
[61] Norris, *Land of Progress*, 157.
[62] United Kingdom, *Hansard Parliamentary Debates*, vol 73 cc731–758 (20 March 1929).

fertilizing crops, industrial manufacturing, and future military operations without enriching the German potash syndicates who dominated the world's supply through the 1920s.[63]

Templeton's next point, that Russian Jewish interests had already been suspiciously overprivileged by the British Mandate in Palestine, posed a serious problem to Novomeysky's bid, however. Templeton argued that in light of the 1915 McMahon letter, the 1918 Balfour Declaration, and Britain's mandate obligations as outlined by Article 22 of the Covenant of the League of Nations[64] all of which seemed to contradict each other, the only way the British could balance their simultaneous obligations was to retain permanent control over Mandate Palestine. Templeton asserted that the Dead Sea was crucial to this control:

> Whoever holds the Dead Sea holds the Key of the Middle East. It might be said that the Haifa Harbour, and the electrification of the Jordan Valley,[65] and the Dead Sea, constitute a unique industrial trilogy which can unlock to the world great beneficent powers, and revive again an active civilization from the River of the Nile to the River of the Euphrates.[66]

Taking great pains to delegitimize Novomeysky's enterprise, Templeton noted that a British expedition had been prevented from conducting geological data collection around the Dead Sea in 1918, in part because no peace treaty had yet been signed between the British and Turkey. Given this fact, Templeton asked accusingly how Novomeysky had managed to begin his scientific and industrial work at the Dead Sea before a treaty had been signed and suggested that someone or something had been "exerting pressure on His Majesty's Government to prevent their action in this most important matter according to the dictate of common justice and fair

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[63] Novomeysky, *Given to Salt.*

[64] "To those Colonies and Territories which as a consequence of the late War, have ceased to be under the Sovereignty of the States which lately governed them, there should be applied the principle that the well-being and development of such peoples form a sacred trust of civilization"

[65] Pinhas Rutenberg, a "Russian Jew" in Templeton's words, had already been granted an overly generous concession for the electrification of the Jordan Valley, a fact the Viscount took great issue with. Lord Melchett responded to Templeton's suspicions of Rutenberg shortly thereafter by pointing out that "both Mr. Rutenberg and Mr. Novomeysky are Palestinian subjects" and that the electricity was given to Rutenberg "because he happens to be a very competent electrical engineer, who applied for it" (United Kingdom, *Hansard Parliamentary Debates*, vol 73 cc731–758 (20 March 1929).)

[66] United Kingdom, *Hansard Parliamentary Debates*, vol 73 cc731–758 (20 March 1929).

dealing."[67] In the case of the Rutenberg concession, Templeton declared that "undue influence" had come from "Zionists and international financiers," implying that Novomeysky's favored status came from the same parties.

Though Templeton's motion was withdrawn at the end of the second House of Lords debate, his vehement objections to Novomeysky's projects at the Dead Sea convinced Novomeysky that he needed to bring more Englishman to the board of Palestine Potash Limited (PPL), though he had already intended to incorporate PPL in both London and Jerusalem and was working jointly with a major in the British army. To secure more funds (Novomeysky determined that he needed to demonstrate 100,000 pounds of financing), he drew on Jewish-American contacts he met through US Supreme Court Justice Louis Brandeis. The group quickly sent him 100,000 pounds and he put four of them—Israel Brodie, Felix Warburg, Bernard Flexner, and Edward Friedman—on PPL's board.[68] To address Templeton's and others' concerns that the company would pull the Dead Sea's resources out of British control, Novomeysky wrote that he "succeeded in getting the consent of the Earl of Lytton, later Governor-General of Bengal, and Acting Viceroy of India, to become Chairman of the Company to be formed, and Lord Glenconner, Chairman of Charles Tennant & Sons Ldt., Basil Montgomery & Co., the well-known Brokers, and some other to join the Board."[69] The concession was at last granted to Novomeysky on January 1, 1930, though he would continue to face questions about its legitimacy from right-wing British nationalists through the rest of the 1930s and 1940s.[70] Once he won the concession, Novomeysky began extracting bromine and

[67] United Kingdom, *Hansard Parliamentary Debates*, vol 73 cc731–758 (20 March 1929).
[68] Felix Warburg, a German-born American banker, was a distant relative of Otto Warburg.
[69] Moshe Novomeysky, *The Truth about the Dead Sea Concession* (London: St. Clements Press, 1950).
[70] After the concessions were granted to Novomeysky, the National League in Britain alleged that the Dead Sea concessions were granted without a thorough investigation of the situation. An August 27, 1931, letter to the High Commissioner for Palestine in Jerusalem from National League President Margaret Farquharson protesting Dead Sea concessions as illegal, Farquharson accused Novomeysky of hiding his true origins because he knew his claim

potash from a small factory he built near the dock he had purchased from Ibrahim Hazboun at the mouth of the Jordan River. In the decade that followed, he started building another works in the southern lobe of the sea to try to double his output.

The early 1940s brought news of another Palestinian claim, this time from the Islamic Waqf of Jerusalem. The Waqf filed a claim on 80,000 dunams of land between Nabi Musa and the Dead Sea, including the land on which PPL operated its warehouses and evaporation pools. PPL's Jerusalem offices received a letter dated February 28, 1943, apprising them of the claims made by the Moslem Religious Fund in Palestine (the Waqf). These claims directly conflicted with PPL's operations because "the lands claimed by the Waqf include those on which the plant of the Palestine Potash Company and the establishments of the Kallia[71] Resort Company are situated."[72] Further, the claims far predated Novomeysky's and Tulloch's arrival in Palestine: "the Waqf supports its claim with old statements in Arabic and Turkish giving accounts of alleged payments made on behalf of the Waqf. One of the documents produced is 300 years old." PPL's response to the Waqf's claim was to retain additional legal support in London and search for someone to send to archives in Istanbul and Ankara to try to discredit the Waqf's evidence.[73]

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to the concessions to be unlawful. Farquharson's National League described itself as a "non-party organization" which worked against the Bolsheviks in the 1910s and in 1922 began taking an active role in "in bringing about greater understanding between Britain and the Muslim world were publicly much appreciated by reputable Muslim figures such as the Aga Khan, Sir Mohammed Iqbal, Hajj Amin Husseini (Grand Mufti of Palestine), Hajee Abdoola Haroon, and the Nawab of Chatari (India)" (Pettigrew and Griffin 2011, 15). In her 1931 missive to the High Commissioner, she claimed "the Members of the British Parliament were deceived into believing that the Dead Sea concession was being granted to an Englishman and a Palestinian" and that

> THE PATRIOTIC WORK OF A BRITISH GROUP WAS SUPPRESSED ON FAVOR OF MR. MOSES NOVOMEYSKY, A RUSSIAN JEW WHO BECAME A PALESTINIAN, AND A CALID TURKISH CONCESSION IN THE HANDS OF AN ENGLISHMAN WAS DENIED RECOGNITION BY HIS MAJESTY'S COLONIAL OFFICE, THUS FORCING ITS SALE TO THE NATIONAL OF A FOREIGN POWER, BOTH UNDER CONDITIONS OF INTRIGUE AND INJUSTICE WHICH SHOULD STIRE AMAZEMENT AND INDIGNATION THROUGHOUT THE WORLD.

[71] This place name is extremely inconsistently transliterated into English. It frequently appears as Kalia, Qalya, Kalya, Qalia, and Kallia.
[72] (ISA kh978/8).
[73] (ISA kh978/8).

Because the Waqf's claim was filed during World War II, nothing ever came of it, and PPL was able to continue extracting and selling potash, bromine, and magnesium relatively unobstructed until the Nakba.

IV. Preparing for War

Based on telegrams sent between Novomeysky in PPL's Jerusalem office and a Mr. Oppenheimer in PPL's London office, Novomeysky's chief concern in the days leading up to UN Resolution 181 going into force in May 1948 seemed to be whether he would be allowed to keep his joint Mandate of Palestine and Mandate of Transjordan concession and his northern works, built on territory that could become either Israel or Transjordan at the end of the war. One telegram from Oppenheimer speculated that Novomeysky would want to nationalize the part of the company in Palestine in support of the Zionist cause and liquidate the English part of the company. Novomeysky wrote "Certainly Not!!" by hand in the margin. In spite of the desire to contribute to the Zionist enterprise he professed in his memoirs,[74] Novomeysky's correspondence as preserved in his ISA files shows he was staunchly opposed to the nationalization of Dead Sea industries under any circumstances, even during the height of the Israeli labor movement's influence.[75]

The location of his northern works right on the mouth of the Jordan River meant that Novomeysky spent a great deal of time and effort meeting with Transjordanian government officials upon Jordanian independence in 1946. In the months leading up to UN Resolution 181 going into effect, creating the State of Israel, Novomeysky secured permission from the

[74] Novomeysky, *Given to Salt.*
[75] Zachary Lockman, *Comrades and Enemies: Arab and Jewish Workers in Palestine, 1906–1948* (Berkeley: University of California Press, 1996).

Transjordanian government to continue operating the factory with his joint Arab-Jewish labor force after the war should the Jordanians take the West Bank at the end of the fighting. In Novomeysky's retelling, "Right up to the 1948 war, we were on the best of terms with leading Transjordanians."[76] He further wrote, "I considered it my particular duty to cultivate good relations with the whole Arab population and the Transjordanian administration in particular."[77] This notion of a duty to cultivate good relations is not reflected elsewhere in Novomeysky's correspondence, in which the financial possibility of his enterprise takes primacy.

During the war, however, Novomeysky's plans broke down. Israeli paramilitary forces evacuated Jewish workers of PPL's northern works to the southern works in small motorboats in the dead of night. Interlocutors often told me this story in urgent tones, as if it were a fairy tale. Some speculated to me that the decision to evacuate Jewish workers came from David Ben Gurion himself, but I found no archival evidence to this effect. When the morning came and PPL's Jewish workers had disappeared, the Transjordanian government declared their previous agreement with Novomeysky void.

By the early 1950s, relations between the Jordanian government and PPL had further deteriorated, and the government of Jordan revoked its half of the concession. A special border protocol Novomeysky had set up to allow Jordanians and Palestinians to continue staffing his factory was canceled, and the southern works had to be staffed exclusively by Jews, while the northern works was taken over by the Jordanian Army. Suddenly left with half of the production equipment and half of the workforce it had before the 1948 War, PPL's productive capacity declined rapidly. By late 1949, journalists and Knesset members began arguing publicly that Novomeysky had colluded with Transjordan during the war, had withheld compensation from

[76] Novomeysky, *Given to Salt,* 278.
[77] Ibid., 276.

workers who lost their jobs when the northern works was destroyed, and was conspiring to extract as little as possible from the Dead Sea so as to deprive Israel of export and tax revenue. Novomeysky did not keep these clippings in this ISA files.

Increasingly desperate, Novomeysky fought nationalization privately through his lawyers in London. Feeling the need to refute the allegations publicly as well, he published a pamphlet with St. Clements Press in London in 1950 called "The Truth about the Dead Sea Concession."[78] In it, he denied collaborating with the Transjordanian army to surrender the plant (though his papers show he planned to continue operating the northern works in Transjordan) and chalked up the rapid decline in extraction to difficulties accessing markets overseas and cartel behavior among American and British oil companies, who formed their own bromine extraction corporation and refused to buy it from PPL for their gasoline.[79] He blamed the Jordanian government for allowing the northern works to be destroyed,[80] and wrote despairingly of the abuse he suffered in the Israeli press for his efforts, comparing it to the anti-Semitism he had faced in Britain during the Mandate.[81]

V. "Arab Labor" And Nationalization

In 1950, Novomeysky's concession guaranteed by Israel was also threatened by the Histadrut, members of the Knesset, and others affiliated with the Zionist Labor Movement who wanted to

[78] Novomeysky, *The Truth.*
[79] Ibid., 7.
[80] Novomeysky wrote: "Friday the 14th of May, 1948 the Declaration of Independence of Israel was proclaimed and the State of Israel was born. On the 19th of May the destruction of the large Palestine Potash Plant at the North end of the Dead Sea began – first by our own forces, and completed by the Arab looters under the benevolent eye of the Arab Legion of Transjordan" (Novomeysky, *The Truth,* 1).
[81] In third person: "Attempts have been made to besmear his work and reputation. While reading the quoted articles in the press and reports of the speeches in the Knesset of members connected with the same papers, he recollects sitting in the galleries of the House of Commons and the House of Lords and listening to the debates when the epithets of 'Bolshevik,' 'German Agent,' and 'Russian Jew' were thrown at him. Then it came from some British Antisemites. Now, more than twenty years later, he hears similar abuses from his fellow Jews" (Novomeysky, *The Truth,* 8)

see Novomeysky's company nationalized. One of the strangest reoccurring themes in Novomeysky's fight to keep the Dead Sea concession was the sheer number of times he found himself having to defend it against completely divergent accusations. He was repeatedly pilloried by British political figures as a Bolshevik, a Russian Jew acting on behalf of foreign agents in Palestine, when in actuality he had moved his entire family out of their homeland (rather reluctantly by his own admission) to avoid taking a position in the Bolshevik regime. By 1950, he found himself accused of betraying the cause of Zionism on the floor of the Knesset and in *Maariv* and *Hamishar,* two major Israeli newspapers of the time. The *Times* of London and the *New York Times* were likewise reporting these accusations.

By the 1950s, Jordan had revoked their half of the concession, and Novomeysky had no idea what that meant for his mining rights. He wrote frantically to the Foreign Office to figure it out. In the meantime, a team of Jordanian engineers (including some Palestinians like Palestinian business owner Walid's father Farid) began redeveloping the destroyed northern works for Jordanian use. It was set to begin production in 1967, but the 1967 war resulted in another change of hands when Jordan lost the West Bank to Israel. The family of a Palestinian engineer, Farid Othman, ended up with the Jordanian deed to the northern works.

Novomeysky's protestations, both public and private, were to no avail. PPL's southern works were nationalized in 1951, and its name was changed to Dead Sea Works. The British Mandate of Palestine's portion of the Dead Sea concession (now guaranteed by Israel) was written into the new company's founding documents, and today is still renewed at thirty-year intervals. With his trove of data about the industrial potential of the Dead Sea, Novomeysky perhaps made his case too well.

Novomeysky's willingness to indulge both the anti-Jewish sentiments in Britain and Zionist aspirations for a Jewish national home in order to secure the Dead Sea concession came back to haunt him in 1951. It also suggests an ambivalence in the Zionist project. Though he had been politically engaged in protests against the tsar in his native Russia, serving jail time for his small role in Tsar Alexander II's assassination, no part of his account of the Dead Sea concession emphasized the importance of his company as a Zionist enterprise. He wrote on very rare occasions of his own ideological or emotional investment in Zionism, referring in rare moments to being "inspired" by efforts to establish a "Jewish National Home," but his accounts are dominated by his impressions as a traveler and then new resident in Palestine, his chemistry experiments, his family history, and his political machinations.[82] The concession and the success of his company were of highest priority, as evidenced by his struggles with the Knesset and the Histadrut in the early 1950s. Novomeysky was staunchly and publicly opposed to nationalization of Dead Sea industries under any circumstances, even during the height of the Israeli labor movement's influence. So much was his rejection of efforts to nationalize PPL that he left Israel entirely and died in self-imposed exile in Paris in 1961.[83]

From the early days of his efforts to secure a mineral concession, Novomeysky seemed to understand the possible economic and political advantages he could gain by including Palestinians and Transjordanians in his labor force. An "Arab-Jewish" labor force was written

[82] In *My Siberian Life* (1956) Novomeysky mentions this only once. His other references to Zionism are specific to people working with the World Zionist Organization. In *Given to Salt*, he noted that Zionism helped him solve the problem of financing: "I needed to find capital resources for large-scale experiments and for time to negotiate with the British and Palestinian authorities regarding a concession for the exploitation of the Dead Sea salts. Granted success in all this, I was sure my road would be clear before me, for it was my intention at an early stage to engage the interest of favourable international financial circles, particularly Jewish…." (Novomeysky, *Given to Salt,* 17). Remaining mentions of Zionism in his memoir refer either to King Abdullah of Transjordan's affection for Zionists and Jews, or to Novomeysky's terrible experience during the House of Commons and House of Lords debates.
[83] David B. Green, "This Day in Jewish History: 1961: 'Broken-hearted' Father of Israeli Potash Industry Dies in Paris," Haaretz.com, 26 March 2016, http://www.haaretz.com/jewish/this-day-in-jewish-history/.premium-1.711008 (Accessed 1 October 2017).

into the concession itself, and Novomeysky arranged legal provisions for Jordanian workers to cross from Transjordan into Mandate Palestine to work. These were special immigration protocols, which every so often seem about to be revived in the Dead Sea area until today. In his memoirs, Novomeysky reflected, "half the total strength was Arab. Practically the whole male population of Jericho worked at the Sea, while at our southern works the whole male population of the Arab village of El Saphia,[84] in Transjordan, were employed by the Company. Since we were working in two different countries, one of which was exclusively Arab in population, it was understandable that this should be so," noting, "One of the most pleasant memories of eighteen years' work of the Company (1930–1948) is the friendly spirit which prevailed between the two sections of our workers."[85] This pleasant feeling of equality and cooperation was likely true only in Novomeysky's recollection, given that workers were deliberately separated by race and religion. Novomeysky helped establish kibbutz Beit HaArava as living quarters for only his Jewish workers and barred Arab workers from the facilities. Jacob Norris's history of Novomeysky's relationships with Palestinians makes clear that whatever Novomeysky's intentions, he exploited his Palestinian partners and workers throughout the northern works' construction and operation.[86]

VI. Privatizing the Dead Sea

The Israeli government decided to privatize Dead Sea Works (formerly PPL) in the early 1990s after triple-digit inflation in 1984–1985 and a stock market collapse on July 1, 1985, caused the Israeli economy to collapse. In the aftermath, the Israeli government began selling shares of

[84] He refers here to the town of *Ghor al-Safia* on the Lisan Peninsula, a major site of sinkhole activity in Jordan.
[85] Novomeysky, *Given to Salt*, 277
[86] Norris, "Toxic Waters."

Israel Chemicals, of which Dead Sea Works had been made a subsidiary in 1968. Two brothers of the Ofer family acquired a controlling stake in Israel Chemicals in 1999, along with the rights to the Dead Sea concession.[87] The Israeli media briefly treated this as a scandal, as the Ofer brothers, who were already rich at the time and only got richer, were perceived to be robbing the nation of its natural resources.

Even those involved in the privatization efforts now see drawbacks. In an op-ed published in Ha'aretz on August 30, 2015, Moshe Arens retold the history of the privatization of Dead Sea Works from his perspective as the vice chairman of the Israel Corporation, owned by the Eisenberg family, who later sold it to the Ofer brothers. In that role, Arens "led the negotiations that gave the Israel Corporation control of Israel Chemicals" and wrote scathingly that "since then, Israel Chemicals' profits have benefited them and the Israeli taxpayer has been the loser."[88] Further, the Dead Sea's environmental collapse had made Dead Sea Works much less profitable. He concluded, "the lesson is that when it comes to Israel's natural resources, privatization may not be the best policy."

Unsurprisingly, Israel Chemicals' and Dead Sea Works' own public accounting of this history makes no mention of these pitfalls or of Novomeysky's eventual fall from grace after the Dead Sea concession. They state simply that the company "has unique access to nature's gifts. In Israel, it has exclusive concessions from the State of Israel to extract minerals from the virtually inexhaustible Dead Sea and holds concessions to mine the rich Negev Desert. The Dead Sea is a vast source of potash, bromine, salt, magnesium and magnesium chloride, and the Negev Desert

[87] See Daniel Maman, "Big Business and the State in the Neoliberal Era: What Changed, What Didn't?" In *Neoliberalism As a State Project: Changing the Political Economy of Israel*, edited by Asa Maron and Michael Shalev (Oxford: Oxford University Press, 2017), 46–59. Maman notes, "In 1995, the state sold Israel Chemicals to the Eisenberg group which, following intrafamily disputes, sold its shares to the Ofer group (which also acquired the state-owned oil refineries and shipping line)" (52).

[88] Moshe Arens, "Be Careful What You Privatize," Haaretz.com, 30 August 2015, https://www.haaretz.com/opinion/watch-what-you-privatize-1.5392904 (Accessed 1 September 2015).

is mined for phosphates and limestone."[89] On the turbulent period of nationalization, Israel Chemicals' timeline reads, "1954: The company changes its name to Dead Sea Works Ltd., which becomes controlled by Israeli government. 1955: Dead Sea Works begins an expansion drive backed by the Israeli government."[90] It is no coincidence that this story is told by Israel Chemicals and Dead Sea Works in the passive voice—"the northern plant was destroyed" and "the southern plant reopened as 'Dead Sea Works' under government control in 1955." Novomeysky figures as a key actor in the companies' mythology, but his trials and travails, his smearing as a traitor, are completely omitted.

Concerns about the eventual depletion of the Dead Sea are also completely absent from this history as told by both Novomeysky and the private companies that would eventually take control of his hard-won concession. In a box of Novomeysky's papers in the ISA, I found an undated report on irrigating the Naqab Desert with Jordan River water showing that Novomeysky was aware of the potentially catastrophic effects of overusing Dead Sea water. The report's author wrote:

> If the Dead Sea level remains constant, the basin South of LISAN would become dry after 35–40 years. Now, the Dead Sea level is not constant, but may rise or fall. This depends on rainfall and cannot be predicted. During the last 30–40 years Palestine has had a rather dry period, and it may be that the next period will be a wetter on and the level may rise. If this is the case, the taking of a part of Jordan water for irrigation should benefit us. But, if the level goes on falling, the taking of Jordan water would soon cause us difficulties.[91]

Without access to the paper archives at the ISA, Novomeysky's awareness of the possibility of the Dead Sea's eventual environmental collapse, so crucial in the history of Dead Sea sinkholes, might never have come to light.

[89] "Israel Chemicals Ltd. History," *International Directory of Company Histories, Vol. 55* (St. James Press, 2003), http://www.fundinguniverse.com/company-histories/israel-chemicals-ltd-history/. (Accessed 15 April 2016).
[90] "Israel Chemicals Ltd. History."
[91] (ISA 978/10-khet).

VII. The Factory as Archive: Novomeysky in No-Man's-Land

I passed what remains of Novomeysky's northern factory at the northern end of the Dead Sea, on the western bank of the Jordan River, frequently during fieldwork: a jumble of derelict concrete and metal structures, a shallow evaporation pool, and a rusted dock dangling uselessly at least fifty meters from the sea's edge. The area is now part of a small Israel Defense Forces outpost. I noted that the structures elicited only a few whispers from observant tourists passing by on bus 486 from Jerusalem. Not all of the buildings at the site date to Novomeysky's time. Some of the structures were first built as cabanas for a Transjordanian hotel. The Jordanian army used them as barracks during the 1967 War, then the Israeli army them used in the war's aftermath, and finally some of them became the site of a short-lived experiment in Israeli tourism. This latter group of buildings has been abandoned since the 1980s.

Figure 11. The IDF outpost. Photo by author, 2015

Right where cracked asphalt gives way to an unpaved track as it passes beside the IDF outpost, a rickety warehouse with a corrugated roof houses the West Bank Salt Company, the only Palestinian-run business profiting from the Dead Sea's mineral riches. The West Bank Salt Company's operations include shallow, serpentine trenches dug from the Dead Sea to evaporation ponds behind the warehouse through muddy shores behind more chicken wire fencing with signs warning in English, Arabic, and Hebrew: "Danger! Mines!" These are the restored evaporation ponds Novomeysky built for PPL. The trenches need to be dredged and redug regularly, more and more often as the Dead Sea recedes further and faster. A few steps from the warehouse, the manager's office is in a tiny building coated in cracking orange stucco. The structure now seems to be listing slightly in the heat, perhaps weighed down by its thick yellow curtains made of upholstery fabric and fringed in dingy gold. The small building provides shade for a few plastic chairs where the manager and an accountant sit when the noise of the fans and the stuffiness of the office become uncomfortable.

The warehouse is the main attraction: inside it is the factory itself. At each phase of the production process, Palestinian workers who live as far away as Nablus supervise heavy machinery, which sifts, cleans, and bakes the raw salt gathered from small evaporation ponds behind the warehouse. The salt turns from a damp, clotting, murky gray color to a sparkling, soft, uniform white as it moves through these noisy machines. Salt crystals escape into the air and coat the metal pipes, funnels, and pumps of the machines in white dust. On my visits to the factory, everyone confines talking to outdoors because of the noise and the particles of salt in the air, even when I visit at midday in the heat of the summer.

Figure 12. The West Bank Salt Company factory. Photo by author, 2015.

Figure 13. West Bank Salt machinery at work. Photo by author, 2015.

The owner, Walid Othman, is rarely present. I always "just miss him," even when I have arranged to meet him at a specific time. I usually end up chatting with Saleh, the operations manager. Saleh is my height at most, but his boisterousness makes him seem much taller to me. He winks at me when I ask why the branded twenty-five-kilogram bags of salt they're preparing for shipment to Gaza today are labeled in Hebrew as well as Arabic, given that the salt is meant for Palestinian consumers. "Because this is Israel," he says. "Well, it's a closed military area. Their cameras see everything, even a cat."

I meet Walid and one of his young, serious daughters later that same evening for icy Coca-Colas in the elegant, air-conditioned atrium of the Dan Hotel, just a few steps east of the Green Line in Jerusalem. He tells me about the long, arduous process of updating the factory's machinery and getting it connected to central electrical grids and water infrastructure in 2010. It took forty years to get electricity to the factory. When Mekorot, the Israeli national water company, came to connect the factory to the water network, they wanted to put the meter two kilometers away from the factory. This forced Walid to install and maintain two kilometers of extra pipe. He viewed this as an attempt by Mekorot to create more leaks and charge the wasted water to West Bank Salt's bill, just another in a long list of small ways the Israeli government was trying to destroy the only "Palestinian address on the Dead Sea, and its strategic importance."

These bureaucratic slights dogged West Bank Salt from the start, since Walid's father Farid received permission from the Jordanian government to turn the ruins of the nascent Jordan Potash Company into a Palestinian-run salt factory after the 1967 War. Between 1948 and 1967, during the Jordanian occupation of the West Bank, the Jordanian government explored the possibility of setting up a potash factory on the site of the old Palestine Potash Ltd. factory

destroyed in 1948. Farid Othman began working with them as engineer in 1964, but the project never really got off the ground. The plant was meant to open in 1967, but the Six-Day War broke out instead.

After the 1967 War, the Jordanian army retreated and Israel occupied the West Bank. As the Israeli army sold the remains of the Jordan Potash Company equipment for scrap, Farid Othman began to visit the two warehouses "riddled with bullet holes" that he now owned according to a deed signed by the Transjordanian Minister of the Economy. The Israel Defense Forces "erected a barracks between them, but he just kept showing up," said Walid. Farid built the West Bank Salt Company literally piece by piece. His son Walid took over the company in the 1990s. Walid summarized his post-Oslo business model this way: "you can't be afraid of investing. Yes, this is Area C, a military area, but you can't wait for things to improve when there's no solution on the horizon." The 2010 refinery improvement project Walid spearheaded was nonetheless slow and frustrating. Like his father, he had to update the refinery piece by piece, getting approval from all manner of Israeli institutions to import, then move, then install each bit of new equipment. As the rosy light of the sunset began to fade outside the Dan Hotel's soaring windows, Walid stretched and gestured for the bill, sighing, "we're still dealing with the problems that Novomeysky was dealing with; we're in a no-man's-land."

VIII. Conclusion

Novomeysky's repudiation of efforts to nationalize PPL was intense. Once the Israeli government nationalized the company, he left the region entirely and died in self-imposed exile in Paris in 1961. In Novomeysky's archive, the Dead Sea and its wealth of minerals are constructed as territory that requires an extractive, capitalist, settler-colonial development

approach. Indeed, the Israeli government's sale of Dead Sea Works (and along with it the British Mandate of Palestine's half of the Dead Sea concession) to a private company held by the Ofer brothers, two Israeli billionaires, seems to have created this reality on the ground. Novomeysky's approach to Dead Sea hydrogeologies and Dead Sea mineral extraction endures today, along with the Dead Sea concession itself. The rhetorical framing of the Dead Sea as an inexhaustible financial resource for those who dare exploit it has been taken up in Jordan, Israel, and the oPt. As a firsthand account of a settler-colonial approach to the natural environment in Palestine, Novomeysky's writings give us a glimpse into the historical dynamics that have led to the Dead Sea's overuse and to regional governments' unwillingness or inability to stop it.

Archives are materially fragile and contingent, often about to disappear. This has been particularly important in the case of Israel and Palestine: different histories bolster competing claims over land and territory.[92] As I have shown in this chapter, archives help construct territory as territory to be settled and resources as resources to be extracted under colonial and settler-colonial regimes. We must have access to archives and all their material layers to begin to view this process clearly.

[92] Abu El-Haj, *Facts on the Ground*.

CHAPTER 3

BETWEEN HYDRO AND GEO:

AMPHIBIOUS SPACES OF SOCIAL EXCEPTION

I. Introduction

As the Dead Sea's salty waters recede, by more than a meter per year at this point, they leave eerie traces of former shorelines in the desiccated desert landscape.[93] Old docks dangle uselessly over the dry ground meters from the water's edge. Beachgoers are left to pick their way daintily across more and more burning sand and sharp stones with each passing day as they seek the cool relief of saline buoyancy in the blue-green inland lake. The receding water has left its mark under this shoreline too, in the form of a frightening geologic form: sinkholes.

Sinkholes as large as a city block opened regularly around the Dead Sea during my fieldwork, dotting the gray-brown shoreline with deep, dark circles. Their location in border regions between Palestinian, Jordanian, and Israeli territory makes them difficult to quantify because security regimes restrict researchers' and residents' movement. Interlocutors estimate that four thousand to five thousand of them now dot the landscape of the lowest place on Earth. As the soft earth along the Dead Sea's shores caves in, the sinkholes take in concrete, asphalt, electrical wires, metal pipes, donkeys, cars, bulldozers, and occasionally people. Dead Sea sinkholes create new economic and social possibilities for some people and foreclose possibilities for others. In this chapter, I document the social relations brought into being by these hydrogeologic phenomena formed by the very interaction of waters (hypersaline and fresh) and land. Rather than foreclose the possibilities for human social life, I argue, Dead Sea sinkholes allow people to break social

[93] al-Nawasra, *dirāsāt al-āghūār al-jnūbiyya*; Niemi et al., *The Dead Sea.*

and religious conventions, to maintain settler-colonial control over occupied land, and to advocate for more government attention to rural concerns.

As my friend and interlocutor Ibrahim unlocks the chain-link gate at the entrance to a recently closed Israeli settlement-run Dead Sea beach in the Palestinian West Bank, he says pointedly, “I have something to show you.” His raised eyebrows marked the drama of what I saw.

Figure 14. The destruction of the new sinkhole. Photo by author, 2015.

Where just two days before had been a large circle of gravel marking the outline of an older sinkhole filled in with sand and gravel, a new sinkhole now gaped in the parking lot. It was over seven meters deep and ten meters wide. The asphalt parking lot around the gravel circle had cracked in a ripple pattern. It appeared to me that the earth was in the process of falling away, but had frozen mid-collapse. The reasons for these Dead Sea sinkholes are well understood by scientists: they form due to interactions among the geological composition of the Dead Sea's shoreline, groundwater, and the hypersaline and mineral-rich waters of the sea. Other aspects of these sinkholes are less clear. These hydrogeologic phenomena, and the amphibious subsurface material relations they index, enact new social, economic, and political entanglements in Dead Sea borderlands.

Across the mineral-rich water on Jordan's Dead Sea coastline, muddy sinkholes that swallowed a Jordanian tile factory in 2008 now sprout long stalks of electric-green bamboo that sway in the wind. Around these sinkholes, the ground is littered with cigarette butts, crushed soda cans, and the occasional empty bottle of *arak* (anise-flavored liquor), evidence that the site serves as an escape from the pressures of small-town life for some local Jordanian residents. Residents speak of these places not as "wet" or "dry" but as "sinking" or "stable." The interaction of water and land is nevertheless what makes these places stand out. These amphibious formations bring opportunities for leisure and become verdant spaces of ecological and social exception in the desert landscape. My analysis here will be confined to the sinkhole problem in the West Bank and Israel; the geopolitics of the Dead Sea's western shores are complex enough. I do not, however, intend to give the impression that the sinkholes are confined to one side of the sea. Indeed, similar economic, political, and scientific quagmires exist in Jordan as well.

Figure 15. Large sinkhole in Jordan's Lisan Peninsula. Bottles of *arak* found nearby. Photo by author, 2015.

Attention to the social, economic, and political effects of the material interaction between land and water (expressed in the *hydro-geo* of hydrogeologic) gives rise to novel questions for anthropological research. Recent anthropological work on water and waterworlds,[94] mining,[95] and earthquakes,[96] as well as recent debates about the Anthropocene as a geologic epoch,[97] all represent considered efforts to untangle either the *hydro* or the *geo* through ethnographic research. Missing from these discussions so far is an effort to analyze points at which water and earth interact, comingle, act on each other, and, in so doing, make the *hydro* and the *geo* impossible to separate. The interaction between water and earth has animated the sinkhole problem at the Dead Sea and contemporary history of settlement in the area as well.

Dead Sea sinkholes all form the same way and originate from the same problem. Rapid recession of highly saline Dead Sea water exposes 70,000-year-old subterranean salt pockets to fresh groundwater running into the inland lake from the highlands of Amman and Jerusalem.[98] The freshwater dissolves these buried pockets of salt, leaving underground vacuums of

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[94] Nikhil Anand, "PRESSURE: The PoliTechnics of Water in Supply in Mumbai," *Cultural Anthropology* 26 no 4 (2011): 542–564; Nikhil Anand, "Municipal Disconnect: On Abject Water and Its Urban Infrastructure," *Ethnography* 13 no 4 (2012): 487–509. Nikhil Anand, *Hydraulic City: Water and the Infrastructures of Citizenship in Mumbai* (Durham, NC: Duke University Press, 2017); Jessica Barnes *Cultivating the Nile: The Everyday Politics of Water in Egypt* (Durham, NC: Duke University Press, 2014); Jessica Barnes and Samer Alatout, eds, "Water Worlds," *Social Studies of Science* 42 no 4 (2012): 483–631; Wendy Espland, *the Struggle for Water: Politics, Rationality, and Identity in the American Southwest* (Chicago: University of Chicago Press, 1998). Kristen Hastrup "Water and the Configuration of the Social Worlds: An Anthropological Perspective," *Journal of Water Resource and Protection* 5 no 4 (2013): 5; Stefan Helmreich *Alien Ocean: Anthropological Voyages in Microbial Seas* (Berkeley: University of California Press, 2009); Mandana Limbert "The Senses of Water in an Omani Town" *Social Text* 19 no 3 (2001): 35–56; Todd Shallot, *Structures in the Steam: Water, Science, and the Rise of the U.S. Army Corps of Engineers* (Austin: University Texas Press, 2010).

[95] Chris Ballard and Gene Banks, "Resource Wars: the Anthropology of Mining," *Annual Review of Anthropology* 32 (2003): 287–313; James Smith "Tantalus in the Digital Age: Coltan ore, temporal dispossession, and 'movement' in the Eastern DR Congo," *American Ethnologist*, 38 no 1 (2011): 17–35.

[96] Manuel Tironi, "Disastrous Publics: Counter-enactments in Participatory Experiments," *Science, Technology, and Human Values* 40 no 4 (2015): 564–587.

[97] See, among others: Jan Zalasiewicz, Mark Williams, Will Steffen, and Paul Crutzen, "The New World of the Anthropocene," *Enviro Science & Tech* 44 no 7 (2010): 2228–2231; Valerie Olson and Lisa Messeri, "Beyond the Anthropocene: Un-Earthing an Epoch," *Environment and Society* 6 (2015): 28–47.

[98] Damien Closson and Najib Abou Karaki, "Salt karst and tectonics"; Yoseph Yechieli, Daniel Wachs, Meir Abelson, Onn Crouvi, Vladimir Shtivelman, Eli Raz, and Gideon Baer, "Formation of sinkholes along the shore of the Dead Sea: Summary of the first stage of investigation," *GSI Current Research* 1 (2003): 1– 6.

unknowable size. So how has the sea's water come to be so shockingly depleted? The answer lies at the intersection of the *hydro* and the *geo*.

I take sinkholes and their component material and semiotic parts as objects of desire and control and investigate how sinkholes, swamps, bogs, and eroding shorelines are not always treated as places to be wiped away by the humans who interact with them, but rather as places of social, political, and even economic possibility. Anthropological work on bogs, wetlands, and swamps has begun to explore the value and sociality of amphibious places.[99] Turning ethnographic attention to sovereignty in amphibious places can elucidate the processes through which communities stake claims over those places, even as they erode, sink, or shift, taking wires, pipes, roads, and valuable arable land with them.[100] While Anand's notion of "hydraulic citizenship" points to a form of sociality created by urban water infrastructures,[101] and Povinelli's "geontology" refers to arrangements of existence between humans and the Earth,[102] my work calls attention to what I call "amphibious entanglements" brought to bear by phenomena in which the *hydro* and the *geo* are inexorably intertwined. *Terra* in the *terra nullius* of this example is hydrogeologically constituted, inexplicable without an understanding of both *hydro* and *geo* material properties. In this chapter, I bring into focus hyrdrogeologic social worlds circulating around phenomena in which the *hydro* and the *geo* are co-constitutive.

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[99] Jessica Catellino, "The Cultural Politics of Water in the Everglades and Beyond," Presentation at the University of California, Irvine, Irvine, CA, 1 October 2015; Ari Kelman, "Boundary Issues: Clarifying New Orleans's Murky Edges," *Journal of American History* 4 (2007): 695–703; Stuart McLean, "Bodies From the Bog: Metamorphosis, Non-Human Agency, and the Making of 'Collective Memory,'" *Trames* 12 (63/57) no 3 (2008): 299–308; Stuart McLean, "BLACK GOO: Forceful Encounters With Matter in Europe's Muddy Margins," *Cultural Anthropology* 26 no 4 (2011): 589–619; Laura Ogden, *Swamplife: People, Gators, and Mangroves Entangled in the Everglades* (Minneapolis: University of Minnesota Press, 2011); Caterina Scaramelli, "Fish, Flows, and Desire in the Delta," *Anthropology News* website, 12 March 2018.
[100] McLean, "BLACK GOO."
[101] Anand, "PRESSURE."
[102] Elizabeth Povinelli, *Geontologies: A Requiem to Late Liberalism* (Durham, NC: Duke University Press 2013).

My interlocutors repeatedly identified the first appearance of sinkholes around the Dead Sea in the 1980s as a "surprise." They agreed that these amphibious apparitions had a distinctly human cause: the extreme depletion of the Dead Sea as a result of the overuse of both the sea itself by Israeli and Jordanian factories, and of Jordan River water by Israel, Syria, and Jordan. Back at the new sinkhole's edge, my friend Ibrahim explains: "On the first day of Ramadan, on the 18th of June, a big new sinkhole opened up. This is the end of this company. This place is closed forever." The new sinkhole opened beneath the parking lot and two shipping container buildings that used to serve as rooms for pricey mineral spa treatments. The buildings now stick out of the hole at odd angles, along with several discombobulated palm trees. Ibrahim invites me to take photos of the damage, repeating, "This is the end of this place, that's it, it's over." He goes on: "All of this is from God. The sinkholes come because the water is going away, and the water is going away because of the factories in the South." Ibrahim is convinced that this new sinkhole means the beach will never reopen. Ibrahim had remained hopeful that it might reopen these past months since it was closed. But now, he is sure, its fate is sealed.

The history of the Dead Sea concession, which I told in detail in chapter 2, is a hydrogeologic history. I will now recap a few key pieces of this history to demonstrate how *hydro* and *geo* are inseparable in the history of the Dead Sea concession, and thus, Dead Sea sinkholes. As I wrote in chapter 2, public interest first turned to the industrial potential of the Dead Sea and its minerals at the turn of the twentieth century, though people have extracted chemicals from the Dead Sea since at least the time of the Pharaohs, who transported crucial compounds used in mummification from the Dead Sea to the Nile Valley.[103] The Ottomans

[103] Arie Nissenbaum and S. Buckley, "Dead Sea Ashphalt in Ancient Egyptian Mummies–Why?" *Archaeometry* 55 (2013): 563–568.

commissioned expeditions to the Dead Sea to test the viability of extracting salts.[104] Sultan Mehmed V issued an imperial charter in 1911 for the extraction of bromine from the sea to three Ottoman subjects: Djindjöz Bey, Zuad Bey and Djenab Chehabeddin Bey. The imperial order required Djindjöz Bey, Zuad Bey and Djenab Chehabeddin Bey to begin extracting bromine within two years after Mehmed V issued it. By 1915, no extraction had been initiated. The Ottoman Porte nullified the concession with an imperial decree, but interest in the Dead Sea's mineral wealth was already emerging from another source: a Russian Jewish industrialist fleeing the Bolshevik Revolution named Moshe Novomeysky.

As I wrote in chapter 2, Novomeysky's interest in the Dead Sea had been piqued by a geologic report passed on to him in 1906 by German botanist and fellow Zionist Professor Otto Warburg.[105] The report was the work of another German scientist, a geologist named Max Blanckenhorn, who wrote about the Dead Sea after undertaking a study of the area sponsored by European Zionists with Ottoman permission in 1904. Blanckenhorn's research suggested to Novomeysky that "the salts contained in those waters very closely resembled that of the salts in Siberian lakes from which I had already commercially extracted chemicals necessary as raw materials for industry."[106] He applied to the Ottoman Empire an extraction enterprise at the Dead Sea in 1907 before his arrival in Palestine, but his application was denied. He visit the area anyway in 1911, and returned in 1920 as an immigrant, ready to lobby the young British Mandate government for unprecedented mineral rights.

In the absence of the geological data needed to help make the importance of the concession clear to potential allies in the British administration, Novomeysky undertook a range

[104] Norris, "Toxic Waters."
[105] Novomeysky, *Given to Salt.* Norris, *Land of Progress*.
[106] Novomeysky, *Given to Salt,* 11.

of tests and expeditions to the Dead Sea himself. This was an essentially hydrogeologic research mission, and the data he collected was everything Novomeysky had hoped it would be—scientific proof of the validity and value of a mineral industry on the Dead Sea's shores. After the lengthy and convoluted campaign for a concession of the Dead Sea's minerals from the young British Mandate governments of Palestine and Transjordan described in chapter 2, Novomeysky secured for himself and his company the unrestricted rights to the wealth of bromine, magnesium, phosphate, phosphorus, and salt of the Dead Sea in 1930. He set up a company, Palestine Potash Limited, based in England and Palestine, and began his extractive work in a small factory on the northern end of the Dead Sea where the Jordan River flows into the hypersaline lake.

In the manner of other Ottoman concessions, this contract gave Novomeysky the exclusive rights to extract, sell, and export minerals from the Dead Sea.[107] The crucial piece in this story is once again at the *hydro-geo* nexus: in granting Novomeysky the rights to Dead Sea minerals *in situ*, the British effectively gave his company the right to exploit whatever he could using the water and the unique geological properties of the area. Novomeysky's operation employed the following procedures as detailed in his memoir *Given to Salt*: "We used the water of the River Jordan, which constantly pours nearly 2,000 million gallons daily into the Dead Sea, as the instrument for the decomposition of the carnality—i.e., the separation of the two salts, potassium and magnesium chloride, based on the differences in their solubility."[108] As the fresh

[107] See also Jacob Norris, "Colonialism in Palestine: science, religion and the Western appropriation of the Dead Sea in the long nineteeth century," In *The Routledge History of Western Empires*, edited by Robert Aldrich and Kirsten McKenzie (New York: Routledge, 2014); Soli Shahvar, "Concession Hunting in the Age of Reform: British Companies and the Search for Government Guarantees; Telegraph Concessions through Ottoman Territories, 1855–58," *Middle Eastern Studies*, 38 no 4 (2002): 169–193; Behice Tezçakar, *Discovery of oil in the minds and the lands of the Ottoman empire: Erzurum-Pulk Oil Concessions* (Saarbrücken : LAP Lambert Academic Publishing, 2010); among many others on Ottoman Concessions.

[108] Novomeysky, *Given to Salt,* 80.

water from the Jordan River acted on the geological substrates at the edge of the Dead Sea, mineral commodities began their journey from extraction to markets elsewhere in the region and around the world. This method remained in effect until Jewish paramilitary groups evacuated the northern factory during the Nakba in 1948. Mineral extraction at the Dead Sea was from then on confined to Novomeysky's second factory, with its vast evaporation ponds at the southern tip of the Dead Sea. It was the economic possibilities afforded by the interaction of water and minerals that catalyzed contemporary Jewish settlements near the Dead Sea, since workers were needed in the factories. The modern kibbutzim Ein Gedi, Mitzpe Shalem, and Qalia all owe their founding to the hydrogeologic economic miracle Novomeysky initiated.

Figure 16. What remains of workers' quarters at the Southern Works. Photo by author, 2015.

Today, the Jordan River trickles a meek thirteen million gallons of fresh water per day into the Dead Sea near the former site of Novomeysky's northern factory as a result of the river's diversion for irrigation upstream. The legacy of Novomeysky's unchecked rights to exploit the Dead Sea's mineral wealth exists in the corporate structures of Dead Sea Works, whose parent company Israel Chemicals Limited was bought after it was denationalized by Israeli billionaire investors the Ofer brothers in 1999. Along with Israel Chemicals Limited's manufacturing infrastructures and financial holdings, the Ofer brothers effectively also bought the Dead Sea concession in 1999, now guaranteed by the State of Israel. With it, they gained special rights to expand Dead Sea Works' factories and pump Dead Sea water into their evaporation pools in whatever quantities they chose, thereby rapidly decreasing the water levels of the Dead Sea and creating the hydrogeologic shoreline conditions in which sinkholes began forming in the 1980s. Thanks to Novomeysky's 1927 concession from the British Mandate governments of Palestine and Transjordan, Dead Sea Works' monopoly over chemical and pharmaceutical products produced from Dead Sea minerals was nearly complete—only the emergence of sinkholes in their evaporation ponds are holding them back. An interlocutor expressed the paradox this way: the rapid recession of Dead Sea water makes Dead Sea Works' operations run faster as the mineral concentration in the brine increases. But as sinkholes regularly open in the ponds, valuable industrial machinery disappears. In the absence of outside checks on extractive industries at the Dead Sea, the interaction between the *hydro* and the *geo* limit its production capacity.

II. Sinking Economies and New Mobilities

Let me return to the ethnographic present and the sinkhole my Ibrahim has shown me. Sinkholes do not foreclose economic possibilities everywhere as they have at Dead Sea Works. At the settlement-owned tourist beach where Ibrahim works, sinkholes have made his employment as a caretaker possible. When small sinkholes began emerging in the parking lot and among the plastic deck chairs that once held tourists from all over the world as they napped in the heat, the managers of the beach saw no alternative but to close it to tourists temporarily. To protect their buildings from theft, they hired Ibrahim to live in the building that used to house the manager's office and keep people out of the closed area until the permanent fate of the beach was decided.

When I got to know Ibrahim a few months after the beach's initial closure, he and the beach's managers thought the beach would soon reopen. They thought they could stabilize the shoreline by filing all the sinkholes with sand and gravel. Any geologist would scoff at a plan like this: since sinkholes form as a result of interconnected underground caverns that are impossible to map, it is impossible to restabilize sinkholes with more material. Eventually, the new sand and gravel will collapse into the caverns as well, and this is exactly what happened when the new sinkhole opened in the parking lot on June 18. At that point, Ibrahim's role as caretaker began to seem redundant. He and the beach's management seemed to realize that the beach would remain closed forever.

Figure 17. Tourists at the beach before its closure. Photo by author, 2013.

Figure 18. The same beach, abandoned after its closure because of sinkhole activity. Photo by author 2015.

Ibrahim's employment with the settlement was made possible because of the sinkholes, but they now threatened to make his position obsolete. To explain why requires a quick detour into the bureaucratic mechanisms of Israeli occupation in the West Bank. The West Bank, occupied by Israel since the end of the 1967 Six-Day War, was fragmented into three jurisdictional zones when the Palestinian Liberation Organization and the Israeli government signed the US-brokered Oslo Accords in the 1990s: (1) Area A, where the Palestinian Authority was to have full military and civil authority; (2) Area B, where the Palestinian Authority was to have civil authority and the Israeli army was to have military authority; and (3) Area C, where the Israeli government maintains civil and military authority. These three zones are noncontiguous, and territory can be reclassified by the Israeli Civil Administration, headquartered in a large settlement outside Ramallah called Beit El. Land around the Dead Sea and in the Jordan Valley is Area C. During the Oslo negotiations, the Israeli government cited security concerns as the reason it needed to maintain military and civil control over the West Bank's borders at the expense of the territorial sovereignty of a future Palestinian state. The Jordan River Valley represents that border from Lake Tiberius down to the Red Sea.

The West Bank tourist beach where Ibrahim works is Area C, but just over four kilometers south of the military checkpoint the IDF operates to keep Palestinians without formal permission from entering Israel. Palestinians without permission to enter Israeli territory in the form of Israeli citizenship or working papers were thus barred from accessing these beach facilities even before sinkholes closed them. Ibrahim's extended Bedouin family lives near Bethlehem but come from land where kibbutz Ein Gedi now stands, on the Israeli coast of the Dead Sea. For many years, Ibrahim bounced between hospitality jobs in Dead Sea settlements that cater to Hebrew-speaking Jewish Israelis and English-speaking tourists in Area C, north of

the checkpoint. At these Israeli-run hotels and resorts in the occupied Palestinian territories, the long hours and his somewhat limited foreign-language skills hampered Ibrahim's progress and kept his salary relatively low. When the beach closed, one of his former managers referred him for the job of caretaker, and he acquired the working papers that legally allowed him to cross the checkpoint into Israel for the first time. The hydrogeologic phenomenon of the sinkholes opened a new role for him in the Dead Sea tourism industry in spite of his marginal social position,[109] and they provided an opportunity for him to circumvent the bureaucratic restrictions of his political status.[110]

Ibrahim gained what he described as an extraordinary opportunity with the closing of the beach: the chance to live on the very edge of his beloved Dead Sea twenty-four hours a day, to be provided room and board in addition to a salary just to keep tourists away, and to legally obtain permission to move around what is today Israel. He was to safeguard the settlement's remaining structural investments while the fate of the beach was decided in corporate boardrooms and government meetings seventy-five kilometers away in Jerusalem. Once large sinkholes began to emerge at the site, as they did on June 18, Ibrahim rightly realized that his sinkhole-created job would likely soon be obsolete. By the end of the summer, Ibrahim had received a phone call from his manager informing him that his caretaker services were no longer needed since the beach would be permanently closed. He began trying to negotiate employment in a Dead Sea spa-products factory a short distance away so he could stay close enough to the

[109] Oren Yiftachel, *Ethnocracy: Land and Identity Politics in Israel/Palestine* (Philadelphia: University of Pennsylvania Press, 2006).
[110] Helga Tawil-Souri, "Colored Identity: The Politics and Materiality of ID Cards in Palestine/Israel," *Social Text* 107 (2011): 67–97.

shoreline he loves. His experience illustrates the way the amphibious interactions that create sinkholes also produce complex economic, political, and social entanglements and possibilities.

The damage that results from sinkholes threatens the livelihoods of factory workers, industrialists, farmers, animal herders, tour guides, and others, even as it opens new possibilities, like for the provisional reclamation of Ibrahim's political and labor rights. Sinkholes force organizations seeking to profit from the Dead Sea to adapt their methods and technologies of extraction and to develop their own informal warning systems. Likewise, they force the Israeli and Jordanian governments to come face-to-face with the needs of local residents who lack political capital, such as when farmers demand that access roads be rebuilt and electrical grids be replaced. As such, sinkholes can be forces for innovation and collective action as well as destruction.

III. Sinkholes and Small-Town Politics

In the early 1980s, when the Israeli government was investing heavily in tourist development in the town of Neve Zohar, on the southern tip of the Dead Sea near industrial evaporation ponds owned by Dead Sea Works, sinkholes began appearing near the construction of a new beach facility. Unsure of the scope of the problem, the Tamar Regional Council opted to continue construction apace. Soon, the situation became untenable as new roads collapsed and construction equipment was swallowed by the holes. The Neve Zohar development project was all but abandoned. Today, only a small number of sun-faded, hand-painted signs advertising vacation rooms to let in English and Russian stand among the small concrete residences as reminders that the Israeli government once envisioned a thriving tourist economy there.

Not long after sinkholes began appearing in Neve Zohar, the problem spread north to

Kibbutz Ein Gedi, a settlement founded in 1948 near the speculated site of an ancient biblical outpost of the same name, just a few kilometers south of the Green Line dividing Israeli and Palestinian territory. Since the late 1980s, sinkholes have destabilized the kibbutz's original corrugated metal barracks and swallowed 80 percent of the kibbutz's date trees. In January 2015, sinkholes opened along a small section of the main road that connects Ein Gedi to its neighboring communities and closed the Ein Gedi public beach, including campsites, the gas station, and the snack shop.

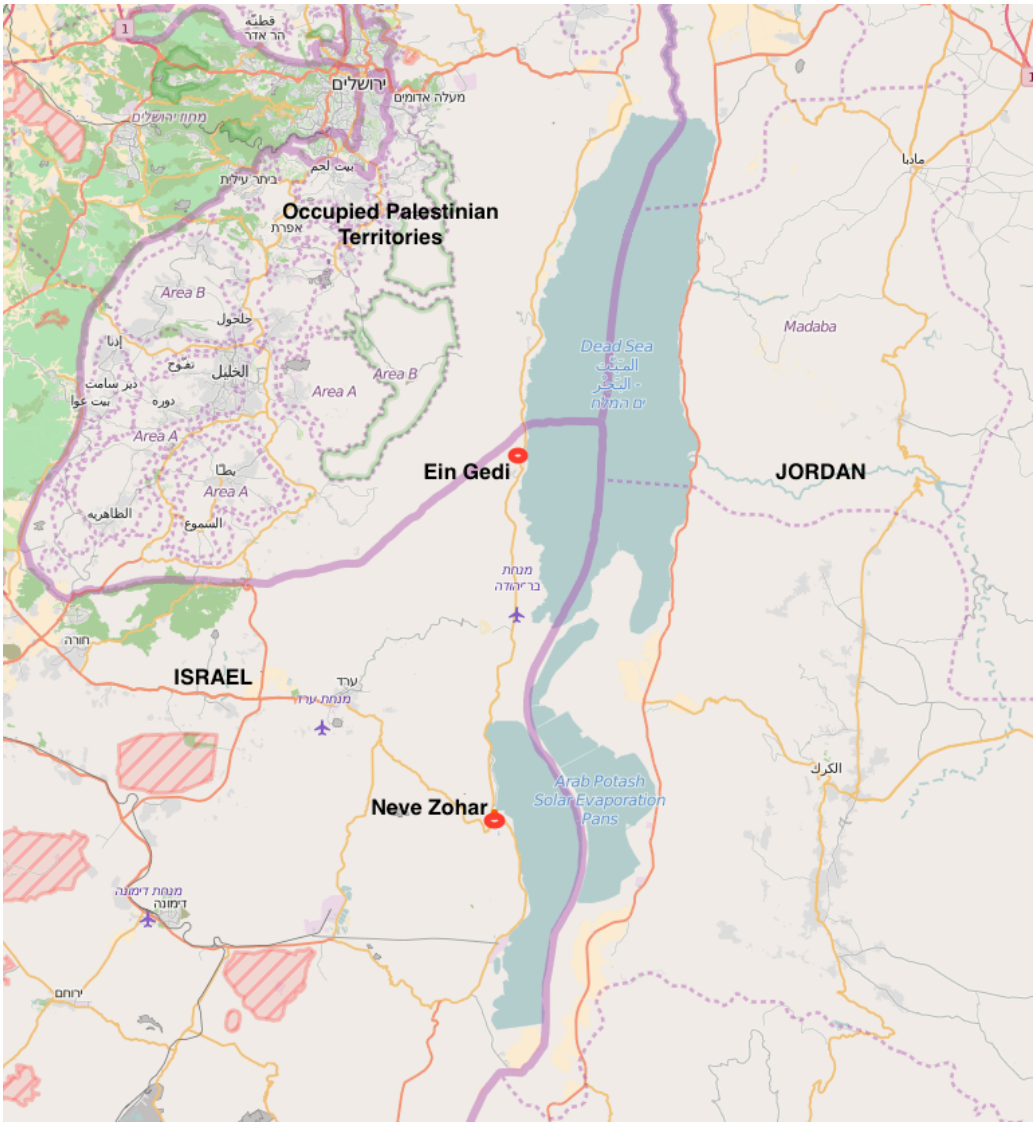

Figure 19. Neve Zohar and Ein Gedi.
Image courtesy of Open Street Map, © OpenStreetMap contributors, openstreetmap.org.

The contemporary history of Ein Gedi is important here. Before the 1948 War and the Nakba, two kibbutzim on the Dead Sea supplied Novomeysky's Palestine Potash Limited with workers: Ein Gedi and Beit HaArava. Jewish settlers founded Ein Gedi just before the 1948 War, on the site of a town by the same name mentioned in the Bible. According to the Bible, Ein Gedi's dates were celebrated for their quality and taste. Damage to the contemporary Ein Gedi's date plantation was a source of sorrow and pain for informants who live at the kibbutz.

Like many other kibbutzim founded around the same time, Ein Gedi and Beit HaArava served as garrison towns during the 1948 War. Shortly after violence began, David Ben Gurion (who commanded the militias that became the Israeli army at independence) ordered Kibbutz Beit HaArava evacuated and closed. He determined that Ein Gedi would serve as a border town until the West Bank, occupied by Jordan at the end of the war, could be conquered for Israel. As a result, the first twenty years of Kibbutz Ein Gedi's existence was fraught for my interlocutors who lived there during that time. They often told me stories of the Jordanian snipers that occasionally aimed at them from the cliffs nearby. Coincidentally, Ibrahim's Bedouin tribe originates from the same place, but they were displaced when settlers arrived to found Ein Gedi as a Jewish outpost. The family was eventually forcibly settled in a cluster of dwellings near Bethlehem. Ibrahim's employment at the closed tourist beach a few kilometers north held an additional resonance for him because of his family's origins.

One dark night with stars sparkling in the warm breeze in 2015, I sat in an air-conditioned conference room at the Ein Gedi Hotel with the kibbutz community while one of their number, a geologist, endeavored to convey to the group the severity of the sinkhole problem on the kibbutz's land. After a lengthy discussion of the geologic origins of the Dead Sea

and its place in Jewish theology, a kibbutz member in his mid-fifties interrupted the geologist: "So, are you finally getting to the sinkholes at the end of all this?" The geologist quickly shot back, "We're all getting to the sinkholes in the end," and the room erupted with laughter. All kidding aside, the geologist proceeded to explain the hydrogeologic origins of the sinkholes and the methods he had helped develop for predicting this type of sinkhole. He told the room, "All around the world, sinkholes are caused by different things, but these we understand have a human cause"—the depletion of Dead Sea water, which, thanks to the Dead Sea concession, cannot legally be limited by the Israeli government. In the geologist's expert opinion, the Israeli government needed to find another a way to reverse the rapid water loss in the Dead Sea. The transportation authority should divert Route 90 away from the sinkhole area, he opined, cutting directly through the kibbutz's remaining date plantations and an archaeological site from which Ein Gedi gets entrance fees. The room groaned. For this community, sinkholes were destroying a way of life dating back to biblical times.

Figure 20. Ein Gedi's abandoned date groves. Photo by author, 2015

Discussion about what the Israeli government would do about the damage wrought by sinkholes on Kibbutz Ein Gedi continued for six months. I attended regular kibbutz community meetings, usually led by the geologist, which played out the classic trope of small-town politics in which the people's interests were opposed by a corrupt governing body—in this case, the Tamar Regional Council. Ein Gedi residents, I came to understand, thought of Jerusalem and Tel Aviv as the center and themselves as the settler-colonial periphery, devoting their lives to maintaining the Jewish state's frontiers as they made the desert bloom. These dynamics were made clear as residents debated what to do about Route 90—the road that connects Ein Gedi and its tourist hotels, spring water factory, and date plantations to Jerusalem. After one especially frustrating meeting that devolved into ad hominem attacks against members of the local council (one of whom is currently being prosecuted by the Israeli government for eliciting bribes), a middle-aged woman in rugged khaki pants and a pink work shirt cried out, "But why should the government listen to *us*? We're only a small group of people far from the capital. Why would they do anything to help us?"

Ultimately, thanks to the fervent lobbying of the community, the geologist's plan won out over other more elaborate and less feasible schemes. Each time I arrived at Ein Gedi, a little more of the date plantation had been uprooted and a few more segments of new asphalt had been laid down. A small army of traffic guards had been hired by the Israeli government to help cars, buses, and 18-wheeler trucks navigate the one-lane route through the construction zone. During the day, the guards took turns stopping cars under the baking sun while their colleagues sat beleaguered in the paltry shade of a sun umbrella; at night, a single guard would be left to stand under a blinding construction lamp. It was grueling work, but it was work in service of the Zionist ideal of maintaining Jewish roots in the now eroding soil of the biblical land of Israel.

IV. Conclusion

Interactions between water and minerals have long defined the economic potential of the Dead Sea, inspired its contemporary settlement, begun to limit seemingly illimitable industrial mining rights dating back to the Ottoman Empire, and allowed individuals like Ibrahim and the residents of Kibbutz Ein Gedi to maneuver within the power of the Israeli state. These hydrogeologic worlds underground define the conditions of possibility of future human life in the region. When "stable" and "unstable" are more salient categories than "wet" and "dry" on the shoreline of a massive inland lake, it becomes incumbent on us to rethink the way we understand the territoriality of these places. Human social worlds are not simply directed by water and land, but rather by different waters (salty, fresh, potable, toxic, mineral-rich) and lands (arable, barren, sandy, rocky, stable, sinking), as well as the hydrogeologic forces through which these interact.

CHAPTER 4

GEOLOGIES OF ERASURE:

SCIENCE, SINKHOLES, AND SETTLER COLONIALISM

I. Introduction

Since the late 1980s, large and small holes in the ground have swallowed more and more of the shoreline around the Dead Sea. Some holes are as large as a city block and thirty meters deep, while others are as small as a loaf of bread and look like the footprints of a giant. Many sinkholes appear in linear clusters, strangely patterned additions to an otherworldly landscape. Some sinkholes form round natural pools filled with water, while others are dry down to depths that can hardly be seen from the hole's crumbling edge. Dead Sea sinkholes look most dramatic when they disrupt structures of the built environment. They rip apart buildings, tear up roadways, and leave previously buried pipes dangling precipitously over a chasm that was solid ground up until the moment of collapse. People live and work with Dead Sea sinkholes in the occupied Palestinian territories, Israel, and Jordan.

Debates over territory unfold in the ways differently positioned scientists and engineers study and predict Dead Sea sinkholes. For the Jordanian and Israeli governments, knowledge about Dead Sea sinkholes has a particular role to play in claiming land around the Dead Sea for three reasons: first, because the area is both environmentally hostile and sparsely inhabited, settling the land through more traditional settler-colonial means is impractical; second, because the Dead Sea area is economically and religiously important, studying, predicting, and ultimately controlling the hydrogeologic forces that threaten it is crucial to maintaining competing colonial

claims in the Dead Sea basin; and third, because Dead Sea sinkholes unsettle the Zionist settler-colonial project of making the desert bloom by swallowing that very desert.[111]

Figure 21. Sinkhole in Jordan. Photo by author, 2015.

Social theorists have recently offered new ways of thinking about social life at the Earth's margins.[112] Sinkholes are among these marginal places because they undermine and limit human habitation. They are also materially marginal: as hydrogeologic formations, they are formed by

[111] Because the Dead Sea sinkholes in the oPt are all located within Area C where the Palestinian Authority exerts neither civil nor military control under the Oslo Accords, managing sinkholes is not part of the process for claiming land.

[112] See for example Elizabeth Povinelli, Nigel Clark, Kathryn Yusoff and others on theories of the geosocial, Stefan Helmreich on marine microbes and scientists' fascination with them, and Valerie Olson and Lisa Messeri on how the extraterrestrial and interplanetary is constitutive of Earth-bound social worlds. Povinelli, Elizabeth, Mathew Coleman, and Kathryn Yusoff, "An Interview with Elizabeth Povinelli: Geontopower, Biopolitics and the Anthropocene," *Theory, Culture, and Society* 34 (2017): 169–185; Stefan Helmreich, *Alien Ocean: Anthropological Voyages in Microbial Seas* (Berkeley: University of California Press, 2009); Valerie Olson, "Political Ecology in the Extreme: Asteroid Activism and the Making of an Environmental Solar System," *Anthropological Quarterly* 85 (2012): 1027–1044.

interactions between waters, land, and human desires to exploit their environments' economic resources.

In this chapter, I analyze different forms of hydrogeologic knowledge about Dead Sea sinkholes as scientific objects suspended in numerous social, political, and economic contestations.[113] In this geographic context, settler-colonial efforts to settle certain kinds of humans in "new" territory (*terra nullius*) have defined the everyday lives of those who live around the Dead Sea. I show how "territory" is not a prefigured category, but rather is produced through social action and knowledge-making practices. Specifically, I refer to the sharing of work on Dead Sea sinkholes at conferences, the methodological framing of new sinkhole research, and the use of InSAR satellite images to predict sinkholes. I propose attention to *geologies of erasure*, or the results of hydrogeologic knowledge-making practices in contexts of deep power inequality, to make sense of the epistemic and political effects of the gathering and circulation of scientific knowledge about environments.[114] Geologies of erasure reveal the political and pragmatic impacts of the scientific knowledge-making practices. In contested settler-colonial landscapes, these impacts include the definition of territory as territory that can be settled.[115] My ethnographic analysis of geologies of erasure will reveal what is erased or nullified in the production of territory through unequal processes of knowing.

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[113] Sheila Jasanoff, *States of Knowledge: the Co-Production of Science and Social Order* (London: Routledge, 2004). Classic works in S.T.S. and environmental anthropology have shown that scientific objects are never just scientific, but rather socially coproduced. Sheila Jasanoff demonstrated how "the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it" (Jasanoff, *States of Knowledge,* 2). Like many other natural scientific objects of study, geological formations such as sinkholes do not simply exist *a priori*; rather, they are coproduced with other social and political actors, institutions, and phenomena.

[114] Anna Tsing, "Natural Resources and Capitalist Frontiers," *Economic and Political Weekly* 38 (2003): 5100–5106. Tsing describes frontiers as material and imaginative "projects in making geographical and temporal experiences" (Tsing, *Natural Resources,* 5100) that render resources legible as resources that are extractible. Similarly, geologies of erasure can render territory into territory to be settled or colonized, bringing into focus the effects of knowledge produced in the context of settler-colonial efforts to claim territory.

[115] I use the term "colonial" to describe the power relations in which groups and institutions at the center attempt to bring heterogeneous communities in the periphery under their control. It has been well established that this describes

First, I will contextualize the phenomenon of Dead Sea sinkholes in the contemporary history of resource extraction in the Jordan Rift Valley. Then I will bring together recent studies in environmental anthropology with important work on environmental history in the Middle East and North Africa (MENA) to elaborate the concept of geologies of erasure. To illustrate this idea, I will detail four ethnographic examples of the differing scalar approaches to Dead Sea sinkholes developed by different groups of people studying, living, and working with them: international water managers, Palestinian academic scientists, geologists working for the Geological Survey of Israel, and inhabitants of the Bedouin towns on Jordan's Lisan Peninsula, where sinkholes in Jordan are most concentrated.

II. The Dead Sea and Its Sinkholes

The Dead Sea was fed until the 1960s by the waters of the Jordan River, which have since been diverted upstream for agricultural use primarily in Israel and Jordan.[116] Only forty kilometers from Jerusalem and fifty kilometers from Amman, the Dead Sea's shores are measured at 426 meters below sea level and falling, the lowest dry land on earth. As the millions of international tourists who visit the sea's shores can attest, the desert that flanks the Dead Sea is spectacular and captivating. Ibexes with squat legs and long, arched horns nibble leaves off acacia trees

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the Israeli government's policies inside and outside the occupied Palestinian territories. See, for instance, David Lloyd, "Settler Colonialism and the State of Exception: The Example of Israel/Palestine," *Settler Colonial Studies* 2 (2012): 59–80; Mazen Masri, "Colonial Imprints: Settler-Colonialism as a Fundamental Feature of Israeli Constitutional Law," *International Journal of Law in Context* 1 (2017): 1–20; and Ilan Pappé, "Zionism as Colonialism: A Comparative View of Diluted Colonialism in Asia and Africa," *South Asia Quarterly* 107 (2008): 611–633. It also describes the Jordanian monarchy's orientation to Bedouin communities living with sinkholes along the Dead Sea. See, for example, Philip Carl Salzman, *Pastoralists: Equality, Hierarchy, and the State* (Boulder, CO: Westview Press, 2004); and Andrew Shryock, *Nationalism and the Genealogical Imagination: Oral History and Textual Authority in Jordan* (Berkeley: University of California Press, 1997). On the Bedouin of the Lisan Peninsula, see Muhamma al-Huwimal, Khalid al-ʿAshush, and ʿAwad al-Nawasra, *dirāsāt al-āghūār al-jnūbiyya: al-ārḍ ū-al-insān* (Amman: Fadha'at, 2013). On nomadic communities as colonial subjects, see Jérémie Gilbert, *Nomadic People and Human Rights* (New York: Routledge, 2014).

[116] Tina Niemi, Zvi Ben-Avraham, and Joel Gat, *The Dead Sea: The Lake and its Setting* (Oxford: Oxford University Press, 1997).

against the red-orange backdrop of stark, rocky cliffs.[117] As the sun rises and sets each day, the striking blues, whites, and rusty reds of the water and the rock seem to change in saturation and intensity. Glistening white salt crystals form on smooth gray stones at the water's edge where the small waves hit sections of undisturbed shoreline. In the shadow of limestone and dolomite cliffs, the sea's shores are a mixture of gravel, clay, and sand.[118] Underneath it all, pockets of salt karst betray the one-time existence of ancient salty lakes: the Sedom Lagoon of the late Miocene and Lake Lisan of the late Pleistocene.[119]

The Dead Sea itself feels unlike any other water most people have ever touched. It is soft, almost velvety, thick with minerals such as bromide, magnesium, and potassium.[120] At the beginning of the British Mandate in Palestine and Transjordan, surveyors speculated that the Dead Sea could supply the world's need for potash (a potassium-based fuel source and agricultural fertilizer) for the subsequent 9,000 years.[121] The human rights group al-Haq ranks the Dead Sea and its mineral-rich waters as one of a speculative future Palestinian state's most important and lucrative natural resources.[122] It is the Dead Sea's biblical importance, however, that made it an object of such fascination for European and American explorers, industrialists, and colonial officials since at least the mid-19th century.[123] As sinkholes swallow more and more traces of this history, the problems posed by the depletion of the Dead Sea's waters take on a

[117] Mazin Qumsiyeh, *Mammals of the Holy Land* (Lubbock: Texas Tech Press, 1996).
[118] Yoseph Yechieli, "Response of the Groundwater System to Changes in Dead Sea Level," In *New Frontiers in Dead Sea Paleoenvironmental Research*, edited by Yehouda Enzel, Amotz Agnon, and Mordechai Stein (Boulder, CO: The Geological Society of America, 2006), 113–126.
[119] Haim Gvitzman, "Groundwater hydrology and paleohydrology of the Dead Sea rift valley," In *New Frontiers in Dead Sea Paleoenvironmental Research*, edited by Yehouda Enzel, Amotz Agnon, and Mordechai Stein (Boulder, CO: the Geological Society of America, 2006), 95–112.
[120] Niemi, Ben-Avraham, and Gat, *The Dead Sea.*
[121] Jacob Norris, *Land of Progress: Palestine in the Age of Colonial Development, 1905–1948* (Oxford: Oxford University Press, 2013).
[122] Claudia Nicoletti and Anne-Marie Hearne, *Pillage of the Dead Sea: Israeli's Unlawful Exploitation of Natural Resources in the Occupied Palestinian Territory* (Ramallah: al-Haq, 2012).
[123] Norris, *Land of Progress*.

new urgency.

The Dead Sea's salty waters now recede by more than a meter per year as a result of agricultural diversions in the Jordan River and rapid industrial evaporation in the Dead Sea's southern section.[124] Sinkholes open unpredictably on the surface of the desiccated landscape as a result of a deteriorating hydrogeologic border called "the freshwater-saltwater interface," which I described in chapter 1. This underground boundary below saltwater shorelines marks the point where groundwaters and saltwaters meet. As the Dead Sea's salty waters are depleted, the border between waters of different salinity moves toward the receding shoreline. When groundwater saturates new underground spaces, it dissolves salt deposits left from the late Pleistocene, forming networks of buried caverns of unknowable size.[125] When the tops of these caverns collapse, sinkholes appear along the sea's edge.[126]

The rapid depletion of the Dead Sea's waters, and the sinkhole crisis that results, has its historical roots in two disputes for control over the Dead Sea basin's economic resources: first, in the Ottoman-style resource concession granted to Siberian industrialist and Zionist Moshe Novomeysky by the British Mandate governments in Palestine and Transjordan in 1920, now guaranteed by the State of Israel to a privately held company; and, second, in Israeli and Jordanian competition for the waters of the Jordan River.[127] This latter dispute has led to the diversion of 800 million cubic meters of water per year to the Israeli National Water Carrier

[124] Awad Al-Nawasra, "Geomorphological Effects on the Decline of the Water Surface Level of the Dead Sea [Arabic]," Doctoral thesis (Khatoum, Sudan: AlZaim AlAzhari University, Sudan: 2013); Niemi, Ben-Avraham, and Gat, *The Dead Sea.*
[125] Niemi, Ben-Avraham, and Gat, *The Dead Sea.*
[126] Al-Nawasra, *Geomorphological Effects*; Yoseph Yechieli, Daniel Wachs, Meir Abelson, Onn Crouvi, Vladimir Shtivelman, Eli Raz, and Gideon Baer, "Formation of sinkholes along the shore of the Dead Sea: Summary of the first stage of investigation," *GSI Current Research* 1 (2003): 1– 6.
[127] See Jacob Norris, "Toxic Waters: Ibrahim Hazboun and the Struggle for a Dead Sea concession 1913–1948," *Jerusalem Quarterly* 45 (2011): 25–42; and Norris, *Land of Progress*. See also Novomeysky's own account: Moshe Novomeysky, *Given to Salt: The Struggle for the Dead Sea Concession* (Max Parrish: London, 1958). The privately held company that has inherited the Dead Sea concession is Dead Sea Works Ltd, a division of Israel Chemicals.

below the Israeli-built Deganya Dam. Only 200 million cubic meters per year of the Jordan River's waters (much of which is sewage outflow from the Ramallah suburb of Beitunia) now flow into the Dead Sea.[128] Since historical catalysts of Dead Sea sinkholes are tied to resource claims, efforts to predict and understand them must also be viewed as inherently linked to efforts to extend colonial control.

The locations of Dead Sea sinkholes in border regions between the West Bank, Jordan, and Israel makes them difficult to quantify because militarized borders restrict researchers' and residents' movement.[129] In 2015, my interlocutors estimated that more than 5,000 sinkholes now dot the landscape of the lowest place on Earth, but this was an unconfirmed guess, and the exact number remains elusive.[130] As the soft earth along the Dead Sea's shores caves in, it takes concrete, asphalt, electrical wires, metal pipes, donkeys, cars, bulldozers, and occasionally people with it. Donkeys trapped in sinkholes have to be fed by hand until they can be hoisted to safety by Civil Defense. People who have fallen in have been lucky so far. Sinkholes are often so deep that cell phones have no service at the bottom, so people who end up at the bottom of sinkholes depend on friends and colleagues to notice they have gone missing and sound the alarm.[131] Since the 1980s, when they first appeared in the small Israeli town of Neve Zohar, Dead Sea sinkholes have disrupted global commodity chains, border control regimes, agriculture, tourism infrastructures, industrial manufacturing, military installations, and everyday life at the

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[128] Micha Klein, "Water Balance of the Upper Jordan River Basin," *Water International* 23 (1998): 244–248; Mark Zeitoun, *Power and Water in the Middle East: The Hidden Politics of the Palestinian-Israeli Water Conflict* (London: IB Tauris, 2008, 46).

[129] Rema Hammami, "Qalandiya: Jerusalem's Tora Bora and the Frontiers of Global Inequality," *Jerusalem Quarterly* 41 (2001): 29-51.

[130] In a recent YouTube video, Israeli geologist and sinkhole expert Eli Raz quotes this figure as 6,000. He notes that "there are sinkholes in other places in the world, but nowhere do they spread as fast as here." Great Big Story, "Sinkholes in the Salt Land," 16 August 2017, https://www.youtube.com/watch?time_continue=84&v=iSRplWVSnro.

[131] For several of these accounts, see Eyal Levy, "The Dead Sea: From World Wonder to Sinkhole Nightmare," *Jerusalem Post*, 5 September 2015, http://www.jpost.com/Magazine/A-Sinking-feeling-411312. (Accessed 10 July 2017).

Dead Sea.[132] Dealing with the problem has become a paramount concern for farmers whose fields are sinking, leaders of Dead Sea industries, managers of Dead Sea tourist beaches, government functionaries whose tax revenues are derived from these tourist beaches, and scientists invested in the longevity of this unusual place and its unique environment.

Recent work focused on human–environment relations in the Middle East has engaged these relations from a historical lens. Environmental historians of MENA have provided critical insights into hidden continuities in imperial, colonial, and postcolonial politics and narratives of landscape in the region.[133] A focus on environmental history in the region has also contributed to a body of work on "environmental orientalism" that had until recently been based on studies in Asia.[134] This scholarship has demonstrated the persistence of environmental orientalism, at times in unexpected domains far outside of the colonial period. Contemporary understandings of environmental crises in the region are distorted by colonial visions of the landscape, just as "colonial understandings of environmental history of the MENA region were distorted by orientalist assumptions" in the nineteenth and early twentieth centuries.[135] Social research on energy economies, petrostates, and oil and natural gas extraction in the region[136] has shown that scale is one of the key features that distinguishes colonial-era "environmental imaginaries" from

[132] Damien Closson and Najib Abou Karaki, "Dikes Stability Monitoring Versus Sinkholes and Subsidence, Dead Sea Region, Jordan," In *Land Applications of Radar Remote Sensing*, edited by Francesco Holecz, Paolo Pasquali, Nada Milisavljevic, and Damien Closson (Rijeka, Croatia: IN TECH Books, 2014).
[133] Two recent collections have showcased this work. See Alan Mikhail, ed. *Water on Sand: Environmental Histories of the Middle East and North Africa* (Oxford: Oxford University Press, 2013); Diana Davis and Edmund Burke III, eds (Athens, Ohio: Ohio University Press, 2011). A key example of this work in the Jordan Valley comes from Samer Alatout, "Hydro-Imaginaries and the Construction of the Political Geography of the Jordan River: The Johnston Mission, 1953–56" In *Environmental Imaginaries of the Middle East and North Africa*, edited by Diana Davis and Edmund Burke.
[134] Davis, "Introduction."
[135] Edmund Burke III, "Preface" in Davis and Burke, eds. *Environmental Imaginaries of the Middle East and North Africa*, ix.
[136] See Toby Jones, *Desert Kingdom: How Oil and Water Forged Modern Saudi Arabia* (Cambridge, MA: Harvard University Press); Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (New York: Verso, 2013); Robert Vitalis, *America's Kingdom: Mythmaking on the Saudi Oil Frontier* (Stanford, CA: Stanford University Press, 2006).

their predecessors.[137] Diana Davis's work makes clear that imperial projects and colonial regimes bolstered their moral arguments for control over territory under the guise of ecological or environmental stewardship by construing indigenous inhabitants of the region as unworthy custodians of its natural resources and environmental health.[138] As will become evident, the continuities among imperial, colonial, and nationalist-era environmental imaginaries persist today, and their colonial effects endure as well.

With the notion of geologies of erasure, I point to the contested politics of knowledge-making practices through which human–environment relations are understood as they relate to geologic phenomena. Like environmental orientalism, geologies of erasure draw our attention to the way knowledge making in the natural sciences is inseparable from its sociopolitical context and focus attention on the practical and political *outcomes* of such knowledge-making practices.[139] In the case of Dead Sea sinkholes, these outcomes include (among other things): the nullification of Palestinian claims to the Dead Sea, the elimination of Palestinian people from Dead Sea landscapes, the exclusion of Palestinian scientists from international scientific networks, and the absence of Bedouin objections to Jordanian government policies in official discourse.

This discussion of knowledge making and political stakes orients toward the nonbiological world, into the realm of salt, karst, water, sediment, clay, and gypsum. Contested environmental knowledge-making practices around the Dead Sea require us to take seriously the

[137] Davis, "Introduction."
[138] Ibid.
[139] On environmental orientalism, see Davis and Burke, *Environmental Imaginaries.* Toby Jones's account of how "American scientists served Saudi political power in the building of an authoritarian political system, one that used science and knowledge and technology and the environment as means to shore up centralized Saudi dominance" helps evidence the geological nature of this entanglement (Jones, *Desert Kingdom,* 5). Conceptually, geologies of erasure highlight not only that geological knowledge production and political goals are inexorably linked, but also the specific instances of disenfranchisement, erasure, and negation, that result from this linkage.

geology that has structured the region's histories of settlement, resource extraction, and military occupation.[140] The material properties of this place, though they are nonliving, will surely play a significant role in determining the future of its inhabitants.[141]

The encounters I detail took place at universities, in the offices of state bureaucrats, as well as at the Dead Sea itself. They occurred in the oPt, Israel, and Jordan. The scale of knowledge making about Dead Sea sinkholes is either regional and "at the level of the watershed" (as in the case of international and Israeli consultants, water managers, and scientists), quasi-national (as in the case of Jordanian and Palestinian geologists and hydrologists), or hyperlocal (as in the case of Bedouin communities in Jordan). Through attention to the colonial approaches to territory that have leached into the way people study Dead Sea sinkholes, I show the epistemic effects of a militarized landscape: geologies of erasure.

III. Watersheds and Nation-States

In a heavily air-conditioned room in the suburbs of Tel Aviv, I spent two days drinking instant coffee and scribbling notes at a "transboundary" water conference about the Jordan River Watershed. Israeli, American, and Western European scholars and development consultants had come together under the florescent lights to seek solutions for a variety of environmental crises

[140] Elizabeth Povinelli, *Geontologies: A Requium to Late Liberalism* (Durham, NC: Duke University Press, 2016). Elizabeth Povinelli's recent work defines geontopower as the mechanism that perpetuates a distinction between life (*bios*) and nonlife (*geos*), which indigenous communities can experience as a "strategy of governance." Dead Sea sinkholes present an extreme case of these dynamics, in which scientists wield geontopower for political ends.

[141] A growing trend in posthumanist anthropology considers the agency of nonliving things. See Julie Cruikshank, *Do Glaciers Listen? Local Knowledge, Colonial Encounters, and Social Imagination* (Seattle: University of Washington Press, 2005); Paul J. Crutzen, "Geology of Mankind" *Nature* vol 415 (2002,): 23; S. Eben Kirksey and Stefan Helmreich, "The Emergence of Multispecies Ethnography," *Cultural Anthropology* vol 25 no 4 (2010): 545–575. Some of this work has been criticized for failing to address the political stakes of environmental crisis. I aim to focus explicitly on the pragmatic and political effects of power structures as they manifest in the production of knowledge about the nonliving natural environment. For an excellent example of thinking in this vein, see Kristina Lyons, "Decomposition as Life Politics: Soils, *Selva,* and Small Farmers under the Gun of the U.S.–Columbia War on Drugs," *Cultural Anthropology* vol 31 no 1 (2016): 56–81.

plaguing the Jordan River and the Dead Sea, sinkholes chief among them. A Jordanian government official delivered the keynote address. He was the only Jordanian who attended, but he headed immediately for the door when he finished his presentation, leaving the Israelis, Europeans, and Americans to speak amongst themselves. In the hours that followed, workshop participants argued about the trustworthiness of Palestinian water consumers (none of whom were present), the merits of international river commissions, and game-theory water conservation strategies. One common perspective prevailed among these academics, consultants, and policy practitioners. As an American hydrologist put it, "We water people think at the level of the *watershed*, not the nation."

The irony of making such a statement in an academic milieu characterized by identity politics and anticolonial boycotts was perhaps lost on this well-dressed scientist in the middle of his business trip half a world away from home. In this region, with its colonial histories and presents, contested and militarized borders create barriers to the production of scientific knowledge about hydrologic and geologic phenomena.[142] In the context of ongoing struggles for self-determination and national recognition, the Dead Sea sinkhole problem—and differing epistemological approaches to it—highlights how the long-term militarization of landscapes in the oPt, Israel, and Jordan makes its way into halls of state power, offices and labs of geologists and hydrologists, and conference rooms full of international development consultants far from the sea's shores.

Complex bureaucratic and military regimes govern land use and mobility in the Dead Sea basin. Exploring the full range of these regimes is beyond the capacity of this chapter, but a short

[142] Ann Stoler, Carol McGranaham, Peter Perdue, eds., *Imperial Formations* (Santa Fe, NM: School of Advanced Research Press, 2007). See also Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference* (Princeton, NJ: Princeton University Press, 2000).

discussion is nonetheless crucial to understanding geologies of erasure produced by sinkhole science. Ottoman-era legal structures govern Palestinian land use and land ownership in the oPt, but do not apply to Israelis living in the oPt.[143] The unevenly and haltingly implemented Oslo Accords of the 1990s divided the oPt into three jurisdictional zones. In Area A, the smallest, the Palestinian Authority (PA) has full military and civil control, if only nominally. In Area B, the PA has civil but not military control. In Area C, by far the largest, the Israeli Civil Administration—based in a settlement that abuts Ramallah—maintains civil control and the Israel Defense Forces maintains military control. The occupied sections of the Jordan Valley and Dead Sea basin fall entirely into Area C.[144] The system of military checkpoints throughout the West Bank does not map onto either the boundaries created by the Oslo Accords nor the 1949 Armistice lines. These checkpoints can move or change status without notice.[145] A dizzyingly complex and occasionally overlapping bureaucratic system of identity documentation further complicates restrictions on mobility. A Palestinian resident of the West Bank might have a PA identity card, a Jordanian *laissez-passer*, which allows them to live in Jerusalem but does not confer citizenship to any nation, an Israeli passport identifying their nationality as "Arab" and their citizenship as "Israeli," or permanent residency documents for other countries for which they have qualified.[146] Mobility is also restricted through more violent means. The IDF has planted land mines in the Golan Heights and throughout the Jordan Rift Valley as recently as 2011.[147] The "Separation Barrier" made of concrete and barbed wire as high as eight meters in

[143] Natalie Orpett, "The Archaeology of Land Law: Excavating Law in the West Bank," *International Journal of Legal Information* 40 (2012).
[144] Tobias Kelly, *Law, Violence, and Sovereignty among West Bank Palestinians* (Cambridge: Cambridge University Press, 2006).
[145] Hammami, *Qalandiya.*
[146] Helga Tawil-Souri, "Colored Identity: The Politics and Materiality of ID Cards in Palestine/Israel," *Social Text* 107 (2011): 67–97.
[147] Judith Sudilovsky, "A Fatal Legacy: Clearing Land Mines Scattered Along Israel's Borders," *Jerusalem Post* 5 October 2016. Accessed 20 February 2017. http://www.jpost.com/Jerusalem-Report/A-fatal-legacy-469057.

places cuts through municipalities large and small, including the city of Jerusalem.

Each piece of this interlocking system of restriction and exclusion has far-flung effects across time and domains, including in the coproduction of sinkholes as objects of geologic knowledge. The border between the West Bank and Jordan, in Area C, remains a closed military zone throughout the Jordan Valley except for a small tourist site opened in 2011 and run by the Israeli National Parks Authority on the Jordan River at a possible baptismal site of Jesus (this is one of eleven Israeli National Parks in the oPt, and to my knowledge it is the only one at which IDF soldiers are actively stationed during open hours). Nowhere does the PA control its own borders, and very little of Areas A or B is contiguous. The Palestinian Authority's Palestinian Mine Action Committee (PMAC) cannot clear Jordan Valley minefields, which fall within Area C, without going through the Israeli Civil Administration.[148] This is a fragmented landscape, both above and below the ground.

Imagining an existent sovereign State of Palestine in the oPt requires an intellectual leap, even for proponents of such notions as "fragmented" sovereignty.[149] By contrast, Israeli monopoly on the use of military force throughout Israel and the oPt is nearly impossible to refute. A 2013 World Bank report found that West Bank Palestinians without permission to enter Israel in the form of a visa are excluded from entering more than 99 percent of Area C, which includes nearly all of the West Bank's natural resources.[150] In Area C, the Israeli government actively pursues policies encouraging Israeli Jews to move into newly constructed settlements,

[148] See http://www.mineaction.org/programmes/state-palestine. For more on the infrastructural and environmental effects of landmines, see Eleana Kim, "Toward an Anthropology of Landmines: Rough Infrastructure and Militarized Waste in the Korean Demilitarized Zone," *Cultural Anthropology* vol 31 no 2 (2013): 162–187.
[149] Partha Chatterjee, *The Nation and Its Fragments: Colonial and Postcolonial Histories* (Princeton, NJ: Princeton University Press, 1993); In the context of Palestine, see also Rochelle Davis, *Palestinian Village Histories: Geographies of the Displaced* (Stanford, CA: Stanford University Press, 2010).
[150] Orhan Niksic, Nur Nasser Eddin, and Massimilano Cali, *A World Bank Study: Area C and the Future of the Palestinian Economy* (Washington, DC: World Bank Publications, 2014).

deemed illegal under international law, through development permits and the construction of infrastructures, including highways, electrical wires, and pipes connecting them to systems within Israel. In settler colonialism, settling territory seen as "empty" is the key mode of gaining sovereign control, rather than extracting resources or occupying by force as in other colonial schemas.[151] These on-the-ground realities of settler-colonial occupation are erased in the hydrogeologic paradigm of "thinking like a watershed."

Military regimes that reinforce sovereign control are now being interrupted by environmental crisis. As Dead Sea sinkholes destroy the built infrastructures of settler colonialism in Area C and other areas, they subvert these colonial imaginaries and mechanisms of military control. As groups and institutions based in centers of political power such as Jerusalem and Amman try to bring Dead Sea communities under their control, sinkholes upend this process as they destroy infrastructures like electrical grids and roads. The ways scientists, tourists, and farmers understand, study, and seek to control this crisis on the Dead Sea's shores have great bearing on political and social relations on both sides of the sea because they help define (or contest) the sea's shores as territory that can be settled or colonized in particular ways.

IV. Subterranean Science Under Occupation

The office of Dr. Raed Ibrahim, a Palestinian geologist, has an item arranged on nearly every flat surface.[152] The top of a file cabinet bears a collection of empty bottles of Jericho Water, each a little off kilter with its clear blue plastic sides dented in a unique way. Dr. Raed uses these to collect field samples since funds for research supplies are very limited. A side table holds a pile

[151] Patrick Wolfe, "Settler Colonialism at the Elimination of the Native," *Journal of Genocide Research* 8 (2004): 387–409.

[152] I have given Dr. Raed and all other interlocutors pseudonyms. I use his honorific and his given name in this chapter in keeping with the Arabic-language custom of referring to people with doctorates as "Dr. [First name.]"

of small stones whose smooth, matte surfaces and colorful layers suggest they were formed in the Dead Sea basin. The professor's desk is the resting place of special treasures from his geological field surveys, including quartz crystals and a large feather of a rare bird. Down the hall in a GIS lab, a graduate student can usually be found struggling with an uncooperative printer. These are scenes familiar to anyone working in a university setting, whether in California or under occupation in the West Bank, where Dr. Raed carries out his teaching and research. His work has taken him all over the West Bank, including to the edge of the Dead Sea. He has not yet published on sinkholes, but has wanted to do so for years.

Dr. Raed says he first became interested in Dead Sea sinkholes during his master's and doctorate training at a small university in Jordan. He maintains close professional contacts with many of his Jordanian former colleagues who remain there, but his research agenda is now confined to the West Bank. He has conducted hydrologic research on multiple catchments around the West Bank and published the results of a few sociological surveys involving local Palestinian populations, with an eye toward identifying points of possible intervention for future environmental conservation efforts. None of these were at "the level of the watershed," however. We have discussed collaborating on a quantitative and qualitative study of Dead Sea sinkholes for some time, but we are always confronted with a point of difference. When I envisioned a comprehensive Dead Sea sinkhole study, I imagined one that either addresses the problem on both the eastern and western shores of the sea (in which case, field surveys would be impossible for Dr. Raed, who does not have permission to cross Israeli checkpoints or enter Jordan), or one that takes a hyperlocal approach to a single cluster of Dead Sea sinkholes (perhaps a set in the West Bank north of the Israeli checkpoint near the settlement of Mitzpe Shalem). Dr. Raed, on the other hand, intends to design a project that includes some Dead Sea sinkholes as well as areas

of subsidence in urban environments in Areas A and B, such as among the auto repair shops of Beitunia. Dr. Raed's position puzzled me slightly, as I had understood Dead Sea sinkholes to be different from other sinkholes in the region because of the way they formed. At first, I attributed the difference to a geological convention I did not fully grasp, but subsequent conversations with Dr. Raed and other sinkhole scientists suggested a different explanation.

All sinkholes collapse because of the dissolution or evacuation of some underground geologic layer—anytime cavities form underground, whether through weather-triggered erosion of naturally occurring limestone karst, the overwithdrawal of groundwater, or limestone quarry activity, a sinkhole is likely to eventually result on the surface.[153] Sinkholes are often differentiated in localized studies. The categories include: dissolution sinkholes, cover-collapse sinkholes, and cover-subsidence sinkholes.[154] Dead Sea sinkholes are generally dissolution or cover-collapse sinkholes, and they are all formed as a result of the depletion of waters in the Dead Sea.[155] All Dead Sea sinkholes thus have a shared geological history—and a shared catalyst. Areas of subsidence in urban zones of the oPt occur as a result of a variety of other factors, from poor drainage at industrial sites to badly constructed roads. They include dissolution, cover-collapse, and cover-subsidence sinkholes.

I thought at first that these distinctions would be of paramount importance to Dr. Raed, but my own conceptualization of the sinkhole problem failed to account for the political boundaries of the militarized landscape with its settler-colonial divisions. In Dr. Raed's words

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[153] Richard Benson and Lynn Yuhr, *Site Characterization in Karst and Pseudokarst Terraines: Practical Strategies and Technology for Practicing Engineers, Hydrologists and Geologists* (Dordrecht, Netherlands: Imprint Springer, 2016).

[154] See for instance Gutierrez, Galve, Guerro, Lucha, Cendrero, Remondo, Bonachea, Gutierrez, and Sanchez, "The origin, typology, spatial distribution and detrimental effects of the sinkholes developed in the alluvial evaporite karst of the Ebro River valley downstream of Zaragoza city (NE Spain)" *Earth Surface Processes and Landforms* 32 (2007): 912–928.

[155] Al-Nawasra, *Geomorphological Effects*.

over coffee in Ramallah one night, “Of course I can’t gather data about most Dead Sea sinkholes, even on the Palestinian side. If I am too near the checkpoint and they see me with my instruments . . . what if they shoot me?” It became necessary for him to see scientific similarities among things that could be studied in spite of the restrictions of the military occupation. He conceived of a study that included a few Dead Sea sinkholes (a small cluster least likely to arouse military suspicion) as well as areas of urban subsidence throughout the West Bank.

For Dr. Raed, Dead Sea sinkholes are not comparable or commensurate to each other. Rather, they are comparable to other incidences of subsidence that he can access. These geologies, while seemingly scientifically similar, are made incomparable by the military and political realities that underpin the life and work of this scientist as he tries to access them. Dr. Raed’s epistemological approach to a sinkholes project reveals the impossibility of comparing geologic phenomena as a result of the sociopolitical context in which they occur. It also reveals aspirations for statehood—this would be a study of *Palestinian* sinkholes. Sinkholes as objects of geological study and aspirations for Palestinian self-determination are thus coproduced. In this sociopolitical context, a legacy of colonial occupations (British, Jordanian, and now Israeli) determines what can be known about sinkholes, and by whom. Dr. Raed, with his academic position at a Palestinian university in the West Bank, his Palestinian Authority identity card, which prevents him from crossing Israeli checkpoints set up inside the oPt as well as over the 1949 Armistice line that divides the oPt from Israel, and his exclusion from Hebrew-language Israeli academic exchanges, responds to the question of geological scale of Dead Sea sinkholes through his particular position vis-à-vis the militarized landscape.

Knowledge about territory, whether natural scientific or social scientific, is instrumental in controlling it.[156] Restrictions on mobility are only one of the ways the Israeli occupation of the oPt limits how much Palestinian scientists can know about Dead Sea sinkholes. Because the IDF intermittently cut off access to the Dead Sea from Palestinian population centers in the West Bank during the first and second intifadas, most Palestinian scientists I interviewed became interested in Dead Sea sinkholes through research conducted outside of the oPt, whether in Jordan or Israel. Few Palestinian friends outside of Jericho had heard of the problem unless they worked in service or manufacturing jobs in Israeli settler-owned Dead Sea industries. This fact is perhaps unsurprising given that few of them spent much time at the Dead Sea and almost none of them visited areas outside of settlement-owned tourist beaches such as Qaliya at the very northern tip of the sea. One of the effects of the prolonged militarization of this landscape has been a social estrangement from Dead Sea environments for many Palestinians. During my participant observation in Israeli settlement-run gift shops and private tourist beaches in the oPt, Palestinian employees in these settlement-dominated Dead Sea industries talked frequently about how younger generations have lost the opportunity to enjoy excursions to the Dead Sea and, as a result, are less interested in it. Because Palestinians' access to the West Bank section of the Dead

[156] Among Nadia Abu el-Haj's "multiple and diverse forms" of colonial knowledge is knowledge about the natural world gathered in the service of colonial governance and expansion. Colonial orientations to settlement in "empty" places like the Dead Sea produce a particular social, racial, and environmental politics that affect scientific knowledge production, economic approaches to natural resources, and ideas about political legitimacy and responsibility. See Nadia Abu el-Haj, *Facts on the Ground: Archeological Practice and Territorial Self-Fashioning in Israeli Society* (Chicago: University of Chicago Press, 2001). Tomaz Mastnak, Julia Elyachar, and Tom Boellstorff demonstrate the historical longevity of the idea that knowledge of the natural world is key to colonial expansion, identifying it in the writings of Francis Bacon. Bacon believed mankind lost its knowledge of nature and dominion over animals at the same time with the Fall. Tomaz Mastnak, Julia Elyachar, and Tom Boellstorff, "Botanical Decolonization: Rethinking Native Plants," *Environment and Planning D: Society and Space* 32 no 2 (2014): 363–380. See also Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (Berkeley: University of California Press, 2002). More generally, social studies of the environment tend to take knowledge about the material world as paramount to the question of how communities interact with their environments. See, for example, Sara Pritchard, *Confluence: The Nature of Technology and the Remaking of the Rhône* (Cambridge, MA: Harvard University Press, 2011); Kim Fortun, *Advocacy After Bopal: Environmentalism, Disaster, and New Global Order* (Chicago: University of Chicago Press, 2001).

Sea is controlled either by settlements (which are illegal under international law) or by the Israeli National Parks Authority, some young Palestinians refuse to go because of their political convictions—"I boycott the Dead Sea" was a common refrain. The militarization of this landscape in service of the extension of settler colonies has produced this disconnection.

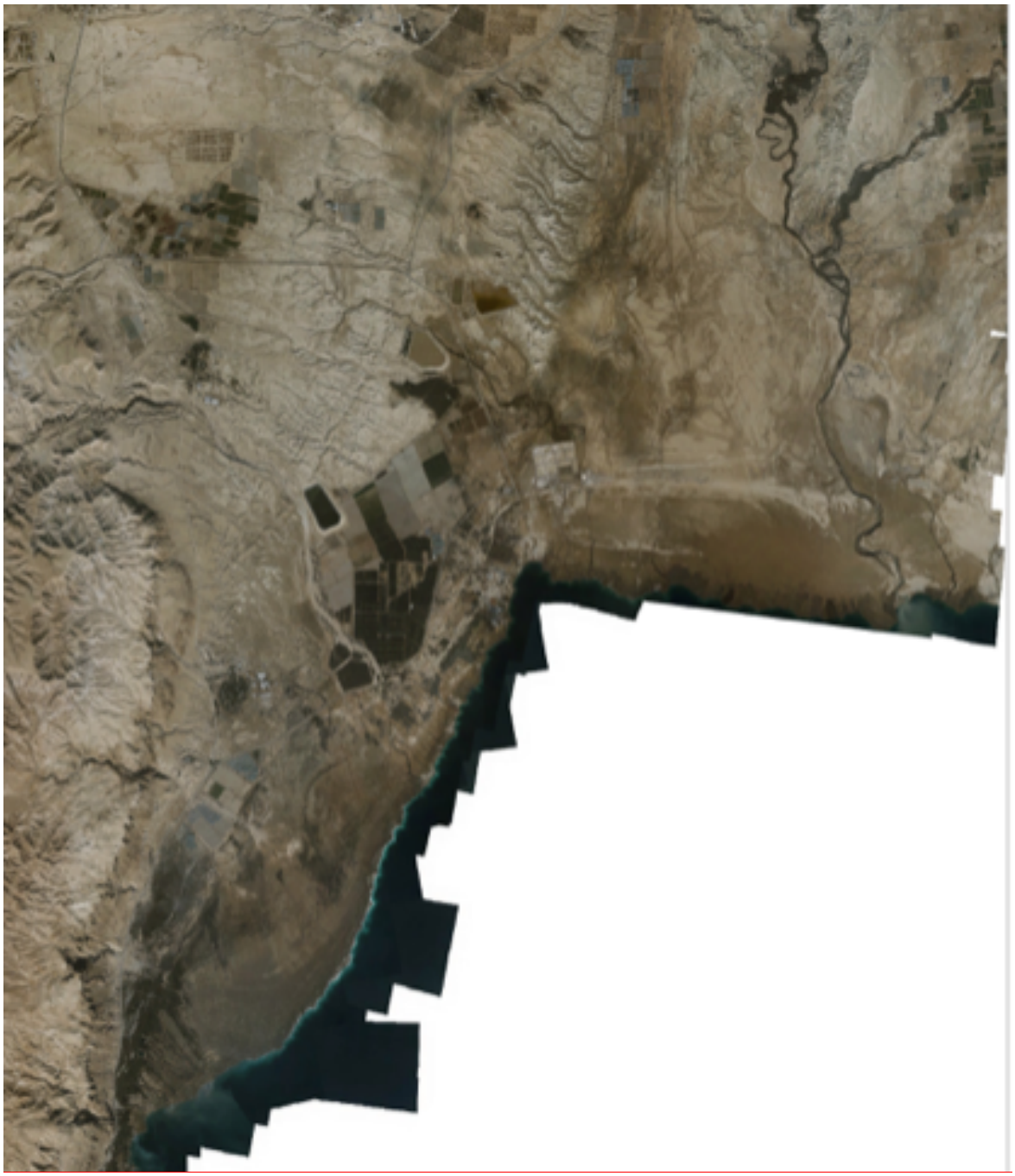

Figure 22. Aerial photos of the northern tip of the Dead Sea received by PA GIS.

The sinkhole problem at the Dead Sea is further obscured for many Palestinian academics and PA planners because of how difficult it is for them to get up-to-date, accurate maps of the oPt. During my first trip to a Palestinian Authority GIS lab in a small, nondescript stone building in Ramallah, not unlike the one I was living in at the time, I learned that Palestinian Authority ministries rely on free remote sensing data for their maps of everything from rainfall to local land-use permitting. Data from free services such as Google Earth are supplemented by a set of aerial photographs that the PA Ministry of Local Affairs buys from an Israeli company every year.

This set of photographs taken from planes gives good local detail and encompasses the entire West Bank, far beyond the reaches of the Palestinian Authority itself, whose limited jurisdiction is confined to Areas A and B. The images have one major drawback, however, which one Palestinian Authority GIS specialist referred to as "distortions." This annual set of aerial photographs is full of modifications by the Israeli government: places on the images where military installations or the early construction footprint of new settlements have been digitally altered to look like agricultural land. Using Google Maps, Google Earth, and their own local knowledge of the oPt, PA employees cross-reference the images.[157] Each year, they find about fifteen "distortions" in the West Bank images. GIS professionals at the PA can only correct these

[157] Google Maps and Google Earth are notoriously unreliable and inaccurate, especially outside of North America and Western Europe, and especially in the oPt, and Google acknowledges as much. In section 14.2 of the Google Maps APIs Terms of Service, Google specifically states that it, "its subsidiaries and affiliates, and its licensors and their suppliers, do not represent or warrant to you that […] the service will be accurate or reliable" ("Google Maps APIs Terms of Service" 1/23/2017, https://developers.google.com/maps/terms. Accessed 11/10/2017). In section 2.6.16 of the Legal Notices for Google Maps/Google Earth and Google Maps/Google Earth APIs, the Israel-specific Notice regarding the company "Mapa – Mapping and Publishing Ltd" which provides data for Israel and the oPt reads "Mapa is not responsible to you for the mapping data and does not make or give to you any representations or warranties, express and implied, in connection with the mapping data, including, but not limited to, the accuracy, completeness, reliability or usability of the mapping data." ("Legal Notices for Google Maps/Google Earth and Google Maps/Google Earth APIs," 12/17/2015, https://www.google.com/help/legalnotices_maps.html. Accessed 11/10/2017).

maps where they have either in-person access to the sites or free GIS data from another source. With the entire Jordan Valley and Palestinian section of the Dead Sea shoreline classified as Area C under the Oslo Accords, these abilities are so constrained as to be completely nullified. Beitunia sinkholes are made similar to some Dead Sea sinkholes in the eyes of Palestinian geologists such as Dr. Raed because of what can be seen in person and through remote sensing, and what is erased. In the search for geological and topographical data about the oPt, Palestinian scientists must contend with a very serious erasure, one that might threaten the legitimacy of studies they conduct: the erasure of the occupation itself from the landscapes and environments they inhabit.

V. Israeli Sinkhole Research Without Lines on a Map

One dusty day in mid-summer 2015, fifty kilometers away from the Dead Sea in Jerusalem, I was trying to learn to read InSAR satellite images of sinkholes gathered by an Italian Earth observation system called COSMO-SkyMed.[158] In January 2015, a sinkhole opened without warning at a popular Israeli settlement-run tourist beach in the oPt called Mineral Beach. When staff found that a large section of parking lot had collapsed when they arrived to open the beach to visitors, they reported it to the Geological Survey of Israel (GSI). The Israeli government issued an order for the immediate closure of the beach, though they agreed to keep the closure "temporary" until further studies could determine the extent of the problem at Mineral Beach. By the time I found myself staring at InSAR images of the Dead Sea, the initial Mineral Beach

[158] InSAR, or interferometric synthetic aperture radar, compares two radar images of the earth's surface taken at time intervals from days to years. It began to be used widely in the 1990s and is now employed to monitor and study deformations as small as a centimeter due to magma flows, earthquakes, moving ice sheets, and much more. See Matthew Pritchard, "InSAR, a tool for measuring Earth's surface deformation," *Physics Today* 59 no 7 (2006): 68–69.

sinkholes had been filled with gravel and the parking lot repaved, but the whole assemblage had collapsed again and more deeply several times, most recently just a few days before. The most recent sinkholes tore up buildings, asphalt, palm trees, and paving stones, and destroyed the beach's connection to the electric grid.

GSI buys InSAR images from the Italian Space Agency, operators of COSMO-SkyMed, to try to predict sinkholes before they happen. GSI pays about twenty-five dollars per image, according to geologists who work there. This price is artificially low by several orders of magnitude as a result of an intergovernmental agreement whose details were never made available to me. By comparing InSAR images taken sixteen days apart, Israeli geologists have found that it is possible to predict the location of a future Dead Sea sinkhole. Areas of very slight but rapid subsidence (as little as three millimeters) in the time between the two image sets indicate an underground cavern preparing to cave in. Only COSMO-SkyMed InSAR maps will work for this undertaking because of the frequency with which the satellites can be tasked and because of the particular kinds of data they collect. Field surveys are then needed to confirm the appearance of the sinkhole in the predicted place.

In the oPt and Israel, field surveys to confirm InSAR-predicted Dead Sea sinkholes are carried out almost entirely by one Israeli scientist who lives in a small kibbutz on the Dead Sea called Ein Gedi, on the Israeli side of the 1949 Armistice line. Once, the Ein Gedi scientist told me that he received a call from a GSI geologist in Jerusalem about a new possible sinkhole. He found one in the process of caving in as he arrived to check on the location less than a half hour after they spoke on the phone. To do field surveys on land owned by private companies on the western shores of the Dead Sea, the Ein Gedi scientist is supposed to ask permission.[159] In the

[159] In closed military areas, he must go through the Coordinator of Government Activities in the Territories (COGAT), an IDF unit.

case of areas owned by Dead Sea Works, including the evaporation ponds that make up the entire southern section of the Dead Sea, this requires official meetings with managers and vice presidents, after which permission is rarely accorded. In the case of smaller companies such as AHAVA Dead Sea Laboratories, whose factory is just a few kilometers west of Mineral Beach, the Ein Gedi scientist calls on his personal network of friends and neighbors for informal agreement (Kibbutz Ein Gedi used to maintain a small stake in AHAVA, and AHAVA runs a skin research lab there). To check the areas at Mineral Beach, a quick text message, e-mail, or phone call is all that is required, even though Mineral Beach is on the Palestinian side of the 1949 Armistice line and Ein Gedi is on the Israeli side of the border. There are no political or military issues of access to Dead Sea sinkholes for this Israeli geologist. Though field surveys are not officially carried out by Israeli scientists in Jordan, GSI buys and analyzes InSAR images of the Jordanian Dead Sea shores as well as the Palestinian and Israeli coast. When they identify a possible sinkhole site in Jordan, they note it, but do not send the information to anyone in Jordan for confirmation or use. These unconfirmed (and potentially untallied) InSAR-predicted sinkholes in Jordan are another example of geologies of erasure.

Back in Jerusalem, I found the neon pixels of the InSAR images difficult to parse. I needed the intervention of an expert to understand what I was looking at. Dr. David Strauss, an Israeli GSI geologist (who told me immediately to call him by his first name without the honorific as I will do here), agreed to teach me to understand what I was seeing.[160] As David and I poured over the InSAR images, his phone rang. A brief conversation in Hebrew followed. David chuckled, "Mitzpe Shalem? Mineral Beach? How do you call this . . . Israel, Occupied

[160] I have dropped the honorific "Dr." in reference to David both because he asked me to do so, and because doing so is reflective of the relative informality of many Israelis in the academy. In Arabic-speaking contexts, the honorific is preserved.

Territories, Palestine, that's a problem for *you*. I mean, is it the Geological Survey of Palestine?" He hung up abruptly, turned back to me, and told me unprompted that the call had been from a reporter who was trying to fact-check a forthcoming news article about the new sinkhole that had closed Mineral Beach for good. The reporter needed to know how to describe the location of the sinkhole. David's response in his capacity as scientific expert highlighted the fact that sinkholes in the West Bank fall under GSI's purview, irrespective of the Oslo Accords or UNESCO recognition of Palestinian statehood. In this geologist's mind, these sinkholes are an Israeli problem. David continued to me in English, "[the media] may describe it some awkward way that we may not like, I don't know. It happens when you send papers for publication and you work in the Occupied Territories and you don't write on the map 'Occupied Territories,' you don't put a border even. But sometimes the reviewers are more strict and they have their own political views. If they see it's in the Occupied Territories, they may want to make us write 'occupied territories,' or 'Syria' if we work in the Golan Heights. Sometimes, not always, but it has happened … .they may want to make us write 'Jordan' or 'Palestine.'" When asked what he does when he receives feedback like this, and whether he makes the requested changes to the map, he replied, "usually no, usually we send it to another journal."

In the manner in which they order and use COSMO-SkyMed InSAR to attempt to predict Dead Sea sinkholes, scientists at GSI work toward a future in which sinkholes might be controlled, at least in the West Bank and Israel. These efforts seek to extend the vision of the Israeli state underground throughout Israel, the oPt, and Jordan, but they have not quite succeeded. Dead Sea sinkholes like the one at Mineral Beach still surprise GSI because InSAR images are disrupted by movement, whether that of palm fronds, cars, or people. At Mineral Beach, the sinkhole opened in a parking lot, under a cluster of palms. David showed me the area

on an InSAR image—instead of the stark bands of bright blue, green, red, and orange, sections of the image feature pixels that alternate rapidly between these colors, an effect that looks like visual static. For the InSAR images to be most useful to GSI, this territory must be "empty," both rhetorically and logistically. Viewing this scientific process through the lens of geologies of erasure reveals that settler-colonial imaginaries produce the epistemic erasure of political claims (and people) from territory constructed as "empty" through processes of scientific knowledge production. As occupation enters the lab, the land around the Dead Sea becomes territory enrolled in the Israeli settler-colonial project. The geologies of erasure that emerge from the use of InSAR to predict sinkholes reinforce the notion of the territory around the Dead Sea as *terra nullius*, even as sinkholes swallow and destabilize that land.

VI. Environmental Cosmologies in Jordan

Across the Dead Sea, Jordanian farmers in a cluster of villages on the Lisan Peninsula retain a cosmological explanation for how the sinkholes have appeared throughout their famous tomato fields and under a small complex of houses and a tile factory, in spite of the fact that scientists and Jordanian government officials in Amman have given them language to describe the process of sinkholes formation underground. In their up-close encounters with Dead Sea sinkholes, these Bedouin communities move seamlessly between competing ideas about how the sinkholes were formed, and in doing so assert their position in opposition to the Jordanian state. The government of Jordan considers itself to be engaged in a multitude of security challenges at present, from the nearly seventy-year-old Palestinian refugee problem to the grave and worsening Syrian refugee crisis, to the rise of Daesh (the so-called Islamic State), which claimed Jordan among its enemies. Even before the recent catastrophic violence in Syria and Iraq, the Jordanian armed

forces employed 6.5 percent of the total labor force in Jordan, the third highest percentage in the world (after North Korea and Eritrea).[161] Soldiers and military bases are everywhere, including in the parts of the Dead Sea basin worst afflicted by sinkholes. Jordanian scientists who study sinkholes routinely secure military escorts in order to carry out their work. They report a relatively easy time getting access, except in landmine areas. Bedouin residents of the towns in the Lisan, on the other hand, have had a more contentious relationship with the Jordanian government ever since the latter began trying to incentivize Bedouin sedentarization with land rights immediately after Jordanian independence in 1946.[162]

When I asked residents of the Jordanian towns along the Lisan Peninsula known collectively as *al-āghūār al-jnūbiyya* to tell me about how, where, and when the sinkholes began appearing in their villages, they would start with stories of surprise. When large holes began appearing in their fields in the mid-1980s, residents thought the holes resembled craters and dubbed them *ḥufur al-njūm* (star holes). When they began appearing in tomato fields, the farmers' working theory was that some celestial body had fallen to Earth, sent by God for unknown reasons. The physical appearance and temporality of sinkholes made this seem likely. Sinkholes seem to open spontaneously and so the catalyst and mechanism is not often obvious to those who find them: one day, the tomato field looks normal, and the next day a large hole has appeared. People who have been close to sinkholes when they appear report hearing alarming crashing sounds, further strengthening a celestial-origin theory. A star or meteor seemed like a reasonable hypothesis.

[161] "Armed Forces Personnel (% of total labor force)," http://www.indexmundi.com/facts/indicators/MS.MIL.TOTL.TF.ZS. Accessed 1 November 2016.
[162] Ruth Kark and Seth J. Frantzman, "Empire, State, and the Bedouin of the Middle East, Past and Present: A Comparative Study of Land and Settlement Policies," *Middle East Studies* vol 48 no 4 (2012): 487–510.

It took me several visits to the town of Ghur al-Haditha to learn about this colloquialism because I had arrived in the village asking questions about the sinkholes using the Arabic scientific term I had learned in the oPt: *hufur al-bālū'a* (lit. "hole of the sink").[163] Residents replied in kind at first. The name "star holes" persists in colloquial use in the villages of the Lisan Peninsula, though villagers now quickly repeat the official geological explanation for the sinkholes to outsiders like me. The official narrative that they learned in the 1990s from geologists from Amman goes something like this: because of water use, drought, and nearby factories using too much water, the Dead Sea is receding, salt dissolves, and surfaces become unstable. In spite of the fact that they still refer to the formations as star holes, residents are quick to emphasize that the problem has a human source when they relay the geological explanation to me. The notion of sinkholes as craters, not geological phenomena, nevertheless governs how Lisan villagers approach the problem when a hole opens in one of their fields.

In broad strokes, the public information campaign about sinkholes and their geologic catalysts seems to have succeeded in every facet except one: villagers do not accept the Jordanian government's and geologists' determination that the land surrounding the sinkholes in their fields is irreparably unstable, prone to future collapse at any time, and must be abandoned. While geologists with whom I spoke in Amman (and elsewhere for this project more generally) conveyed the trepidation they feel when visiting sinkhole sites and cautioned me repeatedly not to approach them beyond the point where cracks are visible in the earth, Aghuar villagers took me into the closest possible proximity to the sinkholes. At one point during a visit to sinkholes in the Lisan area, Khalid, the community leader showing me around crossed a tiny strip of ground

[163] *bālū'a* also means cesspool, sewer, drain, and the kitchen sink. Related words from the root *ba-lam-'ain* include "to swallow, swallow up, to gulp down." Hans Wehr, and J Milton Cowan, *A dictionary of modern written Arabic: (Arabic- English)* (Wiesbaden: Harrassowitz, 1979), 89.

between two sinkholes, which were each approximately ten meters deep and twelve meters wide. I hesitated to follow. The land bridge was only slightly wider than the width of one of my feet. Khalid saw my nervousness and laughed, reassuring me, "It's not dangerous, don't worry. Do you need help?" Khalid's confidence demonstrates the way the idea of *ḥufur al-njūm* supersedes the official geological explanation for sinkholes that he and other Aghuar residents seem on the surface to accept. While a linguistic analysis of the continued colloquial use of the term "star hole" in the towns of the Lisan Peninsula is beyond the scope of this chapter, its persistence is noteworthy because it reveals just one of several points of discord between scientists and functionaries who study sinkholes from their offices in Amman, and those whose lives, livelihoods, and heritage are threatened by them. If the holes are craters, they will only grow if another meteor falls from the sky. If they are indeed formed by growing caverns from below, all land around them is potentially compromised. As long as they remain in some way *hufur al-njūm*, living near them is possible.

Dr. Hamad Ibrahim is one of the Jordanian scientists credited by villagers with spreading a geological (rather than astrological) understanding of sinkholes among the towns of the Lisan. Originally trained as a seismologist, he has been visiting the area to study the sinkhole phenomenon since the early 1990s. He told me "it reassured [the residents] to see someone coming to study sinkholes," at least at first. Still, this sense of security was fleeting for the villagers who bore the financial and security risk of sinkholes opening in their fields, the economic drivers of their communities.

Dr. Hamad started studying Dead Sea sinkholes because of a serendipitous fax his office received from Switzerland in the early 1990s. The fax was in German and addressed to Dr. Hamad's research supervisor. Thanks to his recently minted PhD from a university in Germany,

Dr. Hamad was the only person in the office who spoke German, so the fax found its way to him. A Swiss PhD student had received funding to come to Jordan to study the sinkholes in the Jordan Rift Valley and wrote to Dr. Hamad's office looking for a visa and advice about "which four-star hotel in Amman was the cheapest! He didn't even know there were other places to stay in Jordan!" Dr. Hamad laughed when he told me this story. Though Dr. Hamad's training and research mandate at the time were focused on earthquakes, he quickly began using the same tools that he had deployed in his seismological work to study Dead Sea sinkholes instead—"there weren't any earthquakes happening at the time so it was an easy choice," he told me as we discussed this decision twenty years after the fact. This research relationship between Dr. Hamad and his Swiss colleague remains strong. The two publish together regularly decades after their first collaboration, and are in near-constant communication via e-mail and Skype. A Swiss hydrologist-in-training who had never set foot in the Middle East sparked Dr. Hamad's interest in Dead Sea sinkholes.

In the 1990s, the Jordanian government tried to tackle the sinkhole problem directly by implementing a land-swap plan to move residents of affected villages away from the Dead Sea. Conspiratorial whispers among locals spilled out into the press and Jordanian geologists were accused of trying to enable a government land grab. During a lunch at his family home, one resident of Ghur al-Mazr'a explained his resistance to the 1990s plan over a huge shared metal tray of juicy grilled chicken, vegetables, and rice. Gesturing with a chicken bone to underline the point, he said, "This is *my* land. This is my home! It's not a problem of economics, it's a question of attachment to land." This strong attachment to land persists even though many landowners now depend on Egyptian, Syrian, and particularly Pakistani agricultural labor to work their

agricultural holdings because of the sinkholes.[164] These foreign workers spend their days in much closer proximity to Dead Sea sinkholes than almost anyone else, but did not express a close attachment to the land on the rare occasions I was able to talk to them. One Egyptian field hand I met summarized this ambivalence: "I work here during the season because they pay me. Who knows if I will return next year? I hope I will be somewhere else." These workers and their lives led in close proximity to sinkholes are unacknowledged in Jordanian government plans for dealing with the sinkholes. In the case of Lisan Peninsula sinkholes, geological research perpetuates this invisibility because it refers only to Jordanian Bedouin as stakeholders.

Farmers in the Lisan Peninsula began to complain when they were left to fill in sinkholes in their fields on their own in the 1980s and early 1990s. Filling sinkholes with gravel is a tenuous and temporary solution; you cannot farm over that area without good topsoil, and, in any case, filling in the holes will not stop new ones from opening. Once sinkholes begin forming, the whole area is compromised. As Dr. Nabil, a geomorphologist who teaches at one of the schools in a Jordanian village affected by the sinkholes put it, "it is only a question of time" until the sinkholes make life here untenable, and yet no one who traces their family line here wants to leave. Villagers and the foreign workers they hire continue to work in and among the sinkholes, framing them as static entities that do not shift or change once they have opened. This reality reflects their original theories of the sinkholes as star holes—craters, after all, must be struck from above to change shape. It also indicates the strength of the community's desire to stay in the Lisan, regardless of what futures Dr. Hamad or the Jordanian government may predict for them. Entertaining these competing ideas about how Dead Sea sinkholes are formed simultaneously

[164] Carol Palmer, Waleed Gharaibeh, and Lucine Taminian, "The Politics of Development in Ghor al-Safi, Jordan." *Thimar: Research Collective on Agriculture, Environment and Labor in the Arab World*, 16 July 2014. http://www.athimar.org/Article-42.

allows Lisan villagers to eschew state authority and the authority of scientific experts whose local histories are not embedded in the sinking soil of the Dead Sea basin. It enables a repudiation of the colonial history of Jordanian state control over the area and a retrenchment of Bedouin claims to the Aghowar villages.

VII. Conclusion

A focus on the environment gives scholars the tools to investigate the cultural politics of knowledge flows and technoscientific systems;[165] issues of scale in community responses to regional, national, and global ecological concerns;[166] and multiscalar practices of exclusion across political, social, and technological registers.[167] As we continue to untangle the effects of complex colonial histories, seemingly unending waves of military intervention in the MENA, and the porous, shifting political borders these phenomena create, a turn to the environment can bring to light the relationship between people's daily lives away from the cameras of international news and the regional/global shifts in power that have manifested in successive waves of colonization over the last century and beyond. Further, it allows for nuanced consideration of how communities and individuals assert claims to territory through settler-colonial imaginaries worked out in scientific journals, scalar framings of environmental problems, and the way bodies move through territories of geological crisis.

"Watershed-level" framings of infrastructural and environmental crises like Dead Sea sinkholes may seem unimpeachable from a hydrogeologic perspective, but they are only possible for parties with the power to transcend restrictive forms of military control and colonial

[165] Pritchard, *Confluence.*
[166] Choy, *Ecologies of Comparison*; Anna Tsing, *Friction*.
[167] Fortun, *Advocacy After Bopal.*

occupation. Technologies such as COSMO-SkyMed InSAR (and, crucially, the ability to access these technologies at a remarkably reduced rate) give Israeli geologists the ability to move closer toward predicting Dead Sea sinkholes in the oPt, Israel, and Jordan, circumventing the on-the-ground realities of military occupation in a way Jordanian and Palestinian geologists cannot. With field surveys, these images enable efforts to control parts of the Judean desert rhetorically constructed as "empty." They help construct the land around the Dead Sea as territory to be settled by particular people in particular ways. Even as Israeli and international scientists attempt to confront Dead Sea sinkholes "at the level of the watershed," the material properties of the sinkholes themselves seem to obviate these efforts and limit the possibility of colonial extension. In spite of the sinkholes' seeming defiance of colonial logics of control, research about them enables settler-colonial erasures and represents an extension of military occupation. To produce an InSAR image clear enough for scientists to use for predicting sinkholes, the landscape must be empty. When research undertaken by scientists to whom this technology is available circulates among communities of scholars around the world, the map and text are empty of Palestinian claims over land. In interviews and oral histories with Palestinians who work in Dead Sea industries, the Dead Sea holds a place of nostalgia for days past. In research by Israeli geologists, however, this engagement might as well never have happened.

For Palestinian geologists, substantial barriers to knowledge about sinkholes resulting from military occupation and settler-colonial land-use policies do not nullify political claims or dreams of a sovereign future. Sinkholes serve as their own kind of distortions, distortions of plans to build on this landscape, distortions that cannot be mitigated simply by identifying them. Dead Sea sinkholes are an evolving geologic phenomenon that defies colonial logics and military occupation even as they extend them—from boots on the ground to the five satellites of an

Italian Earth Observation System. For Jordanian farmers in the Lisan Peninsula, treating sinkholes as star holes enables a continued attachment to land that is disappearing, in defiance of expert advice, government admonishment, and military restrictions on access. Balancing the seemingly contradictory notion of sinkholes as astrological and geological is a small way of subverting what Bedouin villagers see as continued state efforts to control them. Doing so allows them to maintain a presence on their land; it is a small act of resistance to colonial forces that have targeted Bedouin communities in Jordan for decades.[168] Viewing this data through the lens of geologies of erasure makes visible the negations that take place as scientific knowledge helps to delineate territory as *terra nullius*, territory to be settled. Geologies of erasure call attention to what is nullified and made invisible by the collecting of environmental knowledge.

[168] Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992). As Mary Louise Pratt wrote, "subjugated peoples cannot readily control what emanates from the dominant culture, they do determine to varying extents what they absorb into their own and what they use it for."

CHAPTER 5

INFRASTRUCTURES OF EXCLUSION: SINKHOLES FIGHT BACK

I. Introduction

I have waited to explain how I came to the sinkholes until the final chapter. I have let them exist self-evidently as objects of research, but that is not really how they got to me. On preliminary research trips to the Dead Sea, I had prepared for a project about the role Dead Sea commodities played in contesting territorial claims. Observation at tourist sites and cosmetics factories in the West Bank and Israel had generated a set of questions, like: How do "Made in Israel" commodities and commodity chains function as primary loci of debate about international law, and what are the implications of this phrase for ongoing conflict over territory in Israel/Palestine? How is sovereignty exerted and impacted by the production, circulation, and consumption of commodities, particularly when the landscapes from which these commodities are derived are materially unstable? What can we learn about the process of claiming territory, some of which is land and some of which is not, from investigating two businesses that commodify, circulate, and consume material components of such places? I had set the project up to negotiate the tricky series of contrasts and contestations that would be necessary to do a project on both sides of a border most people involved were not aware (or did not care) existed. I had planned observation at a settlement-run spa-products factory in the occupied Palestinian territories (oPt) and at a bottled water factory just across the 1949 Armistice line (hereafter, the "Green Line," as it is called by most of my interlocutors, at least those who acknowledged it). Both businesses were partially owned by paradoxically capitalist kibbutzim. Both kibbutzim

used the profit generated by these commodities to enrich their residents, who had given up the Kibbutz Movement's collectivism and prohibition on private property long ago.

When I arrived to start my long-term field research at these factories and other places in the commodity chain, seventeen months had passed since my last visit. The assurances I hald received about access were stale and I was having trouble contacting some key interlocutors. I knew I would need to spend some time reestablishing those relationships to conduct the participant observation I had written so carefully into my research plan. Fresh off the plane, I set myself up with my computer at a café with Wi-Fi in Sheikh Jarrah to send out another round of e-mails and text messages.

As I sat among the cafe's usual crowd of multilingual, cosmopolitan international irganization (IO) employees, scruffy would-be activist tourists, and Jerusalemites Palestinian, I searched the internet for more addresses to e-mail and people to call. An article among the search results caught my eye: "Dead Sea Sinkholes Lead Authorities to Shut Major Artery."[169] According to *Haaretz*, a few days before my arrival, the Netivei Israel-National Transport Infrastructure Company Ltd, the public–private partnership in charge of much of the Israeli road system, had closed one of my planned field sites along with a stretch of Route 90, the only road between the two, because the autumn's heavier-than-normal rains had created sinkholes that made the factory and the road unsafe.[170] The closures were, at that time, forecast to be temporary, but no journalist dared to speculate about when they might end. I figured that this

[169] Shirly Seidler and Zafrir Rinat, "Dead Sea Sinkholes Lead Israeli Authorities to Shut Major Artery," Haaretz.com, 26 January 2015, https://www.haaretz.com/.premium-section-of-dead-sea-road-closed-due-to-sinkholes-1.5365544 (Accessed 1 February 2015).
[170] Sharon Udasin, "Damage to Ein Gedi Nature Reserve Feared Due to Road 90 Roadworks," jpost.com, 26 January 2015, https://www.jpost.com/Israel-News/Damage-to-Ein-Gedi-Nature-Reserve-feared-due-to-Road-90-roadworks-389031 (Accessed 1 February 2015).

might help explain my recent trouble reaching some interlocutors from preliminary fieldwork. It turned out to also mean I would need to change my fieldwork plans altogether.

Figure 23. Route 90 traffic jam caused by the Ein Gedi sinkholes, viewed from the side mirror of my rental car. Photo by author, 2015

Within a few days, it became obvious that the research I had planned would not be possible, at least not in the timeframe I had designated for fieldwork. The sinkholes had not caused that much damage to roads, pipes, or electrical wires yet (I would end up watching this damage accrue firsthand later in the year), but the Israeli government and the private companies affected had made no progress toward reopening the closed areas. Production at the Dead Sea cosmetics factory was shut down, and though the bottled water factory continued to operate,

trucks were officially forbidden from using the small Route 90 bypass road that the Israeli Netivei set up to allow traffic to continue to move north and south in the Jordan Valley. I would soon find out that many trucks used the tiny bypass roads anyway, causing backups that could last thirty minutes to an hour on a regular basis, and a traffic jam that lasted five hours over Passover. Sinkholes interrupted the supply chain and everyone seemed quite sure it would be a long time before it would be repaired. When I was able to begin visiting sinkhole sites, I quickly realized they were a fascinating entry point into the same questions that had drawn me to a project about Dead Sea commodities in the first place.

Sinkholes seemed to subvert the extension of infrastructures over new territory, thereby disrupting resource extraction and the expansion of capitalist/imperial projects that try to bring new territory under their control. Sinkholes closed so many places around the Dead Sea, especially in the oPt. They metaphorically swallowed tourist dollars and shipping contracts, and they created epic traffic jams on holiday weekends. As I wrote in chapter 3, they left Ibrahim, a Bedouin interlocutor who worked in Dead Sea industries, disconnected from WhatsApp. They seemed to defy and disrupt the project of settler colonization. But as I have also argued, sinkholes have created things. They were generative and agentive socially, politically, and economically.[171] In this chapter, I focus instead on all the things sinkholes destroy by looking at sinkholes through the lens of the anthropology of infrastructure.

The infrastructure literature has largely failed to grapple with the way infrastructures contain within them the ability to slow some things, people, and processes down while accelerating others, and thus to segregate and disconnect. This is especially true in Palestine.

[171] Enfield and Kockelman, eds. *Distributed Agency.*

When these *infrastructural assemblages of exclusion*,[172] as I will call them here, are destroyed by sinkholes, which themselves are a result of settler colonialism, everyone and everything is suddenly subject to the same slowing and disconnection reserved previously for the targets of this exclusion. In destroying the infrastructures that enable settler-colonial expansion and the extraction of natural resources, sinkholes fight back, in a sense. Focusing on infrastructures lays bare the ideologies and histories of colonization that sinkholes threaten.

II. Excavating Infrastructure

In recent years, anthropology has seen an outpouring of writing on infrastructure.[173] Classic theories of infrastructure, such as S. Leigh Star's seminal piece, emphasize the connective power

[172] I am taking inspiration here from Latour, Deleuze and Guattari, and Collins and Ong. Collins and Ong understand assemblages as forms or "ensembles of heterogeneous elements" that "are articulated in specific situations – or territorialized in *assemblages.*" Stephen Collier and Aihwa Ong, *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems* (Oxford: Blackwell, 2007), 4–5.

[173] See Anand, "Municipal Disconnect"; Anand, *Hydraulic City*; Nikhil Anand, Akhil Gupta, and Hannah Appel eds., *The Promise of Infrastructure* (Durham, NC: Duke University Press, 2018); Hannah Appel, "Offshore Work: Oil, Modularity, and the How of Capitalism in Equatorial Guinea," *American Ethnologist* vol 39 no 4 (2012): 692–709; Hannah Appel, "Walls and White Elephants: Oil Extraction, Responsibility, and Infrastructural Violence in Equatorial Guinea," *Ethnography* vol 13 (2012): 439–465; Paul Edwards, S. J. Jackson, G. C. Bowker, and C. P. Knobel, *Understanding Infrastructure: Dynamics, Tensions, and Design* (Ann Arbor, MI: Deep Blue, 2007); Paul Edwards Paul, S. J. Jackson, M. K. Chalmers, G. C. Bowker, C. L. Borgman, D. Ribes, M. Burton, and S. Calvert, *Knowledge Infrastructures: Intellectual Frameworks and Research Challenges* (Ann Arbor, MI: Deep Blue, 2013); Julia Elyachar, "Phatic Labor, Infrastructure, and the Question of Empowerment in Cairo," *American Ethnologist* vol 37 no 3 (2010): 452–464; Julia Elyachar, "The Political Economy of Movement and Gesture in Cairo," *Journal of the Royal Anthropological Institute* vol 17 no 1 (2011): 82–99; Julia Elyachar, "Next Practices: Knowledge, Infrastructure, and Public Goods at the Bottom of the Pyramid," *Public Culture* vol 24 no 1 (2012): 109–129. Julia Elyachar, "Upending Infrastructure: Tamarod, Resistance, and Agency after the January 25th Revolution in Egypt," *History and Anthropology* vol 25 no 4 (2014): 452–471; Penelope Harvey, "Cementing relations: the materiality of roads and public spaces in provincial Peru," *Social Analysis* vol 54 no 2 (2010): 28–46; Penelope Harvey, "The Topological Quality of Infrastructural Relations: An Ethnographic Approach," *Theory, Culture, and Society* vol 29 no 4–5 (2012): 76–92; Penelope Harvey and Hannah Knox, "The Enchantments of Infrastructure," *Mobilities* vol 7 no 4 (2012): 521–536; Brian Larkin, *Signal and Noise: Media, Infrastructure, and Urban culture in Nigeria* (Durham, NC: Duke University Press, 2008); Brian Larkin, "The Politics and Poetics of Infrastructure," *Annual Review of Anthropology* 42 (2013): 327–343; Marshall Sahlins, "Infrastructuralism" *Critical Inquiry* vol 36 no 3 (2010): 371–385; Sophia Stamatopoulou-Robbins, "Occupational Hazards," *Comparative Studies of South Asia, Africa, and the Middle East* vol 34 no 3 (2014): 476–496; Antina Von Schnitzler, "Traveling Technologies: Infrastructure, Ethical Regimes, and the Materiality of Politics in South Africa," *Cultural Anthropology* 28 (4) (2013): 670–693; Antina Von Schnitzler, *Democracy's Infrastructure: Techno-politics And Protest After Apartheid* (Princeton, NJ: Princeton University Press, 2016).

of material and knowledge infrastructures.[174] Many scholars have advanced the notion that we notice infrastructure only when it breaks down.[175] As such, infrastructure lies in the background of perception. Research on infrastructure in places like Israel and the oPt complicates this idea. Emerging work on infrastructures taking up the concept from a semiotic perspective suggests that infrastructures can actually create disconnections or stagnation by design.[176] It seems that in the colonial context of Israel/Palestine, infrastructures can indeed be designed to alienate, disconnect, and slow things down.[177] This point is particularly clear in relation to classic infrastructural objects, such as roads and waterways,[178] which will be a focus of my ethnography as well.

Recent work on infrastructure has helped anthropologists ground analyses of state power, authority, and sovereignty ethnographically, particularly in places where "the state" is not monolithic, where sovereignty as the extension of state power over territory in the Weberian sense does not seem to exist. Attention to infrastructures can help anthropologists to trouble ideas of "failed states" in the context of political instability or upheaval. Post-Oslo Palestine is exactly such a case.

In Brian Larkin's words, "infrastructures are conceptually unruly."[179] To use them to their full analytical effect, they must be intellectually tamed. Infrastructures, including mapping

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[174] S. Leigh Star's seminal piece emphasizes the connective power of material and knowledge infrastructures. S. Leigh Star, "The Ethnography of Infrastructure," *American Behavioral Scientist* vol 43 no 3 (1999): 377–391.
[175] Anand, "Municipal Disconnect"; Anand, *Hydraulic Citizenship*; Harvey and Knox, "The Enchantments"; Larkin, "The Politics and Poetics"; Star, "The Ethnography."
[176] See Paul Kockelman, "Enemies, Parasites, and Noise: How to Take Up Residence in a System without becoming a Term in it," *Journal of Linguistic Anthropology* vol 20 no 2 (2010): 406–421, and other recent work on "parasites."
[177] Livia Wick, "The Practice of Waiting Under Closure in Palestine," *City and Society* vol 23 (2011): 24–44; Eyal Weizman, *Hollow Land: Israel's Architecture of Occupation* (New York: Verso, 2012).
[178] Avram Bornstein, *Crossing the Green Line Between the West Bank and Israel* (Philadelphia: University of Pennsylvania Press, 2002); McKee, "Certainty, Cents, Suffering, and Salt"; Zeitoun, *Power and Water.*
[179] Larkin, "The Politics and Poetics," 329.

and surveillance technologies, roads, pipes, and electrical wires, enable only certain kinds of mobility for only certain political actors in urban spaces, as we have seen in some of the newest work on the concept by Joanne Nucho.[180] Infrastructures likewise regulate movement in sparsely populated, rural places, which are nonetheless sites of intense political contestation.[181] As power inequality comes to define more and more social spheres around the world, it becomes increasingly imperative for anthropologists to understand how both material and immaterial (perhaps knowledge or semiotic) infrastructures serve to distinguish political subjects from each other. Encounters with the same infrastructures can allow some people to move in particular ways, while restricting or excluding others from doing so. The challenge for anthropologists who engage with the infrastructure concept lies in balancing its material and semiotic qualities. I employ a theory of infrastructures that insists on both their materiality and their "need to be analyzed as concrete semiotic and aesthetic vehicles oriented to addressees,"[182] but managing this dual imperative ethnographically proves difficult. Importantly, both intellectual genealogies I will refer to trace to Marx through structuralism, though Marx himself never used the word "infrastructure" in his writings.

One of the biggest problems with this recent infrastructure literature is the slippage between the way the concept gets used by interlocutors and the way anthropologists want to use it. The effect when ethnography is introduced can be a tortured set of qualifiers—"material," "urban," "built," etc. This is why I'm writing about an *infrastructural assemblage*, by which I

[180] Joanne Nucho, *Everyday Sectarianism in Urban Lebanon: Infrastructures, Public Services, and Power* (Princeton, NJ: Princeton University Press, 2016).
[181] Rural applications of the infrastructure concept from within anthropology are relatively limited and include studies of international pipelines. Andrew Barry, "The British-Georgian Case: The Baku-Tbilisi-Ceyhan Pipeline," In *Territoires, environnement et nouveaux modes de gestion: La gouvernance en question*, edited by Bruno Latour and Christelle Gramaglia (Paris: Centre National de la Recherche Scientifique, 2005), 105–118; Bilge Firat, "'The most eastern of the West, the most western of the East': Energy-transport infrastructures and regional politics of the periphery in Turkey," *Economic Anthropology* vol 3 (2016): 81–93.
[182] Larkin, "The Politics and Poetics," 329.

mean the configuration of many infrastructural things, both as constructed by interlocutors (roads, bridges, buses, cars, electrical wires, pipes) and as constructed by anthropologists ("mediators between praxis and practice," social institutions, internet systems, methods of sharing information, and much more), which act on and with each other to produce particular effects. The notion of an infrastructural assemblage allows us to think about material, transport, epistemic, knowledge, semiotic, and other infrastructures together. It also makes clear distinctions between "infrastructures" in common parlance—which tends to stop at roads, rails, wires, and pipes—and infrastructures in the theoretical sense. Since infrastructural assemblages are made up of some things labeled "infrastructures" by our interlocutors as well as some things anthropologists have come to understand as infrastructural because of the way they make processes "go," the concept obviates the need for excessive modifiers and makes clear links among infrastructures. All these will indeed be key parts of my ethnography, but I am thinking of them as of a piece with maps, guidebooks, Facebook groups, and even archives, all of which are also crucial to "making things go" in the simplest terms. At the end of this chapter, I will show how Paul Kockelman's notion of "sieves" can help us address these tensions.

III. Infrastructures in Settler-Colonial Contexts

I bring together two intellectual genealogies of infrastructure—one related to knowledge and one related to materiality—in order to articulate more fully what I mean by *infrastructural assemblage of exclusion*. But first, I will include a quick word about infrastructures, power, and settler colonialism. Social scientific knowledge has historically helped colonial powers develop strategies for dealing with these infrastructural concerns.[183] Anthropologists, in particular, have

[183] Bernard Cohn, *Colonialism and its Forms of Knowledge* (Princeton, NJ: Princeton University Press, 1996).

helped European powers consider how to get soldiers from here to there, how to project the authority of rule into the hinterlands of their colonies, and so on.[184] Contemporary anthropological conceptions of infrastructure both seek to contend with the colonial legacy of anthropology[185] and to extend the concept beyond the concrete "apparatus of governmentality" with which such postcolonial studies are often predominately concerned.[186]

A growing body of literature on infrastructure has focused on the circuits and pathways through which people and things travel as a primary locus of analysis, and some of these works have begun to theorize infrastructure and colonialism together.[187] What science and technology studies (STS) scholars have termed "knowledge infrastructures" are also critical to settler-colonial control in the periphery.[188] Claude Lévi-Strauss argued that seemingly irrational practices of indigenous peoples around the world were in fact internally rational, and he suggested that researchers could understand them by analyzing infrastructure, "a mediator between praxis and practices," yoking individual understanding to the material world.[189] I introduce Lévi-Strauss's theory of infrastructure here to clarify the connection between structuralism and infrastructures in STS. In more recent work on expert knowledge in the natural sciences, informatics, engineering, and political economy, knowledge infrastructures figure as mediators between observable/market phenomena and intellectual life.[190] Work inspired by

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[184] Laura Bear, *Lines of the Nation: Indian Railway Workers, Bureaucracy, and the Intimate Historical Self* (New York: Columbia University Press, 2007).
[185] Larkin, *Signal and Noise*; Bear, *Lines of the Nation*.
[186] Michel Foucault, *The Birth of Biopolitics: Lectures at the Collège de France, 1978–1979* (New York: Picador, 2010), 70.
[187] Anand, "Municipal Disconnect"; Bear, *Lines of the Nation*; Larkin, *Signal and Noise*; Von Schnitzler, *Democracy's Infrastructures*.
[188] Paul Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, MA: MIT Press, 2010); Edwards et al., *Understanding Infrastructure.*
[189] Claude Lévi-Strauss, *The Savage Mind* (Chicago: University of Chicago Press, 1966), 130.
[190] Barry, "The British-Georgian Case"; Goeffrey Bowker, *Memory Practices in the Sciences* (Cambridge, MA: MIT Press, 2005); Michel Callon, *The Law of Markets* (Oxford: Blackwell, 1998); Michel Callon and John Law, "Lessons on Collectivity from Science, Technology, and Society," *Canadian Journal of Sociology* vol 22 no 2 (1997): 165–182. Jasanoff, *States of Knowledge*; Latour, Bruno and Steven Woolgar, *Laboratory Life: The*

technological innovations like fiber-optics and "big data" often invokes Edwards's definition of knowledge infrastructures as "robust networks of people, artifacts, and institutions that generate, share and maintain specific knowledge about human and natural worlds."[191]

The establishment of knowledge infrastructures has been a well-documented strategy for colonization and settler colonization, often involving tourists.[192] Guidebooks intended to provide wealthy Englishmen in India information on local customs so they might manage their servants more effectively stand as one example. Knowledge infrastructures like maps, guidebooks, tour guides, bus drivers, and signs, suggest not only that "tourists are semioticians,"[193] but also that tourists can be agents of settler colonialism in liminal or inhospitable landscapes. These knowledge infrastructures also have differentiating effects, enabling the circulations of some political subjects while stagnating others. We see this differentiated effect in the way some people have access to knowledge about the Dead Sea through guidebooks, bus timetables, online forums, and social media. Language is a major gatekeeper since most of these things are in English, Hebrew, and/or other European languages, but almost never in Arabic, despite the fact that Arabic was one of the official languages of Israel until July 19, 2018.[194] Here is one

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Construction of Scientific Facts (Princeton, NJ: Princeton University Press, [1979] 1986); Mitchell, *Carbon Democracy*; Christopher Otter, "Making Liberalism Durable: Vision and Civility in the Late Victorian City," *Social History* vol 27 no 1 (2002): 1–15; Christopher Otter, "Cleansing and Clarifying: Technology and Perception in Nineteenth Century London," *Journal of British Studies* 4 3(2004): 40–64; Star, "The Ethnography of Infrastructure."

[191] Edwards, *A Vast Machine*, 17.

[192] Bear, *Lines of the Nation*; Cohn, *Colonialism and its Forms of Knowledge*; David Landes, *Bankers and Pashas: International Finance and Economic Imperialism in Egypt* (Cambridge, MA: Harvard University Press, 1958); Elizabeth Povinelli, *The Cunning of Recognition: Indigenous Alterities and the Making of Australian Multiculturalism* (Durham, NC: Duke University Press, 2002); Ann Stoler, *Carnal Knowledge: Carnal Knowledge and Imperial Power: Race and the Intimate in Colonial Rule* (Berkeley: University of California Press, 2002).

[193] Chris Rojek and John Urry, *Touring Cultures* (London: Routledge, 1997), 4.

[194] Approximately 20 percent of Israel's citizens are Palestinian, and many Mizrahi Jews with roots in Yemen, Iraq, Syria, and elsewhere are also Arabic speakers. For seventy years, two months, and five days, Arabic was included on the list of Israel's three official languages and government signs were required to be printed in English, Hebrew, and Arabic. With the support of Prime Minister Benjamin Netanyahu's far-right government, the Israeli Knesset passed "the Jewish Nation-State Law" eliminated Arabic as an official language and affirming Israel as a state for Jews. Even before the passing of this law, the Arabic was frequently misspelled or transliterated from Hebrew in order to diminish Palestinian claims over places. Street signs indicating the direction of Jerusalem, for example,

example: while living in Ramallah one summer, the Jordanian Ministry of Tourism erected a huge billboard across from my apartment advertising Jordan's Dead Sea resorts in Arabic. That the Jordanian resorts in Sweimeh seemed as likely a place for Ramallah's residents to access the sea as the settlement-run beaches inside the West Bank is extremely telling, and in fact much of the information in Arabic about visiting the Dead Sea refers to Jordan.

Figure 24. Billboard advertising Jordanian Dead Sea tourism in Ramallah. Photo by author, 2015

An infrastructural reading of Marx helps illuminate why the things we think of as infrastructures must be understood to have uneven effects. Marx described ways to reduce the amount of time commodity-capital exists in terms of what we now readily think of as infrastructure, asserting, "the improvement of the means of communication and transportation cuts down absolutely the

frequently feature an awkward Arabic transliteration of the Hebrew name of the city (*yerushalaim*) instead of the well-known Arabic name for the city (*al-quds*). Even before the passage of the law, scratching out Arabic place names on official signs and public transportation was a favorite pastime of right-wing Israelis.

wandering period of the commodities."[195] Critically, though, he wrote that not every infrastructural improvement is even. Addressing the relative difference "in the time of circulation of different commodity-capitals arising from their peregrinations,"[196] he reasoned that the development of new transportation and communication systems could alter the relative temporal distance between two points, "in a way that does not correspond to the geographical distances. For instance a railway which leads from a place of production to an inland centre of population may relatively or absolutely lengthen the distance to a nearer inland point not connected by rail, as compared to the one which geographically is more remote."[197]

The railway in this example divides even as it connects, and it slows down circulation time between some factories and markets relative to others. Factory A might be more geographically proximate to a market than Factory B, but improved transport or communication between the market and Factory B may bring the two temporally closer together, and this is all that matters to a capitalist bent on accumulating more and more surplus value. Recent anthropological engagements with infrastructure have taken up this particular point in their focus on roads and rails.[198]

The infrastructural links between factory and marketplace in Marx's model can thus be material or immaterial, having a connecting or divisive, accelerating or stagnating effect on the commodities they convey. They are, however, necessarily visible, or built with a clear capitalist

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[195] Karl Marx, *Capital: A Critique of Political Economy. The process of circulation of capital, Volume 2* (Moscow: Progress Press, [1885] 1986), 253.
[196] Marx, *Capital, Vol. II,* 253.
[197] Marx, *Capital, Vol. II,* 253.
[198] Harvey, "Cementing Relations"; Harvey and Knox, "The Enchantments"; Hannah Knox and Penelope Harvey, "Anticipating harm: regulation and irregularity on a road construction project in the Peruvian Andes," *Theory, Culture, and Society* vol 28 no 6 (2011): 142–163; Adeline Masquelier, "Road mythographies: space, mobility, and the historical imagination in postcolonial Niger," *American Ethnologist* vol 29 no 4 (2002): 829–856; Bear, *Lines of the Nation*; Benjamin Fraser and Steven Spaulding, eds., *Trains, Culture and Mobility: Riding the Rails* (Lanham, MA: Lexington Books, 2012).

intension. Infrastructures function in Marx's cycle of accumulation of capital as accelerators, reanimators of dormant capital, but Marx acknowledged that it is equally possible for them to have the opposite effect under certain circumstances. In this model, infrastructures encapsulate everything in between the moment when a commodity is produced (and capital is dead or paralyzed in the form of commodity-capital) and the moment when a commodity is sold and capital is reanimated, brought back to life with a surplus added to its original quantity. This piece of Marx's theory indicates an important connection between infrastructures and empire. The cultivation of "new" markets is critical to the passing of circular capital to spiral capital, to use Marx's terms.[199] Infrastructural projects in the Marxist model thus must expand outward into some kind of empire, whether it be colonial power or multinational conglomerate, and this was reflected in the material conditions and ethnographic context in which Marx lived. New lands must be conquered economically or political for the cycle of accumulation to continue—a dynamic reflected in the colonial drive for territorial expansion.[200] But what happens when that new land falls away? What happens when that new land begins to fight back?

Hannah Knox and Penelope Harvey's study of road-building practices in Latin America is another materialist analysis of material infrastructure, in spite of its emphasis on phenomenology and enchantment.[201] Knox and Harvey approached "roads with curiosity as to their capacity to enchant with respect to three specific promises: speed, political integration and economic connectivity."[202] In other words, Knox and Harvey's chief concern with roads was their ability to cut down on turnover time. As I have explained above, Marx shared this interest

[199] Karl Marx, *Karl Marx: Selected Writings*, edited by David McLellan (Oxford: Oxford University Press [1867] 2000), 452–544.
[200] Bear, *Lines of the Nation.*
[201] Harvey and Knox, "The Enchantments."
[202] Harvey and Knox, "The Enchantments," 522.

in roads and rails. Knox and Harvey also emphasized the intentional quality to roads, upon which Marx remarked in passing. "As technologies of modernity," they argue, "roads tend to appear in most accounts as materially obdurate structures which are the outcome of rational processes of planning and design."[203] Again, a materialist framing of infrastructures as everything that cuts down turnover time is evident in their analysis. In framing material infrastructures as the "outcome of rational processes of planning and design," Harvey and Knox failed to account for the ways in which roads and other material networks can emerge piecemeal, muddled, and perhaps inefficiently when it comes to reducing the temporal gap between production and purchase, death and reanimation of capital. Rather than promoting efficiency, roads can enforce the long way around, formalize stagnating traffic, and divide communities, as they do in the oPt. Knox and Harvey, however, insist that roads and railways are "standardised structures for the purposes of integrating the nation-state . . . a particularly modern ambition."[204] This is a major departure from Marx. Even in Marx's *Capital, Volume II,* roads are not standard because they can change the relative distance between factories and markets through their impact on turnover time.[205] Knox and Harvey's claim that "roads offer a means of rectifying this history of inequality based on the limited social and physical mobility of peasant communities" is incongruous with Marx's idea that the things linking factories and markets can have either a stagnating or an accelerating effect.[206] While Marx admitted that roads do not uniformly increase the mobility of people and things, I wish to push this further by questioning the intended function of infrastructures. Neither Knox and Harvey's framing of infrastructure nor Marx's conception of what connects factories and markets allows for an examination of infrastructural assemblages

[203] Harvey and Knox, "The Enchantments," 524.
[204] Harvey and Knox, "The Enchantments," 524.
[205] Marx, *Capital, Vol. II.*
[206] Harvey and Knox, "The Enchantments," 525.

of exclusion that function in their ability to withhold and deprive mobility from some subjects, while accelerating others. To show why this matters in the context of the Dead Sea and its sinkholes, I will now describe the infrastructural assemblage that conveys people, things, and narratives of place to and from the Palestinian and Israeli Dead Sea shores. This ethnographic section is unwieldy, in part because the infrastructural assemblage is itself cumbersome.[207]

IV. Bus 486 and the Road to the Dead Sea

For the first few months of fieldwork, I took Egged bus 486 from Jerusalem to the Dead Sea three or four times per week. This is the only public transit link along the Dead Sea, which is part of why I decided to live in Jerusalem in the first place. The particulars of the segregated Israeli public bus system merit their own explanation.[208] I will limit myself here to an explanation of the route of the 486 and a quick description of some of its passengers to explain how my bus trips figure into my ethnographic analysis. The bus is only one part of this assemblage conveying certain political subjects to the Dead Sea's shores, many of whom are the target consumers of "Made in Israel" commodities, even those made in Palestine, like many famous Dead Sea cosmetics.

[207] With apologies to the reader.

[208] Several official Israeli-run bus systems exist in Israel and the West Bank, and their clientele divide down ethno-national lines. The biggest of these systems, Egged, has routes both within Israeli cities and between them. They travel between settlements on roads that crisscross the West Bank where Palestinian-plated cars are forbidden from driving. They do not enter East Jerusalem or most other predominantly Palestinian towns and neighborhoods except to carry Jewish settlements in and out of the neighborhood where there are large, heavily guarded settlements. Egged buses were primary targets for *intifada* bus bombings. A separate bus system serves Palestinian neighborhoods and towns within Israel. These buses have numbers, official routes, and stops, but do not operate on an official schedule. Rather than the computerized ticket system complete with scanable passes that Egged buses have, they feature stacks of loose onionskin paper tickets with place names written only in Arabic. They tend to spew exhaust, appear run down, and come in a variety of shapes, sizes, and colors. I have never seen a Jewish Israeli on one of these buses. IDF soldiers routinely board them demanding to see Palestinians' passports and *tasreehat*. In some parts of Jerusalem, these two bus systems serve the same areas and even the same stops. Jews take one, Palestinians take the other. In Palestinian areas of the West Bank, the PA operates a system of shared taxi vans called *servees* between Palestinian towns that leave when full.

Bus 486 leaves from the West Jerusalem Central Bus Station[209] at intervals of between forty and ninety minutes between 8:00 a.m. and 4:45 p.m. Since I was living on the east side of Jerusalem at the time, picking up the bus at the West Jerusalem Central Bus Station seemed like a waste of time since the bus would pass through my historically Palestinian neighborhood (without stopping) on the way to the Dead Sea. On my first bus trip, I decided to try to pick it up at its first stop after the Central Bus Station, in a neighborhood I had never visited but which appeared on the map to be closest to where I was living. I made my way to the corner of Bar Ilan Street and Shmuel HaNavi Street and waited. Ominous clouds rolled overhead and I shivered, wondering how the bus could already be running so late. Then I realized I was the only woman in sight at the busy intersection wearing pants.

In my naiveté, I had failed to realize that the neighborhood of Shmuel HaNavi is a predominantly Haredi area. Its history is intertwined with the turbulent twentieth-century history of Jerusalem. Because my primary field site was not Jerusalem and I lived on the city's east side, the west side of town was rather unknown to me. I found out later that, according to histories of the Jewish side of Jerusalem, the first house in Shmuel HaNavi was built in the 1920s opposite the Palestinian neighborhood of Sheikh Jarrah to expand the northern boundaries of Jewish Jerusalem.[210] The Green Line runs between Shmuel HaNavi and Sheikh Jarrah. Between the Nakba (when Jerusalem was divided between Israel and Jordan) and the 1967 War (when Israel took the east side of Jerusalem and with it the rest of the West Bank from Jordan) the only people willing to live on the Jewish side of the frontline were Haredim, whose strict devotion to

[209] Even this name could be contested. It is officially called the "Jerusalem Central Bus Station," but those of us familiar with the Palestinian bus system (see my previous note on the segregated nature of the buses in this context) are compelled to differentiate it from the East Jerusalem Bus Station located just outside Damascus Gate/Bab al-'Amud.

[210] David Rossoff, *Where Heaven Touches Earth: Jewish Life in Jerusalem from Medieval Times to the Present* (Jerusalem: Feldheim Publishers, 2001), 554.

Orthodox Judaism keeps the community in poverty and exempts them from having to serve in the IDF.[211] During the second intifada, a bus bombing took place near the intersection where I waited for the bus. A large plaque in an adjacent orthodox neighborhood I have never visited lists the names of the dead, seven of them children, one a pregnant woman, and one not Jewish (listed separately from the other names and without the honorific "kadosh" accorded to Jewish Israeli victims of such violence).

Figure 25. A group of Haredi men walking down the street that separates Shmuel HaNavi from Sheikh Jarrah. This street is also the 1949 Armistice Line and the boundary between East and West Jerusalem. Photo by author, 2013.

A few blocks away, Sheikh Jarrah's Palestinian residents have been fighting twin displacements for decades to keep their homes. The first force seeking to displace them consists of settler organizations like Ateret Cohanim and El'ad who pour money into disputing the ownership of Palestinian homes in Jerusalem in order to replace them with Jews from overseas (both organizations were also undertaking expensive efforts to "Judaize" the Palestinian

[211] John Forester, Raphael Fischer, and Deborah Shmueli, *Israeli Planners and Designers: Profiles of Community Builders* (Albany: SUNY Press, 2012).

neighborhood I was living in).[212] The second force of displacement was the veritable army of well-paid European and American bureaucrats and functionaries representing international organizations (IOs), from the EU to the World Food Programme to the UN Relief Works Administration, headquartered in Sheikh Jarrah and nearby Bab Ez-Zahra. The generous housing stipend these cosmopolitans receive from the IOs they work for have come to define the market price of apartments in the neighborhood, which is far out of reach for Palestinian residents—or underfunded American grad students, for that matter. Because of the "Center of Life" laws through which the State of Israel seeks to strip Palestinian residents of Jerusalem from their special *laissez-passers*, this displacement through gentrification has dire consequences for Jerusalem's Palestinian residents.

The 486 passes through the center of Sheikh Jarrah but does not stop again until the entrance to the Mt. Scopus Tunnel in a Jewish enclave of East Jerusalem where Hebrew University is located. This is an early differentiating effect of the infrastructural assemblage of exclusion at issue here: Palestinians who wish to take the bus to the Dead Sea must either go all the way to the West Jerusalem bus station where they will be scrutinized by soldiers who occupy their neighborhoods in riot gear and arrest their brothers and sisters during night raids, or risk waiting for the bus in Shmuel HaNavi.[213]

And so it is in Jerusalem, where waiting for the bus becomes a confusing moment of ethnographic and historical encounter with the brutal and violent forces of displacement, land claiming, and ethnic cleansing that bubble under the surface in the city at all times. Related

[212] Ateret Cohanim and El'ad are funded by the Moskowitz Foundation, which raises money in part by operating a bingo hall in Hawaiian Gardens, CA. Settler-colonial networks have a mind-boggling reach.
[213] Thomas Abowd, "National Boundaries, Colonized Spaces: The Gendered Politics of Residential Life in Contemporary Jerusalem," *Anthropological Quarterly* vol 80 no 4 (2007): 997–1034. See also Sayed Kashua's work on living in a Jewish neighborhood in Jerusalem as a Palestinian citizen of Israel. Sayed Kashua, *Native: Dispatches from an Israeli-Palestinian Life* (New York: Grove Press, 2017)

forces of displacement operate on the edge of the Dead Sea, but I would have to dig a little deeper to see them.

V. Passengers

The 486 bus primarily serves the following groups: (1) international tourists, most of them Jewish based on their attire and ways of speaking; (2) young Israelis heading to the desert to camp, hike, mountain bike, and swim in the Dead Sea; and, occasionally, (3) the friends and family of Israeli settlement residents in the West Bank and Israeli sections of the Dead Sea coast (most people who live in the now rather prosperous Dead Sea settlements/kibbutzim own cars and prefer to make the trip on their own). The morning and evening buses are routinely packed to capacity, and the weeks before and after major Jewish holidays, two or three buses must be scheduled for each departure time to accommodate the holidaymakers. I have shared seats on the 486 with teenage German tourists, their wrists wrapped in red Kabbalah threads, the female members of families of Haredim with posh English accents,[214] Russian Israelis with a fondness for tank tops and bucket hats, and IDF soldiers heading to or from bases in the oPt for weekends off, the butts of their combat weapons poking me in the side as they fall asleep to the bus's gentle rocking. On a few occasions, while waiting at one of the post-apocalyptic bus stops on the Dead Sea for the 486 to take me back to Jerusalem, Bedouin women shared the shade with me. They come from Naqab communities and use the 486 to visit family or friends in Bedouin villages between Jericho and Jerusalem, or to take care of paperwork in Jerusalem. Egged buses are the

[214] Haredi men do not share seats with women. Flights departing from Ben Gurion Airport are routinely delayed because Orthodox men refused to sit in their assigned seats if there is a female passenger next to them. A complex set of seat switching has to take place to accommodate them. This often particularly baffles those flight crews that do not typically work the Tel Aviv route.

only public transportation that exists in this part of the Jordan Valley and the West Bank. A Palestinian public transit network of *servees* goes to Jericho, but not beyond. This is the reason I was living in Jerusalem in the first place.

The bus always stops on an ad hoc basis at the request of passengers or if the driver happens to notice someone waiting at a prescribed stop (these become more windswept and godforsaken as the route traverses the Dead Sea coast). It can take radically different amounts of time for the bus to get from Jerusalem to Ma'ale Adumim, Jericho Junction, or Ein Gedi, depending on traffic, the lead-footedness of the driver, the desired trajectories of individual passengers, and, in 2015, the state of the road as a result of the sinkholes.

Figure 26. A Dead Sea Egged bus stop in the West Bank. Photo by author, 2013.

This movement in fits and starts and the degrading condition of Route 90 account for the bus's radically unpredictable schedule along the Dead Sea. In 2015, the official schedule was almost completely useless because of the sinkholes, in stark contrast to the relative timeliness of other Egged bus lines.

Once, while waiting for the bus to pick me up at the Ein Gedi hotel, three scheduled buses listed on the laminated Egged schedule posted at the hotel's entrance failed to arrive. A young Italian couple who had been waiting longer than I had grew visibly frustrated, and one of them finally called Egged to find out what was going on since this was the only way to get to Jerusalem short of taking an outrageously expensive ninety kilometer taxi ride or hitchhiking. The Egged employee on the other end of the helpline denied that a bus stop even existed at the Ein Gedi hotel. The Italian tourist, incredulous, said that he was quite sure that the stop did exist since he and his girlfriend had taken the bus to the Ein Gedi hotel the day before. The argument continued in circles for about seven minutes. It was only concluded by the arrival of the bus. The Italian tourist hung up mid-sentence. When he tried to ask the driver what had happened, the driver feigned an inability to understand him. I had seen this particular driver get into a yelling match with two young Russian women the week before because they wanted to get off the bus where it was stuck in sinkhole-related traffic rather than wait the unknown amount of time it would take for the bus to reach its next stop which was visible fifteen meters away. The driver adamantly refused to allow this because it was not a prescribed stop (nevermind the fact that the bus was stuck on a small road that was not part of its official route because sinkholes had forced a detour) and proceeded to harass them cruelly through the traffic jam until we reached the bus stop at the base of the Ein Gedi Field School. It was better for the young Italian man not to get an answer out of him, I thought to myself.

VI. Sinkholes Disrupt the Route

Numerous geographies reveal themselves while riding the bus. Some of these are remarked upon by passengers, while others seem to elude them. As the bus winds its way out of Jerusalem, it passes beside a checkpoint that is imperceptible to most tourists. It looks more like a tollbooth than the checkpoints on the news, with their frightening guard towers, barbed wire, graffiti, rock-throwing young men and boys, and heavily armed young IDF soldiers in riot gear, tear gas hanging in the air. For Israelis and international tourists, this infrastructural assemblage at the checkpoint accelerates their travel. For Palestinians with PA ID cards, it has the same immobilizing effects as the most infamous checkpoints like Qalandiya that keep them behind the Separation Barrier, even without the terrible traffic jams, strip searches, barbed wire, cattle-pen-like holding areas, and unannounced closures of more well-known checkpoints.

On the way to the Dead Sea, traffic does not stop as it passes through here—cars and trucks are never screened on their way into the West Bank, only on their way out of it. This means that for those uninitiated into the geographic specificity of post-Oslo Areas A, B, and C, the transition into the West Bank is imperceptible. This is not by accident—this part of the West Bank falls in Area C, but it is also part of a special area known as the E-1 Zone. Some of the only hints that we're passing by Palestinian towns in the West Bank are the hillsides of trash and the black water tanks. Some passengers on the 486 notice these things and remark on them, but none seemed to know what they signified.

As the bus follows Route 1 toward the Jordan Valley, it passes Bedouin encampments on both sides of the highway, where Bedouin riders of bus 486 often begin and end their journeys. These camps are more permanent than the Israeli news media makes them out to be. Livestock sleep in pens, graze on the hillside, and sometimes roam between buildings with corrugated

metal walls and black cloth roofs. The villages have names: Jabal al-Baba, Wadi Jimel, Bir al-Maksud, Khan al-Ahmar.[215] They are populated by Bedouin of the Jahalin tribe who were displaced from the Naqab Desert. Now these communities are being displaced again with each demolition order the IDF issues for "unpermitted" structures, from homes to kindergartens.[216] These are the same tactics the IDF uses against Palestinians in East Jerusalem. Tourists on the 486 stare wide-eyed at the villages as we go by, wondering aloud about the women in black, the children climbing over the stones, and the animals, musing about what it must be like to "go back in time," a classic settler-colonial reaction to indigeneity. Once, as the bus rumbled by, a small protest was in progress involving mostly white men and women who had turned up to try to help the community stop a particularly large-scale demolition order.[217] The demolitions were stalled, but they are underway again as I write this.[218] The bus does not stop here.

Elevation is an embodied geography. After the Mt. Scopus Tunnel, the bus starts its precipitous drop. Jerusalem is about 2,500 feet above sea level, and the Dead Sea is about 1,400 feet below it. In a little over an hour, the bus plunges nearly 4,000 feet. Bus passengers often note the popping in their ears (one family engaged in a lively debate about whether the pressure change meant the bus was gaining or losing elevation, but the elevation loss was generally evident to most other people). Many were enchanted by the regular elevation markings on the road to the Dead Sea (Route 1), the length of which is inside the West Bank unbeknownst to

[215] BimKom, "The Bedouin Communities East of Jerusalem: a Planning Survey," Bimkim.org, http://bimkom.org/eng/wp-content/uploads/jahalin/bir%20al%20maskub.htm (Accessed 15 February 2015).
[216] Orly Noy, "In Jabal al-Baba, the Trees Are Protected But the People Aren't" 972mag.com, 25 December 2017, https://972mag.com/in-jabal-al-baba-the-trees-are-protected-but-the-people-arent/131903/ (Accessed 22 March 2018).
[217] During fieldwork, I attended a related protest at Bawwabet al-Quds ("Jerusalem Gates") in Abu Dis. Silvia Boarini, "Israel Dismantles Gateway to Jerusalem," Aljazeera.com, 25 February 2015, https://www.aljazeera.com/indepth/inpictures/2015/02/israel-dismantles-gateway-jerusalem-150223072640358.html (Accessed 2 March 2016).
[218] Khaled Tayeh, "PM: Jabal al Baba is a Red Line," Wafa.ps, 27 November 2017, http://english.wafa.ps/page.aspx?id=k5hir3a95395154943ak5hir3 (Accessed 10 January 2018).

most people. Large signs designate sea level: "-150 meters," "-300 meters," and so on. Beside the sea-level sign, there is a large plaza where a Bedouin man stands on weekdays with a camel ready for expensive photo opportunities and rides. There is sometimes a second stand with hot and cold drinks to serve tourists as well. In the center of the overlook next to the parking lot, there is a large, abstract, sand-colored sculpture evocative of a huge primordial fossil. It bears graffiti in several languages and smells of urine. The bus does not stop here either.

As the bus makes the sharp right-hand turn on to Route 90, which runs north-south through the entire Jordan Valley, the road starts to undulate. Passengers bob up and down as if floating on a swell. They gasp as the bright blue sea, the red cliffs, and the strips of white salt deposits between them come into view. Those seated on the bus's right side try to capture the majesty with their phones and cameras through dirty bus windows. Those seated on the bus's left side try to hide their disappointment by photographing the cliffs soaring up on the bus's right side instead, perhaps catching a squat ibex in the right season. In 2015, those cliff photographs were interrupted by large signs posted every 150 meters or so reading "Road 90 Is Blocked To Trucks Traffic In Ein Gedi Area No Thru to Ein Boqeq"[219] due to sinkhole activity, which were taken down when the road was repaired, and "BEWARE! SINK-HOLES AREA AHEAD," which remain today.

There are also older signs signaling sinkhole activity on the road's left side, but they are small and faded and bear no information beyond "CLOSED SINKHOLE AREA" to explain to potentially curious visitors what lies on the other side of the chain-link fence. For passengers on the bus, the true effects of the new sinkholes would only come into view several stops after the bus reaches the Dead Sea. The driver would first take a small access road off the highway,

[219] These new signs refer to a moment of crisis and collapse, the story of which I would eventually learn from Dr. Itai Maggid, a geologist and longtime resident of Kibbutz Ein Gedi who goes by his first name, Itai.

nodding to an armed guard in the guard booth at the gate of Kibbutz Kalia, an illegal settlement, before pulling into a parking lot outside the expensive Kalia Kibbutz Hotel and behind another chain-link fence, this one topped with barbed wire. Picking up only the occasional passenger, the bus then moves southward, back onto Route 90. If stops are requested at the postapocalyptic bus shelters along Route 90, the driver will slam on the breaks and open the doors to the searing heat to let a passenger or two disembark next to graffitied benches with peeling paint and rickety structures that shade them precariously. I have spent hours of my life at these bus stops, sometimes out of phone credit or out of service range, wondering if I would die there or if the bus would ever come. Kibbutz Kalya Junction, En Feshkha, Ovnat, Mitspe Shalem: they are all inside occupied territory and all qualitatively about the same—silent except for the sound of the wind most of the time. Often, it is a long walk from the closest bus stop to tourist spots on the Dead Sea, and I am usually the only person stupid enough to try it.

As the bus continues south, it passes at last through a second checkpoint, which also serves as a bus stop at Mitzuke Dragot. This time, passengers realize this is a checkpoint, though it too looks like a tollbooth. Behind an electronic gate, the bus stops to allow an IDF soldier to board, walk its length down the center aisle with his hands on his gun, looking each passenger in the eye for unspecified signs of suspicious behavior, before disembarking through the bus's back door. I have never seen anyone get pulled off this bus at this checkpoint, probably because the bus is coming from West Jerusalem and the majority of its passengers have already had their bags searched extensively as they walk through the West Jerusalem bus station's large metal detectors at each entrance,[220] and do not present as Arab or Palestinian.[221] This again is a

[220] There was a significant bombing at the West Jerusalem bus station in 1996, and a smaller one in 2011.
[221] The idea that one can appear Palestinian is itself deeply problematic and racist. The 2008 film *Salt of this Sea* by Annemarie Jacir exploits this fallacy when its main characters, both Palestinian, escape the West Bank by changing their clothes, adding kippot, and swapping out their green "Allah" charm hanging from their rearview mirror with a

differentiating effect built into this infrastructural assemblage of exclusion. Though passengers might think that passing through the checkpoint denotes a return to Israel, the checkpoint is entirely within the West Bank. The Green Line is still almost twelve kilometers south of it. Routes 1 and 90 are transportation infrastructures that facilitate the rapid movement of only some people, like my compatriots on the bus, through occupied territory.

Palestinians without the correct papers cannot cross south of the checkpoint. There are usually several cars with white and green plates, sometimes a van or two, parked on the north side of the checkpoint. Some Palestinians are allowed to own cars with yellow plates: Palestinian citizens of Israel who have Israeli passports can, as can Jerusalemite Palestinians with their red *laissez-passer* listing a place of birth in "Jerusalem, Jordan."

Palestinians with green Palestinian Authority identification cards cannot own yellow-plated cars, but are allowed to cross checkpoints for work or medical care, or to visit family, if Israel grants them a permit, or *tasreeh*, the terms of which vary on a case-by-case basis. In this apartheid transportation-scape, these vehicles cannot be driven through the barrier even if their passengers have the correct papers.[222] This is a part of the West Bank that has been annexed with virtually no international attention at all—the checkpoint enables a settler-colonial dispossession. It is a piece of the infrastructural assemblage of exclusion. It does the work of separating colonizer, whether direct or indirect, from colonized. Passing through the checkpoint is also the first good look tourists get of the Dead Sea's sinkhole problem. They feel its effects shortly thereafter.

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hamsa. Annemarie Jacir, *Salt of This Sea,* DVD, directed by Annemarie Jacir (New York City: Viacom Media Networks, 2008).

[222] The market for used cars in the West Bank, especially those with yellow Israeli plates, is huge and profitable. Older cars with yellow plates most frequently stolen. They are sometimes then taken into refugee campus, which the PA police must work with UNRWA for permission to search, and stripped for parts.

In 2015, sinkhole activity created another checkpoint on Route 90, this time to divert vehicles through Ein Gedi's archeological site, nature reserve, and date groves after sinkholes opened under a section of Route 90. The bypass road was only wide enough for one car or bus to pass at a time, so a team of traffic cops set up a checkpoint made up of barriers, flood lights, and chairs in which to pass the long hours diverting cars, trucks, and buses on to the access road a few at a time. For nine months, the tiny access road was a flurry of exasperated drivers, and heavy machinery twenty-four hours per day.

Figure 27. Map of the Ein Gedi traffic checkpoints, January to September 2015. Image courtesy of Open Street Map, © OpenStreetMap contributors, openstreetmap.org.

When I ventured on foot on to the closed section of old Route 90 in search of the sinkholes that started this madness, all I found was a borehole four inches in diameter and a small circle of new pavement. The Israeli government found the sinkholes causing all this infrastructural destruction not because they had opened, but because InSAR images indicated Route 90 was sinking ever so slightly, and the Ministry of Transportation drilled a hole through the road to confirm its presence.

Figure 28. Repaved section of Route 90 that remains closed because of sinkholes. Photo by author, 2015.

Figure 29. The southern Route 90 traffic checkpoint. Photo by author, 2015.

VII. Driving Geographies

After about a few months of riding the bus, I decided to rent a car to facilitate my access to sinkholes sites that were difficult to get to with the irregular schedule and widely spaced stops of the 486 bus. Plus, the cost of the bus rides was adding up. I needed a yellow-plated car to drive in East Jerusalem where I lived and to pass through the checkpoint at Mitzuke Dragot. A fellow researcher told me that a rental company I will call Haim Five had the best rates for small cars, and I found that to be true. The tricky part was figuring out how to handle the rental company's requirement that I not use the car to cross national borders. This was clearly an attempt to keep Haim Five cars out of Palestinian parts of the West Bank,[223] and away from borders with Egypt, Jordan, Lebanon, and Syria. But what does this injunction even mean given the way so many roads for Israeli cars crisscross the West Bank, including Routes 1 and 90? Crossing borders in

[223] This is itself an almost meaningless category, but I am thinking here of Area A.

this context is not at all obvious to the uninitiated. I knew with relative precision when I would cross into pockets of Area A land, and I wanted to be able to take the car to Ramallah, Jericho, Birzeit, and elsewhere. But how would Haim know that I had done so? How would someone with less-precise knowledge of the territory know if they had violated these rules, which themselves made no sense in the context of Israel's continued efforts to annex the West Bank and settle new parts of it? Plausible deniability would have to do. I decided the most prudent approach would be to rent the oldest, smallest, least-shiny car Haim would give me. In the end, over the objections of the rental agent, I managed to get a navy-blue Nissan Micro with 200,000 kilometers on the odometer and only passable gas mileage given its tiny size. The first time I took it on Route 1, a hubcap fell off. The Palestinian-owned garage in my neighborhood could not replace it with a branded version, so I bought a generic, plastic one before I returned the car. Miraculously, no one at Haim Five ever noticed that the front passenger-side hubcap did not say "Nissan" on it, nor that it was held in place with white zip ties.

Traveling from East Jerusalem to the Dead Sea by car gave me a whole new set of geographies of Routes 1 and 90. Given the huge bite the rental car took out of my research budget, I became obsessed with trying to save fuel. The steep grade of Route 1, which drops thousands of feet between Jerusalem and the Jordan Valley, allowed me to coast down the highway for what felt like a great distance. I would have to hit the breaks at specific points, particularly when I was rolling down the winding hills with the massive settlement of Ma'ale Adumim on my left. This was a new way of understanding the topography of "greater Jerusalem," the E-1 area. Most cars around me would turn off Route 1 to putter up to Ma'ale Adumim, toward al-Izzariya as well, but there were never signs for that. I came to think of this as the gas-pedal geography, where I have to give some fuel to keep up with traffic or some brakes

to keep in control of the little car. There was also an embodied topography of the changes in altitude, where my eyes started to feel the pressure and my ears started to pop, where the plastic water bottles in my car started to lose their shape a little bit as if I was landing an airplane instead of driving a Nissan Micro. There was a more refined geography of plated cars too, which I had not been able to see as clearly from the bus. I became used to the precise point on Route 1 when the greens and whites started to appear, when rusty jeeps would join the highway, when there would be a chance I might see a tractor.

There were two technical geographies that never failed to amuse me because of the way they betrayed an inability of telecom to accurately place me in this border zone. I had noticed a text-message geography based on when I would start getting bombarded with text messages from Wataniyya, one of the Palestinian cell service providers, offering me good rates for phone calls during my trip to Jordan, where the satellite had mistaken located me. Similar text messages from Orange and Umniah would only arrive when I ventured close to the water itself, but Wataniyya messages began before I even reached Jericho. The second technical geography was a radio-signal geography. I began to learn the exact point where Jordanian radio stations started to dominate the airwaves, and where the Hebrew-language ones fell away. When I went to Jordan at the end of my fieldwork, I noticed that this radio geography was reversed. Only Israeli stations came in on the Jordanian side of the sea, since all broadcasts out of Amman were blocked by the mountains on the edge of sea. In a sense, this penetration of radio was the only small sign that Israel does not fully control the north section of the Dead Sea. Passing through the checkpoint at Mitzuke Dragot, I would have to take care that there was an English-language song playing on the radio instead of Um Kalthum. When you drive through there in a car rather than on the bus, a teenage soldier with a huge gun leans down to look in your unrolled window and say “Shalom.”

This is a test—you must answer back in English or in Hebrew without an Arabic accent. If you do not "look" or "sound" Palestinian, they do not even ask to see your papers.

During the 2015 Israeli parliamentary election, a clear political and ethnonational geography emerged on the road as well. As before, Israeli flags would appear on the sides of the road especially close to the turn-off for a settlement—for instance, Mitzpe Yeriho. In the run-up to the election, posters for the conservative political parties Likud and Beit Yehudit were plastered on the edges of the golden rocks through which the highway cuts near the same settlement junctions. These belied the idea that some settlers shared with me that these settlements were nonideological, and were rather about achieving a quiet, middle-class lifestyle near the expensive city of Jerusalem. If this were true, the political posters in evidence would have been much more diverse. As I contemplated this, I also started to notice that on some days, a lot of Israeli military equipment would be moving toward Jerusalem on Route 1, such as trucks carrying tanks and multiple police vans. Each time this happened, I would later read the news that entire villages in the North Jordan Valley had been evacuated for military "training" exercises that day. These were traces of colonial violence "returning" to Israeli territory, and very clear signs the Routes 1 and 90 serve as military infrastructures, extending the IDF's reach in the West Bank. These geographies make up the ground on which this infrastructural assemblage of exclusion operates.

VIII. Transportation Infrastructures of Exclusion

Driving a rental car put me in touch with Palestinians who work in the Dead Sea and have access neither to public transport nor cars. On my drives between Jerusalem and Dead Sea sinkhole sites, I stopped regularly at a gas station at Lido, where Route 1 and Route 90 meet at a right angle and where the Megilot Regional Council offices are. This is the last gas station for

seventy-eight kilometers in one direction because sinkholes closed the one at Ein Gedi. To prevent the inevitable panic I would experience watching the unreliable gas gauge drop, I would fill up the tank at Lido. Like most gas stations in the area, this one is owned by an Israeli Jew and staffed entirely by Palestinian men from all over the West Bank who do not have a *tasreeh*,[224] as it is inside the checkpoints and they will work for low wages because the Palestinian economy is so depressed. On a few occasions, I met Palestinians working at Dead Sea gas stations who lived in the same neighborhood as I did in Jerusalem, just on the other side of the Separation Barrier. Mahmoud, a longtime employee from a village north of Jericho, became one of my regular interlocutors. I would pull up to the pump and he would come over to help, then break into a smile when I greeted him, "Marhaba ya Mahmoud!" I would buy at least one hundred shekels of gas (about thirty dollars at the time), after withdrawing from the ATM with an exorbitant withdrawal fee. "First the cash, then the gas," Mahmoud would joke. He works every day from early morning, around 6 a.m., until 2 p.m. He does not use buses on his commute, in part because there is no route to the area via Palestinian shared taxi van (*servees*), and he could not access Egged bus stops near his home, which were all on the other side of the Separation Barrier.

[224] A *tasreeh* is a temporary document giving Palestinian ID holders permission to enter Israel, for work, family reunification, or other bureaucratic reasons.

Figure 30. An Egged bus stopped at the Ein Gedi Field School. Photo by author, 2015.

Hadi is another regular interlocutor and friend without a *tasreeh* who works at the Dead Sea. He is in charge of small snack stand outside the Qumran Visitors Center, run for profit by a resident of the kibbutz/settlement Qalia. Qumran is the site of the discovery of the Dead Sea Scrolls, unearthed by a Palestinian shepherd from Jericho around 1946. The scrolls now reside inside a massive enclosure at the Israel Museum in Jerusalem. The Palestinian delegation to UNESCO has announced that they will bid for Qumran to be placed under their "cultural power," as strange a technocratic phrase as I have ever heard.[225] Hadi lives outside Bethlehem

[225]Permanent Delegation of Palestine to UNESCO, "Qumran: Caves and Monastery of the Dead Sea Scrolls" UNESCO, 2 April 2012, https://whc.unesco.org/en/tentativelists/5707/ (Accessed 1 September 2018). See Herb Keinon and Tovah Lazaroff, "Palestinian Claim to Dead Sea Scrolls May Be Next Up At UNESCO," jpost.com, 22 March 2018, https://www.jpost.com/Arab-Israeli-Conflict/Palestinian-claim-to-Dead-Sea-Scrolls-may-be-next-up-at-UNESCO-546773 (Accessed 30 March 2018).

and traverses the circuitous eighty-kilometer route to work every day through a combination of *servees*, hitchhiking, and carpooling. During interviews, his manager reported that she arranged for informal carpools among Palestinian employees, but did not pay for them. I spent many days hanging out outside Hadi's kiosk with him, watching him politely serving tourists from around the world, even when they berated him for stocking Kosher but not Kosher-for-Passover popsicles, or some other small slight. I enjoyed spending time with Hadi very much, and we had many enjoyable conversations about amusements and concerns of daily life. He had made a large collage mural of paper currency taped to the flaps that open and close the kiosk. He has bills from all over the world, and in the middle, a picture of two men standing in his kiosk. One of the men is an occasional employee of the Qumran Visitors Center, also named Hadi and from Jericho, who can no longer work because he had to have knee surgery and can no longer carry out the more physical parts of the job.[226] On the other flap, the aesthetics are the same, though the bills vary slightly, and it contains a different picture of the same men, in the same place, smiling. The men who work at Qumran, nearly all Palestinian, have a very difficult time with transportation since public transit systems that serve Palestinians do not run closer to the Dead Sea than Jericho, seventeen kilometers away. The women who work at the center are all Jewish Israelis whose transportation struggles involved long car rides to and from Jerusalem, though they could take an Egged bus if necessary. These are transportation infrastructures of exclusion, part of the larger assemblage. This can be a relatively easy geography because these roads facilitate movement into this "new" territory, but only if you are not Palestinian.

[226] See Jeremy Siegman, "Enemies in the Aisles: On the Micropolitics of Antagonism in the Occupied West Bank," PhD dissertation, University of Chicago, 2018.

IX. Sinkholes Act on Transportation Infrastructures of Exclusion

Route 90 has been a site of sinkhole activity for decades, particularly south of the Mitzuke Dragot checkpoint and the Green Line, near Ein Gedi. When a set of sinkholes appeared under buildings that used to be part of Ein Gedi's public beach, the Israeli government began to close the beach in stages. This layered history has a kind of stratigraphy of fencing and signage. The first sections of the beach to be closed are further from the road, behind a now-disheveled barrier of short metal posts, rusted and twisted by the weather. Paths and roads to the closed areas have been blocked with two-foot by two-foot stones and allowed to degrade in each year's winter storms and scorching summer sun. The oldest signs say "DANGER OPEN PITS" in Hebrew and English; serifs on the Latin letters make them look even more out of date. More recent signs are printed in all three of Israel's national languages, black on orange. The land between the road and the sea is a rippled mess of cracks, earth that looks like a violent watery swell. As in other places where sinkholes have destroyed the built environment, buildings have been torn apart and thrust upward at strange angles, as if they were fishing boats bobbing in a storm. As the sinkholes encroached and the water receded, more and more of Ein Gedi's beach was closed to the public. By the time I arrived for fieldwork, the public beach and gas station at Ein Gedi had been closed for good. There were no longer any public beaches on that side of the sea, and only one private beach in the lobe of the Dead Sea that is not a Dead Sea Works evaporation pond. A teenage kibbutz resident continued to staff the small snack shop inside the closed area, hoping to catch grungy backpackers who defy fences, barriers, and warning signs in pursuit of free access to the Dead Sea's buoyant water and may want an overpriced popsicle afterward.

The Israel Ministry of Transportation repaved Route 90, which passes right next to the sinkhole area, in the 1990s. Ein Gedi kibbutz residents love to tell dramatic stories about the

tumult of that time, the buses that got stuck when small sections of pavement collapsed, the date trees that were uprooted, the startled reactions of tourists unaccustomed to hard life in the Judean Desert. Norman, an immigrant from England who had lived at Kibbutz Ein Gedi since 1967, especially relished poking fun at foreigners astonished at the sinkholes. We would sit in scratched up plastic chairs on the patio outside his studio space talking for hours in the shade of Ein Gedi's botanical garden about the trials and travails of Norman's early days on the kibbutz, which he remembers fondly the way many people recall the hijinks of their youth. "I remember when Jordan had snipers up there," Norman said, pointing to the cliff just north of the kibbutz, where the Ein Gedi Field School now stands, "and now people are afraid of cracks in the pavement."[227]

Figure 31. The destruction wrought by sinkholes at a settlement-run beach. Photo by author, 2015.

[227] Norman also loved telling the story of his fellow old timer, Hank, who once shot himself in the leg trying to kill a desert leopard, which had been terrorizing the animals in the Ein Gedi Zoo at night. Desert leopards no longer live in this part of the desert, hunted to near extinction.

Norman's disdain notwithstanding, the Israeli government was very afraid of what cracks in the pavement could do to Route 90, "the longest road in Israel"[228] and a key cargo artery from the Red Sea port city of Eilat. Teams of engineers and geologists collaborated to devise a plan for Route 90 that they thought could stand the test of time. They decided on an iron plate made up of woven fibers strong enough to support the weight of the many tractor-trailers that used Route 90. The plate was laid on top of solid ground, and asphalt was paved over it. Even if sinkholes developed under the road, the plate would be strong enough to hold the cars and trucks that pass over it each year. This plan seemed to be working as the road was holding up just fine. Then came the heavy rains of the winter of 2014–2015.

Following the closure of the gas station at Ein Gedi's public beach, officials at the Ministry of Transportation decided the extent of the damage underground needed to be assessed. InSAR images processed by the Israeli Geological Survey showed the rapid subsidence that indicated a sinkhole right underneath Route 90. Though the iron plate was holding, the only way to get a look at how deep the underground caverns were was to cut out a three inch by three inch square and look underneath it. In early 2015 they did so, finding that a large sinkhole had indeed formed under the road, and in the process of confirming this, they destroyed the structural integrity of the iron plate. The sinkhole under the road appeared to extend beyond the width of the road on both sides, so rebuilding it would be impossible. Authorities did not investigate the full contours of the cavern under Route 90, but they nevertheless had to close the road permanently on January 25, 2015. A temporary plan was set up to use much smaller roads that provide access to Ein Gedi's nature reserves, archaeological site of a third-century synagogue, remaining date trees, and bottled water plant, to route traffic around the closure until a permanent

[228] In actuality, Route 90 passes through the West Bank for 125 of its total 469 kilometers between Metula in the Golan Heights, and the Red Sea port of Eilat.

solution could be agreed upon, financed, and built. These small roads, which were used by an endless stream of rental cars, Egged buses, and delivery trucks for months, are not even two cars wide. They wind slowly between parking lots, orchards, the archaeological site, and industrial machinery, with many dips and turns along the way. It would be impossible to widen this route without cutting into the date trees, the nature reserves, the bottled water factory, and/or the archaeological site. Something would have to give to keep Route 90 open.

I attended the several rounds of town meetings that followed, a few of which I have recounted in chapter 3. I am returning to this material now from a different vantage point because as the Ein Gedi community fought over what would happen to Route 90, sinkholes made visible the political stakes of the infrastructural assemblage of exclusion they compromised. To be cut off from Jerusalem, the colonial center, in a sense, would compromise the contemporary existence of Ein Gedi, which saw considerable economic and population growth after Israel occupied the West Bank in 1967 and connected the village to Jerusalem more directly via Routes 90 and 1. But to lose the date groves, the nature reserve where King David is said to have sought refuge from King Saul, and the archaeological site would mean the loss of a biblical and historical justification for the kibbutz. To disconnect the kibbutz from this history could call into question the justification for the work of settler implantation in this landscape. With the public beach, campground, and gas station already closed by sinkholes, the community perceived the spread of sinkholes as a threat to the continued existence of the kibbutz, and if it lost its biblical antecedent, the fear was that the Israeli government would become less supportive of the town's continued existence. Would it still be worth it to maintain the town? Older kibbutz members recalled that before this road was built, pregnant women would be evacuated from Ein Gedi by helicopter to Jerusalem in their seventh month of pregnancy so that they could receive hospital

treatment for the birth. Route 1 and Route 90 changed this—or, rather, the occupation of the West Bank in 1967 changed this. This infrastructural assemblage of exclusion sped up and enhanced the mobility of Jewish settlers of the area and the international tourists they make money from, while disconnecting Palestinians from their lands. Now, sinkholes might uproot the settlers too.

I have tried to show in my extensive ethnographic consideration of getting to the sinkholes, both metaphorically as an object of research and practically as a matter of transportation infrastructures like buses and roads, that infrastructures in colonial or settler-colonial contexts produce differentiated effects for different subjects. This forces us to try to move toward a concept of infrastructure that can help us understand the distinctions between the kinds of movement that they enable. Not only are infrastructures "conceptually unruly," per Larkin, but they cannot be defined simply by their effects on the mobility of people, things, ideas, and symbols because these effects are different, and differentiating.[229]

The infrastructures that carry people to the Dead Sea do not conform to the modernist road model Harvey and Knox articulated, with its tripartite promise of connectivity, political freedom, and economic growth. Buses, patrol cars, soldiers, checkpoints, and highways figure as a single infrastructural assemblage linking the major population centers near Jerusalem with the placid, glassy, buoyant waters of the Dead Sea, while making these same waters harder to access for Palestinians like Ahmad and Maher who live near Bethlehem and Jericho. This infrastructural assemblage enables a system of exclusion, and therefore perpetuates an unevenly applied slowness. This is not a case of disconnection due to breakdown, or of the unintended slowing of turnover time in certain production cycles, as Marx described, or even disconnection due to

[229] Larkin, "Politics and Poetics."

erosive/corrosive effects of natural phenomena like Knox and Harvey analyzed. This infrastructural assemblage produced slowness and stagnation for certain people when they worked exactly the way they were built to.

Sinkholes physically disrupted this infrastructural assemblage and laid bare the settler-colonial stakes within it. More importantly, perhaps, they disrupted the differentiated exclusionary effects of it, at least in part. Suddenly, people—regardless of identity documents, ethno-national group, and socioeconomic class—were stuck in the same traffic jam. Sinkholes are not only the erosion that Knox and Harvey describe. It's important to note the disconnecting and exclusionary effects of Route 1 and Route 90 in this larger infrastructural assemblage of exclusion; these functions were embedded in the road from the start. The sinkholes, themselves colonial effects are not "natural" nor "normal" environmental phenomena.

So far, this has been a story about material infrastructures and settler colonialism, but what about the knowledge infrastructures I explained briefly? They are also included in this infrastructural assemblage of exclusion. Some examples of knowledge infrastructures within the infrastructural assemblage that sinkholes disrupt at the Dead Sea are: the ability to know how much time a trip will take, the ability to know whether a road is open or closed, the ability to know whether you can access a particular historical site, Dead Sea beach, gas station, or hotel. Israelis and international tourists were constantly taking to comments sections and internet forums to figure this out, while Palestinians did not seem to be doing so at all. Thanks to sinkholes, no one moving through this infrastructural assemblage knows what they are getting into. Sinkholes deteriorated these knowledge infrastructures, at least for the time it took to fix the road.

X. Sinkhole Sieves

To make sense of the effect of sinkholes on the infrastructural assemblages that enable settler colonialism, I turn to recent work on the semiotics of infrastructure that has drawn on classic works in linguistics and in semiotics.[230] Paul Kockelman, in particular, has brought together the material and immaterial elements of what I have termed the *infrastructural assemblage* in one unitary frame, combining an analysis of language (drawing on Jakobson, who drew, like Lévi-Strauss, on Saussure's work), commodities (drawing on Marx), and STS (which I have connected here with the work of Lévi-Strauss for its emphasis on mental processes and the cognitive interpretation that mediates our interpretations of the empirical conditions of the world in which we live).

In his 2010 article "Enemies, Parasites, and Noise: How to take up residence in a system without becoming a term in it," Kockelman created an intellectual framework that encompasses a vast array of concepts: signs, signers, objects, codes, channels, interpreters, joint attention, sign-codes, signer-channels, actors, producers, thirdness, messages, signals, transmitter, receiver, encypher, decypher, crytogram, and others.[231] Kockelman acknowledged how tedious this can get, noting "from our example of joint attention how difficult it is to distinguish codes and channels (in their traditional sense) from each other, or to separate them from semiosis per se, or to isolate a solitary sign event from the hurly-burly of interaction in the first place."[232] I will focus here on Kockelman's distinctions between channels, infrastructures, and institutions because they present a promising framework for working through the way infrastructures with

[230] Kockelman, "Enemies, Parasites, and Noise"; Paul Kockelman, "The Anthropology of an Equation: Sieves, Spam Filters, Agentive Algorithms, and Ontologies of Transformation," *HAU: Journal of Ethnographic Theory* vol 3 no 3 (2013): 33–61; Bill Maurer, "Transacting Ontologies: Kockelman's Sieves and a Bayesian Anthropology," *HAU: Journal of Ethnographic Theory* vol 3 no 3 (2013): 63–75; Elyachar, "Phatic Labor"; Elyachar, "Next Practices"; Elyachar, "Upending Infrastructure."
[231] Kockelman, "Enemies, Parasites, and Noise."
[232] Kockelman, "Enemies, Parasites, and Noise," 408.

different components and differentiating effects may be thought of as one assemblage.

The concept of channels as distinct from but intimately related to infrastructure and institutions helped Kockelman account for the way the things that enable connection can also create stagnation or paralysis even when they are not breaking down. He wrote, "the blockage of any message-qua-impulse often leads to a rerouting (through other channels) and an enciphering (through other codes) of the message."[233] In some sense, then, channels, infrastructure, and institutions are themselves subject to dreams, obsessions, and parapraxes. Kockelman's ideas about the unintended effects of controlling channels is particularly crucial for the analysis of infrastructures in Israel/Palestine.

Three years after he published "Enemies Parasites and Noise," Kockelman produced another semiotic think-piece that presents another way to undertake an infrastructural analysis of my trips to the Dead Sea and its sinkholes. In "The Anthropology of an Equation: Sieves, Spam Filters, Agentive Algorithms, and Ontologies of Transformation," he aimed to bring together semiotics and statistics, critical theory and math, through the use of sieves as a heuristic.[234] For Kockelman, a sieve is any mechanism that serves to differentiate what is desirable from what is undesirable. Sieves may be abstract or literal, and, as such, they can be the object of anthropological inquiry and also constitutive of the analytical frame of anthropological inquiry. They can change the properties and characteristics of the things they divide, and they are never an end in themselves, since what they divide for some other external purpose. Using his heuristic sieve allowed Kockelman to articulate ideas about how meaning is made using statistical reasoning. In the process, he devised a model using index, kind, agent, individual, and ontology to think about how interpretations create epistemologies (that is to say, ways of knowing), rather

[233] Kockelman, "Enemies, Parasites, and Noise," 415.
[234] Kockelman, "The Anthropology of an Equation."

than the other way around. Maurer explored the potential of Kockelman's model by elaborating it slightly, arguing that there is an inherent flexibility to the schema Kockelman proposed because it is "proprioceptive."[235] As such, "this is theory that moves, and that wants us to move with it, so that we can move in and with the moving world."[236] This is what infrastructures do out in the world, and our theories of them, do too.

These arguments are intimately connected with "Enemies, Parasites, and Noise." Using Serres, Shannon, and Peirce, as he does in "Enemies," Kockelman articulated semiotics properties of the sieve. Sieves are what divide the noise from the signal,[237] as well as both prototypic parasites and hosts to other parasites. In their temporal and spatial character, sieves represent "a potential indexical ground."[238] Sieves are the inverse of the items they sort (see: hole in the ground). The ability to sieve can itself be sieved between sieves that sieve with a fine grain versus coarsely (quality control system for pasta strainers). Sieves are the simplest form of interpreting agents. Sieves, in Kockelman's model, can be "atelic" or not, meaning they can generate order for no particular reason, or be built in the service of one particular function.

This possible atelic nature of sieves addresses the shortcoming of a Marx-inspired infrastructure concept that acknowledges the possibility for infrastructures to divide or decelerate rather than connect and speed up. Marx framed the disconnecting, exclusionary, and slowing-down effect of things like communications and transportation systems as unintended. This is likely a result of the fact that it is only possible to read a theory of infrastructure retrospectively through Marx's writings, which were themselves focused on other, very particular issues. Kockelman wrote that his view of sieves as either atelic or unatelic was inspired by his desire to

[235] Maurer, "Transacting Ontologies," 63.
[236] Maurer, "Transacting Ontologies," 63.
[237] Kockelman, "The Anthropology of an Equation," 36.
[238] Kockelman, "The Anthropology of an Equation," 39.

try to deal with randomness, a key aspect of probability, and an important part of Bayes's Rule.[239] This idea that sieves can be atelic or unatelic allows me to use Kockelman's concept of sieves to analyze the possibility that infrastructures can be designed to stagnate and disconnect rather than accelerate and connect. It also allows us to understand many infrastructural "things"—buses, roads, cars, signs, Facebook posts, guides, small talk—as parts of one infrastructural assemblage. Finally, it allows us to see the ironic parallel between this infrastructural assemblage of exclusion, an atelic sieve, and the sinkholes, unatelic sieves.

As Kockelman wrote, sieves "have desires built into them (insofar as they selectively permit certain things and prohibit others); and they have beliefs built into them (insofar as they exhibit ontological assumptions)."[240] Routes 1 and 90, likewise, have desires built into them. Substituting Kockelman's sieves for "infrastructures" or "channels" brings attention to the way coarticulating systems, both material and abstract, create distinctions between "desirable" and "undesirable" people and things. Some examples of these differentiations perpetuated by infrastructures: foreign tourists, desirable because of their deep pockets and willingness to spend, are distinguished through checkpoints from Palestinians coming to the Dead Sea for their own day trips, undesirable because their very presence on the land undercuts the Zionist national project. Healthy or pure Dead Sea minerals that augment the areas mystical cache are sieved from the substantial amount of sewage flowing into the Dead Sea as a result of the absence of wastewater management systems on higher ground through the manufacturing and marketing processes at settlement cosmetics factories. Natural and peaceful vistas of red rocks coated in glittering salt are geographically and cognitively divided from industrial areas dedicated to extracting chemicals that will be used by the IDF elsewhere. This last sieving is accomplished by

[239] Kockelman, "The Anthropology of an Equation."
[240] Kockelman, "The Anthropology of an Equation," 48.

the particular routes of Dead Sea roads and the kinds of images of the Dead Sea and its surrounding desert that circulate around the world through souvenirs, guidebooks, and Dead Sea commodities, all of which are also part of this infrastructural assemblage.

XI. Conclusion

Thinking of the ways of knowing that drive interpretation as sieves brings together these material conditions with the cognitive sorting they generate in people who encounter this landscape—a foreign tourist coming to the settlement-owned Dead Sea resort at Kalia beach in the oPt on a 486 bus from Jerusalem may think to himself, "This place is clean. I got on an Egged bus in Israel and we drove along smoothly paved highways, never passing any sort of checkpoint like the ones I see on the news. Having arrived here, I'm using Israeli shekels to buy a bottle of water with Hebrew lettering on it as I make my way to a lawn chair close to the edge of the Dead Sea." The place gets "sieved" as desirable, safe, Israel (in contrast to dirty, dangerous, broken down, Palestinian) as a result of the sieves through which the desirable tourist himself passed. As such, sieving helps get at the *designed* stagnation and disconnection embedded unevenly in the infrastructural assemblage of exclusion.

Sinkholes are themselves sieves, though they are unatelic ones. This could help us understand the fact that sinkholes are both products of settler colonialism and also destroyers of it. Everyone is suddenly subject to the same slowing and disconnection reserved for the targets of infrastructural assemblages of exclusion. The sieving effects of the settler infrastructures when they encounter these sinkholes are reversed. The exclusionary effects of the sieving infrastructures get turned on their heads. They start to slow down the colonizer too.

The slowness sinkholes create has produced some of my most beautiful memories of

fieldwork. After the sinkholes in the parking lot of the settlement-run beach where Ibrahim worked as caretaker took down the electric polls that powered Ibrahim's refrigerator and Wi-Fi router, I began bringing him supplies for a barbeque whenever I could. Though his manager also brought food once each day, he had no way to store leftovers so I thought any contribution would be welcome, although he did not ask. Ibrahim no longer had to be vigilant for tourists trying to visit the beach because it had been closed for more than six months and the barriers at the entrance to the site had been made permanent, too big to mistake. There was nothing to do but sit and eat.

I would stop at a butcher shop in Jericho where young men in matching polo shirts that looked too clean for butchers' uniforms would grind fresh lamb, whole onions, and herbs for me into a mince. Then, I would buy fresh bread from the best bakery on Jericho's main square (the one to the right of the butcher shop, not the one on the left), pick up fresh vegetables to roast, and buy ice-cold date juice sold in reused 1.5 liter plastic bottles that once held bottled water. The shape of the bottle gave away the brand, though the labels had been scrubbed meticulously off—Jericho Water bottles were tinted slightly blue and had the silhouette of a mountain range imprinted in the top half of the bottle, while Ein Gedi Water bottles were made of clear plastic and had a smoother spiral imprints in them from top to bottom. When I arrived at the beach with the supplies, Ibrahim would light a fire in the coals of his small grill. We would shape the mince into kofta, cut the vegetables in half, and put it all on the grill. The beautiful stray cats who lived under the beach's abandoned buildings would begin to inch closer to us as the meat cooked, knowing their own dinner was not far off. We would eat as the sun went down and then pick our way down the desolate shore to the Dead Sea's edge. By the fading light, I had to take care not to turn my ankle in a small sinkhole, but the trip was always worth it. The hut that used to provide

lifeguards with shade had fallen down in the wind months ago and almost all the tables and chairs, once such hot commodities among tourist visitors, had broken or been stacked up. In 2015, the place was almost unrecognizable compared to my first visit in 2012. Even the texture of the waterline had changed dramatically because the absence of tourist feet allowed the sea's salt to build up a glittering layer of large crystals the likes of which I had never seen elsewhere.

One particular night, as a large moon rose over the mountains of Jordan across the sea, Ibrahim and I sat on two relatively intact plastic chairs positioned carefully on the uneven coral-like crystals. The moon ("a man, not a woman," Ibrahim reminded me after I mis-gendered it female in Arabic), reflected off the glistening water. In the calm and quiet, Ibrahim mused about God and divinity and asked me "how could anyone not believe in a God? In any God? Not a Muslim God or a Christian God, just a God?" Even as a nonbeliever myself, I had no answer for him. A thought jumped to the front of my mind: because of the sinkholes, I will not have this experience again. Thank God for bringing it to me at least once. Thank God for this remarkable place. On my drive back to Jerusalem along Route 90 and Route 1, the weak headlights of my tiny rental car barely illuminated the dark, but the bright light of the moon guided me home.

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