BY THE TIME THIS TEXT IS PRINTED, the residents of the Bedouin village of al-'Araqib, a dozen or so kilometers north of Beersheba on the northern threshold of the Naqab/Negev Desert, will have recorded the village's 323rd demolition. The largest of these demolitions, in 2010, involved almost a thousand Israeli policemen riding fleets of trucks and bulldozers, using clubs, tear gas, and rubber bullets to drive the residents forcefully out of their improvised ramshackle structures. Most were smaller affairs involving the visit of a single tractor quickly squashing several empty tents on the way elsewhere in the desert after a policeman pinned a photocopy of a court order onto a structure or small tree. It becomes increasingly hard for the police to find anything on which to pin the court orders.

At its most populous, the village numbered about four hundred people, mostly from the extended al-Turi family. Now only a small core of a dozen or so inhabitants remains, within the grounds of the old al-Turi cemetery, right next to the graves. The current demolition count started only in the early 2000s, but the first expulsions had already begun in 1951, three years after the end of the 1948 war, when the Israeli military turned its attention to the Bedouins and started expelling them, as it did with other Palestinians. Almost ninety thousand Bedouins, some 90 percent of their population in the Naqab, were pushed over the Egyptian and Jordanian borders. The rest were scattered internally and concentrated in a limited area in the more arid parts of the desert. In 1953, the military ordered several of the families inhabiting the al-'Araqib, including the al-'Uqbihs and al-Turis, to evacuate their land temporarily, for six months, and move some fifteen kilometers southeast, purportedly to allow for a military exercise. In 1954, after their requests to return were repeatedly denied, Sheikh Suleiman Muhammad al-'Uqbi took his family back to al-'Araqib in the first effort to return. The structures he set up were swiftly destroyed and the inhabitants roughly handled and expelled. Since then, at irregular intervals that sometimes lasted months, other times decades, the original inhabitants of al-'Araqib and their descendents have exercised their "right of return,"
physically, persistently, continuously, on the ground, rebuilding after every cycle of demolitions. Traces on the ground—wells, structures, ruins, and, most importantly, the cemetery—keep that possibility of return alive. Returns are followed by expulsions, but the Bedouin Nakba continue.

"A TRIBE AGAINST A STATE"

From 1973 onward, the returns to al-'Araqib were led by Nūrī al-'Uqbi, Sheikh Suileman's son, who had since founded the Association for the Defense of Bedouin Rights, a small (often one-man) NGO, the first of its kind committed to the Bedouin land struggle. The cycle of returns, demolitions, and confrontations escalated in the early 2000s after the al-Turi returned to build their village next to their ancestral cemetery. In these years, Nūrī al-'Uqbi set up a protest tent a kilometer or so west, next to the ruins of his father's house. By then, the area had been radically transformed. Al-'Araqib was no longer part of the open frontier of the desert's edge, but had become a small landlocked "island" surrounded on all sides by Jewish agricultural settlements, forests, military bases, a highway, a railway, and a major waste-disposal facility.

The recent cycle of demolitions, like those of other illegalized Bedouin settlements, form the most recent chapter in what the Israeli establishment and the media now calls "the battle over the Negev": a systematic state campaign meant to uproot the Bedouins, concentrate them in purpose-built towns located mostly in the desert's more arid parts, and hand over their lands for the purpose of Jewish settlement.

In 2009, Nūrī al-'Uqbi filed a claim for his lands in the district court in Beersheba. He was ambivalent about engaging the Israeli legal system. He had already experienced the way Israeli courts had refused to protect his and other Bedouin claimants. In all previous cases, the courts had ruled against the Bedouin plaintiffs and had upheld state policy. Al-'Uqbi was also aware that appealing to the court's arbitration would give it and the Israeli state an aura of legitimacy. But he had gathered much evidence for his family's ownership of his land—erial photographs, land-sale documents, tax receipts, correspondence with Ottoman, British, and Israeli officials, and military orders testifying to his family's and other Bedouin tribes' settlement and cultivation practices in the northern threshold of the Negev over the past 150 years that he believed no one could contest. Al-'Uqbi hoped that he would be able not only to reverse the dispossession of his family, but also to confront the very foundations of the legal regime that enabled the dispossession of
other Bedouins in the area. The case, one among dozens of others unfolding in these parts, was at the center of a public campaign of protests and demonstrations and was supported by a small, but committed group of activists from Israel and abroad. Nūrī al-'Uqbi said the struggle was that of "a tribe against a state," but this tribe seemed not only one of blood relations, but of a small political community that formed around this issue.

His belief in the law was misguided, and his hopes were crushed under the bulldozers’ chains. Al-'Uqbi v. the State of Israel was heard in 2009. On March 15, 2010, the court ruled against his petition. Still hopeful, al-'Uqbi filed an appeal. On May 14, 2015—incidentally, the eve of Nakba Day—the appeal was dismissed and the legal avenue was closed. During that entire month of May, now known among Bedouins and activists as Black May, the state escalated its raids and demolitions of Bedouin villages in Israel and the West Bank. The struggle now continues outside the Israeli court system. Popular committees of Bedouin, Israeli, and international activists now scramble to protect forty-six other villages facing demolition, including, next, Umm al-Hirān and Atir.

In Part 2, I mentioned that to understand an incident, it is necessary to locate it in the world of which it is a part. In the case of the village of al-'Arqaqāb, the meaning is quite literal: it includes the environment and its transformations, the climate and climate change. Indeed, central to the land struggle is the unique climatic condition at the threshold of the desert, which the state mobilized against its Bedouin inhabitants. Eviction and displacement are based on a legal doctrine, codified in 1975 by a team of experts at the Israeli Ministry of Justice, that combined the mid-nineteenth-century Ottoman land code—to which Israel is committed by the principle of legal continuity—with meteorological data, both contemporary and historical.

The operative principle of the Ottoman Land Law instituted in 1858 is a distinction between cultivated and uncultivated land. Seeking to expand cultivation after a cycle of devastating droughts that threatened to bankrupt the empire, the Ottomans incentivized agricultural production by granting a form of private ownership to those who cultivated land and took that land away from those who didn’t. Uncultivated land, referred to as mawā’r—literally, “dead” land—rocky mountaintops, swamps, and deserts, areas untouched by or orphaned from human husbandry, came under the ownership and control of the sovereign, then the sultan, now the state of Israel.

The Israeli interpretation of the Ottoman code is tautological, self-serving, and goes against all contrary evidence. In the desert, it postulates, the
possibility for agricultural cultivation of cereal crops did not exist—this is the scientific definition of "desert," as we will see. Because cereal cultivation was supposedly impossible, there could never have been permanent settlements in this area. Consequently, the Bedouins there must have been nomads—a common perception that is largely wrong—and nomads possess no land rights.

Resting on a simplified spatial and conceptual distinction between native and culture, barren and cultivated lands, what critical geographer Oren Yiftachel called the "dead Negev doctrine"* mobilized the threshold of the desert to mark a border beyond which lies a vast zone, half of Israel's total land area, within which no land rights exist.

Israel went on to register all lands in the desert as "state lands" and declared the Bedouins living there to be squatters. Those Bedouins who were expelled during and after 1948, according to this doctrine, were banished from lands that did not belong to them in the first place. Inasmuch as their presence was tolerated, it was only as a matter of charity.

Not only did the threshold of the desert mark the border of a zone of dispossession, but it also gave shape to denials that such dispossession has taken place. The doctrine also reflected a core element of Zionist ideology—one that imagined Jews as having returned to a desolate, neglected "dead land," a land belonging to no one, and having revived it.

Over the years, during a number of Bedouin land-rights trials, this legal doctrine kept on revolving around the same elliptical groove it had carved within the law: if the border of the desert marks the limit beyond which no cultivation can take place, there could be no permanent settlements and property rights beyond it. Because it allows no private land rights, state control over the territory is unrestricted, and it can do in this space as it wishes.

On the ground, however, there is of course never a clear borderline that defines the beginning of the desert. Rather, there is a gradient of slowly changing environmental and botanical conditions that throughout the generations gave rise to slowly shifting agricultural practices. The Bedouin inhabitants of the northern threshold of the desert, like previous civilizations, have developed ways to use much smaller quantities of rainwater to cultivate cereal crops, as well as a host of other species of plants. The threshold of the desert is a thick frontier in which aridity and cultivation exist side by side and its location widely fluctuates between drought years and rainy years. There is plenty of evidence for the permanent settlement and cultivation of Bedouins deeper within the more arid parts of the desert during Ottoman, British, and Israeli rule. This evidence is important, because it can be mobilized not only within the Israeli legal context, but to demonstrate the fallacy on which Israeli law stands and the climatic imagination that guides it.

In January 2016, together with the al-'Araqib Popular Committee, other Bedouin organizations and the anticolonial organization Zochrot, Forensic Architecture took part in building and assembling an alternative civil forum entitled Ground Truth, curated by Debby Farber with Aziz al-Turi and Nuri al-'Ughi.* It was an improvised institution in a temporary structure we built outside the al-Turi cemetery. It involved testimonies and the collection of documents, and it also included the closing session of the Truth Commission on Nabiim in the Naqab, a long-term project by Zochrot.10

The term "truth commission" might be misleading. Those truth commissions instituted in South America or in South Africa were instruments of "transitional justice," conceived to help societies engage the wounds of periods of state terror and move on. A truth commission undertaken in situations of ongoing conflict and colonization, however, as a tactical, political act which forms part of the struggle itself. Ground Truth was a forum for the gathering and presentation of testimony and evidence that was denied in court for reasons and under pretenses that we will see later. It thus also had to engage with the very conditions by which historical and legal evidence can be gathered, presented, seen, and heard. In addition, it examined the environment and the climate as subjects of history and law. This in itself required a radical shift between scales and several acts of translation: the nature of testimony and evidence of environmental violence is different from those pertaining to incidents of fast, eruptive violence. The temporality of the climate is long, and its physical extent could be vast. Environmental violence is slow and is produced by multiple lines of causality, both proximate and remote. Furthermore, such environmental transformations and land conflicts are entangled with human-induced climate change.11

Ground Truth was scheduled for January 1 and 2, 2016, because we hoped the new year would give us a little breathing space, a stay on the forum's inevitable demolition. On January 3, the structure was dismantled by its users, shortly before the bulldozers arrived to demolish it. The salvaged raw material has been used for the construction of several other structures in the area of the desert threshold.
The temporary forum of Ground Truth on January 1, 2016. Designed and built with Aziz al-Titi and Sharon Rotbard, the al-'Arab village council, Forensic Architecture, and Zochoor.

Speakers at the Ground Truth/Truth Commission on Nabiya in the Naqab forum. From the left: Sayyb al-
Titi, Nabi al-Dubb, Aziz al-Titi, Dr. Safa Abu-Riba, Nabi al-Dubb, Rashad Shugrat (RMAQ) and Omar
al-Ghoshari, Debby Farbar, Neta Rech and Estela Shehmi.

ALMA SCHRÜCK, JAN KEISCHTER
Collection and photography of documents, and the creation of an online archive (forthcoming), Ground Truth, January 1–2, 2016. ALINA SCHMIDT, JAN HESSMANN

Traces of Ground Truth after its destruction, January 3, 2016. ALINA SCHMIDT, JAN HESSMANN
THE ARIDITY LINE

Although one of the most contested frontiers in Palestine, the threshold of the desert is not demarcated by fences and walls, but rather by a line that exists only on meteorological maps. It stretches continuously for more than seventy-five hundred kilometers and separates the subtropical Mediterranean climate zone from the Sahara and the Arabian deserts. The long history of the village of al-'Arqub has unfolded in relation to other historical-climatic transformations along this vast and shifting environmental threshold. When the desert line ebbs or flows, due to natural cycles, human processes, or their combination, it does so along its entire length.

The threshold of the desert is an elusive category. Botanists define it according to changes in plant type, geologists by studying soil formations, and geographers by studying the density and form of human inhabitation. However, the desert edge is most commonly defined in meteorological terms, by the distribution of rainfall. As fleeing as this threshold is, maps demand decisive demarcations. Because the zone of dispossession in the Negev is coextensive with the meteorological definition of the "desert," it was necessary to establish a clear definition of what constitutes the desert's threshold. When a fleeting meteorological threshold is drawn on maps and coded into laws, it starts affecting the territory itself.

To set climatic areas apart, meteorologists draw what they call "isohyets"—lines that connect all points with the same average amount of annual rainfall. The 200-millimeter isohyet is the one most commonly considered to be the "aridity line"—that is, the beginning of the desert. Across this line a narrowing gradient of thinning blue bands in which each lighter shade represents an area of less rain in iterations of 25, 50, or 100 millimeters per annum flips over to gradually more saturated bands in the spectrum of yellow and orange as the rain is gradually phased out.

The 200-millimeter limit as the threshold of the desert was first suggested in 1914 by a German-Russian climatologist and botanist named Vladimar Köppen as a part of his climate classification system, the basis for contemporary meteorology. Köppen was one of the pioneers in developing atmospheric measurement with balloons, and he also published one of the first cloud atlases. His long-term research, which involved calculating average temperature and evaporation, was published at the end of World War I, when Europeans started ruling vast tracts of the Middle East after their defeat of the Ottoman Empire. Climate mapping was then a largely colonial and imperial science. Köppen tried to settle the differences between the various accounts of travelers and cartographers who had attempted, since the nineteenth century, to determine environmental thresholds. Orientalist travelers employed mainly visual observations to identify the last line of cultivation, but things were not so easily defined on the ground, because topography, politics, and different cultural habits fragmented the position of the desert edge. Furthermore, the European travelers could identify only the kinds of cultivation they were familiar with and often missed the variety and subtlety of different agricultural practices in more arid zones, a mixture of wilderness and cultivation.

The reason that Köppen proposed the 200-millimeter isohyet as the aridity line was that, as his botanical experiments confirmed, it was the minimum amount of water necessary to cultivate cereal crops without artificial irrigation on a flat surface. Wheat grows best in warm climates, never too far from arid areas. The species originated in today's northern Syria and southern Turkey, a few dozen kilometers from the Syrian Desert. The plant will also sprout with less annual water and produce edible wheat, but it needs at least 200 millimeters to create grains large enough for the cultivation to be economically viable and, more importantly, firm enough to be stored without disintegrating. The threshold of the desert was thus not an observable border, but a calculated one. The calculation involved an interplay between several factors: meteorological data (rainfall), patterns of
human use (agriculture, economy), and plant species (the “einkorn” wheat
on which Köppen experimented).

The definition of desert in relation to a single class of grassy grain crops
registered for Köppen the centrality that such plants had in the formation
of human culture. The organized cultivation of an otherwise marginal reed
originating near the deserts of the Fertile Crescent led hunter-gatherers
to settle some eight to ten thousand years ago. As historian Yuval Noah
Harrari puts it, wheat was not domesticated by humans, but rather domes-
ticated them—literally so: it made our species settle, build homes, silos,
and roads, and live in villages, cities, states, and empires, those “great
heaps of people and grain,” as political scientist James Scott calls them.15
The role of wheat was so decisive in human history not only because of
its nutritional value, but also because of the unique capacity for its sur-
plus grains to be stored for years without crumbling or losing their nu-
trional value and thus for them to be circulated as a currency. It was wheat’s
function as money that made it one of the most biologically successful sub-
stances on earth, to the extent that it now occupies more than two mil-
ion square kilometers of the earth, more of its dry surface than any other
plant. It is easy to see that the opposite would also appear reasonable to
ancient and contemporary men—if cereal crops led to the development of
economy, culture, the state system, and law along the threshold of the des-
ert, past the line of their cultivation no economy or culture or state could
exist. That the desert was seen as the primary extraterritorial zone is a fact
that still casts a shadow on contemporary politics.

The problem of defining, delineating, and mapping the threshold of
the desert was thus never only an environmental question, but one that
bore upon historical, political, and juridical considerations. For the Otto-
man Empire as well as for the British Empire that ruled after it, the desert
marked the limit beyond which their effective sovereignty waned. It was
the end of economically productive territory, of the area that was governed
because it could be taxed. Both empires governed little beyond the desert
threshold, and the Bedouin tribes that were living there were granted or
effectively enjoyed degrees of de facto autonomy to run their own affairs
according to their customary law and traditional land system.16

In 1921, as a secretary of state for the colonies, Winston Churchill prom-
ised the Bedouins that the empire would respect their traditional customs
and law, in effect recognizing their degree of autonomy and their system
of land tribes.17 But such autonomy beyond desert lines had also another
side to it. A year earlier, in 1920, while still acting as the secretary of state

A demolished Bedouin settlement near ‘Arab al-Rashaida, a Bedouin village on the eradicdy line, south east
of Bethlehem. The traces on the ground are the shovel marks of a single bulldozer driving back and forth to
demolish the homes. The “call administration” run by the Israeli military demolished this community as part
of its attempts to force the Bedouins of the West Bank to accept resettlement near Jenin.

IMAGE TAKEN WITH A 35MM MOUNTED CAMERA. SHOT RETOUCHED PUBLIC LAW

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for air. Churchill proposed a solution to governing these sparsely inhabited zones across the empire: to use the nascent air force to punish rebels. Indeed, after the end of World War I, the history of the aircraft and that of the desert became entangled. The British in Iraq, Afghanistan, Egypt, Somalia, Darfur, Palestine, and the tribal areas of Waziristan, the French in Algiers, and the Italians in Libya and Ethiopia preferred not to send their policemen, cartographers, tax collectors, and troops beyond the threshold of the desert and left this task to their nascent air forces. What the British called “aerially enforced colonization” was based on the ability of the aircraft to bomb rebels into submission as an economically efficient alternative to the otherwise onerous and expensive tasks of colonial control on the sparsely populated and arid frontiers of the empire. To that extent, the threshold of the desert became the end of a certain kind of manifestation of imperial violence and the beginning of another. It is thus hardly a coincidence that the combination of partial autonomy and violence imposed from the air is still enacted along these same frontiers.

However, beginning in the second half of the nineteenth century, another process became evident. The desert line was not only established as a fixed cartographic object, but was seen as an elastic entity that could be continually pushed against in order to extend, through economic incentives, irrigation projects, and new seed types, the areas of agricultural cultivation into arid areas. Pushing at the desert line enlarged the zone of economy, of law, and of state control and reduced the extent of the extraterritoriality. Around the turn of the twentieth century, the Ottomans built a string

of new garrison towns and administrative centers a few dozen kilometers into the desert as it crossed their empire. From Egypt through the areas that are now Palestine/Israel, Jordan, the Syrian Desert, and Iraq, many of these towns are now abandoned, because the high-tide line of the desert has overflowed them. One survived: the town of Bir al-Saba’, later British-ruled Beersheba, is now the Israeli metropolitan city of Beersheba.

The French, Spanish, and Italians who colonized North Africa improved the use of artisanal wells and artificial irrigation gradually to push their line of cultivation, which previously ran closely parallel to the southern Mediterranean coastline, farther south into the Sahara. In the process, they also massacred Bedouins and other seminomadic people and expelled the rest deeper into the desert. In the post–World War II era, the Arab national governments likewise employed artificial irrigation to cultivate the lands at the desert’s edge and expel or control the Bedouins by concentrating them in towns.

Of all the colonial projects in North Africa, the Italians, who colonized Libya beginning in 1911 (and as Fascists beginning in 1922) were the most similar to the Zionists, similarly arguing their colonization as a form of “return” to a Roman patrimony. A string of agrarian settlements was built along the edge of the Libyan steppe, and forests were planted to stabilize the Libyan sand dunes. Almost half the Cyrenaican Bedouin population was displaced into concentration camps deeper in the desert. When they rebelled, starting in 1930, the Italians bombed them with mustard gas. In late 1932, while these “pacification wars” were drawing to a close, an enthusiastic American journalist reported from Libya under the headline of “Will the Libyan Desert Bloom Again?” The journalist wrote: “The far-seeing eyes of Mussolini looked way beyond the wastes that had been abandoned for more than a thousand years by all but fighting Arabs when he made a triumphant journey through the colony... the frontier of cultivation moved thirty-five miles from the coast... acreage of barley has been quadrupled, hundreds of thousands of new olive trees have been set out, bringing the total to about a million.” This could have been a Zionist text about the Negev.

THE CONFLICT SHORELINE

The longest continuous aridity line on meteorological world maps begins in West Africa, just north of the Morocco/Western Sahara border. This is the conflict shoreline—the shifting threshold of the desert, which connects local histories and is currently the site of conflicts all along it.
This aridity shoreline passes through Algeria, Tunisia, Libya, and northern Egypt. It enters Palestine in an area of sand dunes on the southern shores of the Gaza Strip, north of the city of Rafah. This area is inhabited by the poor Bedouin fishing community of the al-Musawi. It was on the ruins of their homes that the largest Israeli settlement block of Kafr was established in the early 1970s (and destroyed in the summer of 2005). The meteorological threshold then passes by the neighborhoods, refugee camps, and greenhouses of eastern Rafah, the site of some of the bloodiest battles of the 2014 Gaza war, including that of Black Friday, August 1, 2014. One of the reasons for the fierceness of the battles in southern Gaza is that, as I noted in Part 2, the earth there is dryer and the water table is lower, conditions more conducive to military tunneling. The line then moves across the rubble piled everywhere along the Gaza side of the border zone and then crosses the mighty fences that enclose the Gaza Strip. (It is possible to do so because we are moving with the weather.) On the Israeli side of the fences, the landscape immediately becomes looser. The line moves through miles of field crops—strawberries, melons, herbs, and cabbages—irrigated by state-of-the-art watering systems. The line then crosses a number of towns and settlements, including Ariel Sharon’s Sycamore Ranch, his home and burial place. After that, it cuts across the al-Araqib stream and the gentle hills around it, moving right over the old cemetery and the ruined homes of the al-Turi. It is here and on the hills farther to the east that “the battle for the Negev” is waged, where the ramshackle homes and animal pens of the illegalized Bedouin villages are bulldozed time and again. Moving north and eastward, the topography gently rises and the desert line enters the large pine forest of Tamar. The forest ends abruptly at the high barbed-wire fences that mark the length of the West Bank wall in those parts. On the other side of the fences, the landscape immediately falls barren. It is on these hills that the military and “independent” settler groups carry out the destruction of homes, the blocking of wells, and the displacing of Bedouin communities, and this with no pretense of following the due legal processes required within Israel. The aridity line then crawls up the interspersed soft and hard limestone of the Hebron Mountains. East of the city of Hebron, it passes through the militant-religious-nationalist Jewish settlement of Kiryat Arba, whose inhabitants put the Palestinian families at the center of the city under permanent siege. North of the city, the hills rise like broken teeth made up of sharp cliffs and canyons that drain rapidly into the Dead Sea. Keeping to a more or less consistent altitude of about three hundred meters above sea level, it passes by several other settlements.

A dozen or so kilometers east of Jerusalem is Matale Adumin, one of the biggest settlements in the West Bank, built on top of a hill on the lands of the Jahalin Bedouins, who still struggle to hold onto the outskirts of this green suburb. Several years ago, the settlement authorities attempted to displace the Jahalin Bedouins by releasing raw sewage downhill directly onto their homes. Now, the military simply sends its bulldozers to do the job.

Following the aridity line, we descend several hundred meters and move along the western slopes of the Jordan Valley at an altitude close to universal sea level. A few dozen kilometers later, we dive three hundred meters under this altitude. Many of the eight thousand Bedouins in this area are refugees displaced from the Negev during and after the 1948 war. Israel designates most of the area as either “nature reserves,” “closed military zones,” or agricultural fields and orchards belonging to the thirty-seven Jewish settlements of the Jordan Valley. The military, trying to keep the area bordering Jordan “sterile,” sends the Bedouins away by shooting at herders and herds. Several dozen kilometers north of the Dead Sea, it is a relief to see the tail of the environmental monster of the aridity line sliding past the border fences into Jordan and disappearing behind the western slopes of Jabal Amman.

But the line continues its course, connecting histories otherwise defined by and confined to national borders. Following it forces us to think about history beyond the frame of the state. In Jordan, the aridity line moves north and east, crossing into Syria precisely at the border city of Daraa. It was into this city that the drought of 2006–2010 displaced one-hundred thousand farmers impoverished by crop failures. Almost 1.5 million farmers across Syria shared a similar fate. In 2011, this contributed to the protests that marked the beginning of the Syrian civil war. The line continues from the eastern outskirts of Damascus, through Homs, then eastward toward al-Raqah, declared by Daesh as its capital. Many of the battlefields in the civil war are strung along the threshold of the great Syrian Desert.

From Syria, the desert line crosses into Iraq, where the out-of-use channels, dams, and water pipes of previous decades’ agricultural push into the desert are now the backdrop to spectacular fighting. The aridity line then crosses Iran to the frontier desert provinces of Afghanistan and Pakistan near the shallow Hindu basin lakes now almost entirely dry and moves up along the Helmand river—where some of the fiercest fighting in the ongoing insurgency took place, as well as some of the most robust opium cultivation and persistent Western aerial bombing campaigns.
There are other continuous aridity lines. The Sahel, the southern threshold of the Sahara, is a belt of desert threshold that runs across the entire African land mass. It was there that the consequences of desertification were first measured in the late 1960s, following repeated cycles of drought and famine and the eventual introduction of instrument measurements. It was one of the last parts of the world that had previously not been meteorologically measured. The word Sahel is Arabic for ‘shore-line’—but recently, this shoreline seems to be only receding as the desert advances. Temperature and evaporation are on the rise, and millions of square kilometers of steppe and former arable land are turning brown, leaving miles of baked plant remains where the sparse green pastures and fragile agriculture of the savannah once were. Droughts often lead to increased competition over shrinking resources, aggravating the consequences of civil strife. In turn, continued conflicts in these areas have caused the destruction of vegetation and agriculture and have accelerated the processes of desertification.39 Like the northern Saharan conflict shoreline along the Sahel, existing tensions have been aggravated by climate-related shifts of the aridity line. In past decades, conflicts have broken out in most countries all along the aridity line: Senegal, Mauritania, Mali, Niger, Chad, Sudan, Somalia, Ethiopia, and Eritrea. Capturing the tension between desertification, conflict, and planting, the London Sunday Times recently reported on a European-funded five-thousand-mile-long wall made of millions of trees across the Sahel, meant to slow down desertification and to do nothing less than “hold back Saharan terror.”40

METEOROLOGICAL TRACES

Developing a more nuanced understanding of the desert climate—the long-term history of its weather, variation, steady change, and interaction with notions of law, territory, and extraterritoriality—is thus an essential task in the Naqab/Negev and elsewhere. Evidence for varying climatic conditions for periods prior to the institution of the meteorological record in the area under the British mandate in 1931 (Ottoman rain measurements, starting at the second part of the nineteenth century, did not include the Naqab), can be found in documents and material records that were not intended to be meteorological: oral traditions of the indigenous people living there, travel literature, diaries, cultivation logbooks, and governors’ correspondence written by Orientalist cartographers, soldiers, and spies who were roaming through Palestine at the time. Land-transfer documents and tax records contain information about declared volumes of cultivation. Sections cut through stalactites found in caves tell us something about quantities and patterns of rainfall as annual rings in a way analogous to tree trunks. Archaeological remains, wells, dams, farms, fertilized seeds, and plants testify to continuity and change in agricultural patterns. Interpretation of early twentieth-century aerial photographs confirms settlement and cultivation patterns in these parts. In addition, sometimes the film’s very blurriness can indicate the moisture content of the atmosphere—the thickness of the air between the lens and the surface of the earth—at the time the photograph was taken. These records allow us to understand the ways in which climatic shifts over time and space interacted with political processes. Looking at these records, we can see how much conditions of aridity fluctuated over the centuries.31 Remains of some Nabatean and later Byzantine towns, cereal fields, grape vines, and olive orchards could be found some fifty kilometers south of today’s average aridity line, within otherwise dry and desolate lands. On the other hand, beginning in the late nineteenth century, cartographers such as the German-American Gottlieb Schumacher and the British colonial administrator Herbert Kitchener drew the threshold of the desert a few dozen kilometers north of where it is marked today, roughly along where the 300-millimeter isohyet is now drawn on contemporary maps, right through acres of orchards and fields.32

Reading the history of the climate from such nonmeteorological records can provide only general indications.33 But because climatic fluctuations along the threshold of the desert are not registered simply by variations in crop productivity—which depend on many different factors, but more often on crop failures, in the sharp differences between life and death, which are more likely to affect human culture and thus be reported—it is among the clearest environmental sensors for registering shifting historical climate patterns.

The movement of the line of the desert has been understood since antiquity in theological terms. Divine retribution was exercised by turning fertile lands to desert (“the cities of the Negev shall be shut up”)44 or, conversely, biblical prophecies promised that, given good conduct, adequate sacrifices, and some prayer, the desert will be made to flourish (turning “the desert into pools of water, and the parched ground into springs”).45 These biblical passages are the source for the colonial and Zionist messianic meteorology of “making the desert bloom.”
NEGEV SETTLEMENTS, VEGETATION, AND PRECIPITATION

In 1942, Bedouin tents were densest in the northwestern part of the Negev and existed on both sides of the aridity line as seen in the map on the right. The NDVI map on the left shows Bedouin villages (black squares against yellow/orange background) concentrated in the more and eastern parts of the northern Negev, almost entirely south of the 200-millimeter isohyet. Jewish settlements are now located in the area previously most densely settled by the Bedouins (white squares against green background). They are surrounded by robust vegetation—fields and gardens—supported by artificial irrigation. The juxtaposition of these two maps tells the story of the displacement of Bedouins in relation to meteorological conditions and the uneven distribution of land and water.

THE BEDOUIN NAQBA

"Making the desert bloom" requires obtaining land. When the land is already occupied, it requires purchase or the displacement of its inhabitants. Zionists did both. In the decades preceding the state’s establishment, they bought land from the Tarabin, al-Azagme, al-Jubarat, and Tiyaha tribes in the northern Naqab.30 This was a clear recognition of the Bedouins’ land ownership, an ownership the forthcoming state later ignored. In this period, Zionist settlers tended to see the Bedouins not as dangerous competitors possessed with a strong national identity, but as "orientalised biblical figures embodying the way of life of their forebears," as historian Moron Benvenisti has put it.31 A Zionist leader proposed that the Bedouins were “the type closest to that of ancient Semitic population...and thus blood relations of the Jews.” David Ben-Gurion toyed with an idea of converting them back to Judaism.32 What Zionists could not see was that, at the turn of the twentieth century, the Bedouins were undergoing a rapid process of social and political transformation.33 Toward the end of the Ottoman period, the pressure on land grew, and Bedouin tribes were expelled from northern Palestine and moved south. The Bedouins of the Naqab started to adopt a more settled pattern of life. "Migration" occurred along short routes between fixed summer and winter accommodations, primarily from the higher to the lower slopes of the same hill and within well-defined territories of tribal control, or dira. The process of sedentarization led to the “closure of the frontier” (around the same time it closed in the American West), and nomadic life effectively ceased.34 The settling of Bedouin tribes was apparent in the proliferation of hard structures, or biyya, structures built of adobe and stone as anchors at the center of tribal lands.

Since 1931, when the Zionists, under the British Mandate, instituted systematic meteorological measurements, the location of the aridity line has been a product of monitoring, calculation, averaging, and adjustment. Like a shoreline, it ebbs in drought years and washes past its cartographic delineation in rainy ones. The line drawn on the official maps in the Atlas of Israel officially constituting the border of the Negev is the average between all the years since records began to be kept. Annual fluctuations are generally of the range of twenty kilometers on either side, but the line was also known to have shifted some one hundred kilometers in each direction.41

The northern threshold of the Negev is where the conception of a Jewish return to a “dead area to be revived” was most clearly manifested. The colonization of the desert was not concerned only with territorial
expansion, but also with the transformation of the figure of the Jew from one associated with cosmopolitan, wandering nomads into a native, setting down roots again while expelling the area’s inhabitants, themselves now perceived to be nomads, as if expelling or exercising its own past identity. It also involved, quite literally, an attempt at changing the climate. Indeed, the introduction of artificial irrigation, new seed types, technologies of intensive farming, synthetic fertilizers, pesticides, and large-scale afforestation—the secular vocabulary of the worldwide “green revolution”—forced the desert into a gradual retreat, together with its original inhabitants, and made, at least temporarily, the desert bloom.

Most Palestinian urban or farming communities were expelled from the areas that became Israel in 1948, but the Israeli military turned to deal with the Bedouins only after the end of the 1948 war. Between 1948 and 1953, the Israeli military expelled almost 90 percent of the one-hundred thousand Bedouins of the Negev to the West Bank, Gaza, and farther into Jordan and Egypt. These displacements involved massacres of people and livestock, the burning of tents, the destruction of 60,444, and the sealing of wells, as well as, on some occasions, strafing from light planes. On the eve of the 1948 war the area most densely settled by Bedouins was northwest of the 200-millimeter isohyet. Afterwards, the twelve-and-a-half thousand Bedouins who remained were displaced southeast into a one-thousand-square-kilometer saline area known as the siwyg, Arabic for “enclosure” or “fence,” in which the average precipitation was about 150 to 100 millimeters per year, an area which Israeli agronomists determined is not suitable even for intensively irrigated agriculture. Bedouin displacement in the Negev was not only a matter of territory, but also of climate. The siwyg operated, as political scientist Neve Gordon has suggested, like a Native American reservation of the nineteenth century.

When the Bedouin villages of the northern Naqab were removed, also erased were the names of the hills, rivers, and archaeological sites by which the desert was known for hundreds of years. A new Hebrew map was drawn up, and new road signs were installed. Zalman Lifshitz, head of the Negev Names Committee established by David Ben-Gurion in the late 1950s to take charge of this process, declared: “the whole question of Arabic place-names in the Negev has become irrelevant since there are almost no Bedouin there.” The Naqab had fully turned into the Negev. Between and sometimes within settlements, fields, and forests, some physical traces of Bedouin life remained, but the empty cemeteries, wells, water holes, and ruins of stone houses were publically attributed by state-sponsored tours or signs to ancient cultures. Such remnants, of which the cemetery in al-`Araqib is but one example, became the anchors to which Bedouin communities would try to return some sixty years later.

To settle the Negev, the paramount Zionist challenge involved the trafficking of water. Even before the state’s establishment, water was channeled from the coastal plains. It was the ability of the national water company (Mekorot) to undertake large-scale water engineering projects that enabled the establishment—during a single day in 1948 of eleven settlement points in the northern Negev. The Yarkon-Negev water link was constructed in the 1950s—after the displacement of the Bedouins and to irrigate their seized land—with recycled firefighter pipes imported from London, where they had been used during the Blitz. The pumping stations and pipelines were built underground for “security reasons” and in order to avoid water theft.

THE POLITICS OF DROUGHT

In a response to the presentation of this study in the Ground Truth forum, historian and land rights activist Gadi Algarzi and Bedouin scholar Awad Abu-Freih suggested that the cycle of drought interacted with the history of Bedouin land struggle, with alternating acts of displacement and return. I will try to trace this process.

The first years after the establishment of Israel in 1948 were plentiful with rain. This enabled the expansion of Zionist agricultural cultivation into the desert. During the first decade of the state, some 30 percent of all cereal cultivation in Israel came from the northern Negev. In 1950, Yosef Weitz, who since 1932 had been the force behind afforestation and was then head of the Jewish National Fund (JNF) Lands and Forests Department (also, not unrelatedly, one of the leading forces behind the expulsion of Palestinians in 1948), reported back to Ben-Gurion about the planting of a million eucalyptus and tamarisk seedlings. Weitz saw forests as “a biological declaration of Jewish sovereignty,” a means of erasing Bedouin settlements and of preventing their return. Weitz thought the forests would combine ecological and security logic in “rolling back the desert with trees, creating a security zone for the people of Israel.” The relation between afforestation and Judaization of the landscape was not confined to the Negev. Shortly after Israel’s establishment in 1948, the JNF, under Weitz, also planted millions of conifers in different parts of the country, covering up the remains of Palestinian villages that had been destroyed during or after 1948, preempting any claim or possibility of return. This practice still takes place in the Negev, where
afforestation is used as a means of erasing former Bedouin settlements and of preventing their resettlement.

The plentiful early years of the state led to the displacement of even the last remnants of Bedouin inhabitation still left in the northwest part of the desert, close to both sides of the aridity line, the part somewhat suitable for cultivation. The agrarian settlements of the Kibbutz and Moshav movements fought each other for the spoils of Bedouin lands.

During these years the emptied lands of the northern Negev were also handed over for the construction of several “development towns”—Ofakim, Yeruham Arad, Dimona, and Mitzpe Ramon—in which the state settled mainly North African Jews in public housing blocks built around state-subsidized industries (the European elite believed that these Arab Jews would be better accustomed to the desert edge than migrants arriving from Central and Eastern Europe). One of the largest “state factories” constructed in 1952 on Bedouin lands just outside the borders of the Negev was the Negev Nuclear Research Center near Dimona, where Israel produces, without acknowledging it, its nuclear warheads. Bedouin tribes are ordered to keep fifteen to twenty kilometers away from its fence.

Drought hit hard in 1956, lasting for five years, until the autumn of 1962. It was the longest drought of the twentieth century. Field crops failed, and so did newly planted tree saplings in the JNF’s afforestation of the desert threshold. Seeing their investment in mechanization, agricultural infrastructure, and irrigation going to waste, farmers and private investors started abandoning their projects, retreating northward from the Negev. It was in response to this drought that a state-run agricultural firm was established to insure farmers from natural disasters. It decided to use the aridity line as an instrument of redividing and did not provide drought compensation to farmers cultivating south of it. This led to further agricultural abandonments in areas just south of the 200-millimeter line. The drought affected the remaining Bedouin communities, too. In some places, it led to severe malnutrition and even hunger. However, unlike the commercial farmers, the Bedouins were able to adapt, shifting from agriculture to grazing, and they held on to the area.

The climate played a complex and dialectical role in the land struggle. Droughts were used politically by both sides in opposite ways. Moshe Dayan, who during most of the drought years was Ben-Gurion’s minister of agriculture (1959–1964), attempted to use the Bedouins’ hunger to push tens of thousands of them outside the Negev. Writing in Haaretz in 1962, Dayan explained:

The Bedouin must become urban laborers—in industry, service, construction, and agriculture. Eighty-eight percent of Israel’s residents are not farmers. The Bedouin will become part of that majority. While it is a sharp transition, it means the Bedouin will not live on his land with his flock, but rather will be part of the urban class that comes in the afternoon and puts on his slippers. His children will become accustomed to a father who wears pants, who doesn’t carry around a dagger nor is pulling lire out in public. They will go to school with their hair combed and parted. It will be a revolution, but it can be done over two generations. Not forcefully, but directed by the government. The reality known as “Bedouin” will disappear.

This is a kind of racism, Algazi commented, that is different in kind from the racism that seeks to displace, expel, and exclude. Rather, it seeks to erase a culture by its forced incorporation into the dominant group.

Dayan’s policy led to the establishment of Bedouin settlements near Arab towns in northern and central Palestine, as well as to informal settlements on the outskirts of Jewish cities. As a child growing up in Israel in the 1970s, I can still remember Bedouin villages with some envy, children on horses or herding goats, and even a few camels that we could see while driving just outside the suburbs that ringed the metropolitan centers. After a few years, they were evicted from these sites, too, mostly displaced into a number of desolate towns—known by Bedouins as “concentration towns.”

Although in the drought years of the late 1950s and early 1960s, it was possible to expel some of the Negev Bedouins and to harass the others, it was not possible for the state to settle the northern Negev effectively. The abandonment of Zionist agriculture in the south and the Bedouins’ relative advantage in dealing with drought opened a space for the first wave of Bedouins to return and give the land struggle a small breathing space. In the mid-1960s, the plentiful years returned and violence escalated. The return of the rain allowed the Zionist line of afforestation and cultivation to push south beyond and over Bedouin settlements. In 1966, afforestation began in earnest again with Yatir, the largest forest in Israel. It was planted on Bedouin lands and was meant to separate the Bedouins of Israel and 1968 Palestine from those of the West Bank, many of whom were refugees from the Naqab.

During these years, the National Water Carrier, designed and built during the drought years, one of the largest of its kind worldwide, gave another boost to Zionist colonization. It started channeling an annual quantity of 100 million cubic meters of water from the Jordan Valley basin.
to the Negev settlements, which could expand their cultivation southward regardless of annual fluctuations in rain totals. The Bedouins traditionally had cultivated along the streams and tributaries, but now it was the entire surface of the northern desert, including the shallow hill slopes, that was put to agricultural use.

The Zionist transformation of the desert’s edge had an ecological footprint that reached far beyond the region and that has contributed, since the 1960s, to a drop of about one meter a year in the level of the Dead Sea, because most of its incoming waters are being diverted through the National Water Carrier. Thus, the farther south the cultivation line was pushed, the lower the lowest point on earth has become.54

Until 1966, the Bedouin enclosures or siyag was placed under a military regime. In 1966, after the termination of the military rule, the siyag was replaced by another well-tested colonial strategy: the concentration of indigenous populations in higher densities to reduce the extent of the land they possess and free up land for state exploitation. Seven “concentration townships” were built between 1968 and 1989 and are now home to one-hundred-and-thirty-five thousand people. Forced urbanization severed Bedouins from their pastoral and agrarian lives and facilitated their proletarianization in industrial and agricultural projects, as well as their incorporation as salaried soldiers into the Israeli military, where they are employed mainly as trackers or as an interface with the civilian populations of Gaza and the West Bank.

Many Bedouins refused resettlement, their population expanded, too, and today they number about eighty thousand. Their villages had been declared illegal, and the state considered them trespassers or squatters, refusing to mark them on maps or to provide them with basic infrastructure and municipal services, even medical ones.55 Without ownership of the land, Bedouin settlements were continually uprooted as state priorities in the Negev shifted. In the early 1980s, many Bedouin settlements were displaced when the military transferred its major air force bases to the Negev following Israel’s withdrawal from the Sinai as part of the peace agreement with Egypt.56 More recently, Bedouins were displaced to make space for the construction of the Ariel Sharon City of Training Bases—with accommodation for one hundred thousand military personnel—south of Beersheba.57

The irony is that while the state claims it is trying to settle the Bedouins by changing their traditional nomadic life (which has not been their life for more than a hundred years) to an urban existence (the concentration towns might be dense, but they have none of the qualities that make them urban), it has repeatedly moved them around in the desert, leading to what Palestinian legal activist and planner Hana Hamdan has called “a condition of forced nomadism.”58 Recent government plans have sought to contain the escalating
conflict with new proposals. But these plans have merely tried to solve the problem with more of the very thing—concentration towns—that had aggravated it in the first place. As Nūrī al-Uqbi explained to me: “The Bedouin Nakha was not to be expelled outside the country; our catastrophe was to be concentrated.”

There were other institutions set up for the task of displacing Bedouins. An organization called the Green Patrol was established in 1977 to deal with Bedouins’ return to the land at the threshold of the desert. Its name was yet another manifestation of the strategic importance that ecology plays as a political tool on the desert threshold. It had a seemingly benign task, the ecological preservation of the threshold of the desert, but was in fact tasked with policing the expansion of the illegalized Bedouin villages. The quest for “nature preservation” put the Green Patrol into direct conflict with indigenous culture and Bedouin land ownership claims. “They would attach a jeep to a tent and just drive off. They would poke holes in our jerry cans so that we’d run out of water,” a former Bedouin soldier in the Israeli military and a resident of one of the illegalized villages recounted. “Imagine how a man felt when he returned from the army to find his tent destroyed and his wife beaten.”

The official understanding is that areas where unrecognized Bedouin villages are located are considered “empty” had tragic consequences during the 2014 Gaza War. The “iron dome,” the missile-interception system installed by Israel to protect them from rockets fired from Gaza and elsewhere, is designed to calculate the rockets’ approximate landing spot. If they are predicted to fall in an “open area,” the system doesn’t fire one of its 520,000 interceptors. On July 19, 2014, two days after the Israeli invasion of the strip, a rocket fired from southern Gaza, aimed, most likely at the nuclear reactor, was projected to land in an “open area.” It did so indeed, except that in this open area, as marked on maps, was the unrecognized village of Jarasbah. Thirty-two-year-old Auda al-Wadj was killed, and four of his family members were wounded. Still, the state has not installed shelters in these villages, as it does in all other civilian communities, and has advised the Bedouins simply to lie on the ground with their hands protecting their heads when they hear a rocket about to land.

The drought years of 1999 to 2001 further interrupted the afforestation efforts and led to water shortages, the failing of saplings, and bush fires. The interruption contributed to the return and resettlement of al-Araqib on an area the state had reserved for a forest. Plantation around al-Araqib resumed in the plentiful year of 2002. By this period, the methods of
Roundup, produced by the multinational agrochemical corporation Monsanto, on a person's skin. After the court forbade the practice, old habits resumed, and the crops were simply crushed under the wheels of the Green Patrol's road vehicles or uprooted by the blades of their bulldozers.

During the recent decade, on the lands in and around al-'Arabib, the JNF has overseen the planting of three forests. The Ambassadors Forest, inaugurated in 2005, had diplomat from forty-nine nations planting trees on behalf of their countries. Only the South African ambassador was wise enough to decline the honor. The God TV Forest was planted in 2008 as a gift from an organization that propagates the millennial view that ultimately all Jews must convert to Christianity or face an "everlasting lake of fire." The Nuremberg Forest was paid for by that German city. It had a dedication sign reading: "Lest We Forget." This combination of selective commemoration and erasure is a common practice. In the Jerusalem corridor tens of millions of conifers were planted by the JNF on top of the ruins of dozens of Palestinian villages destroyed in 1948. Some of these forests are Holocaust memorials. On its website, the JNF claimed that it has planted 750 million trees in Israel since 1901. It is also the largest landowner in Israel, and, despite a number of complicated legal challenges, it still refuses to lease or sell land to non-Jews.

These days, the most common justification for planting forests is that they are responses to desertification. Recognition of year-to-year patterns of desertification (as opposed to cyclical droughts) in the Negev started in the early 1970s and went hand in hand with increased global attention to the consequences of human-induced climate change. The JNF used the alarm about the consequences of climate change and desertification to promote its own agenda of Bedouin displacement, suggesting that in the Negev, "desertification could be stopped by large-scale afforestation" and by "restrictions imposed on livestock grazing." Both methods are directly mobilized against the Bedouins: the former by planting forests over and around their settlements and the latter by further restricting their pastoralism.

Environmentalists continually protested, in vain, that JNF afforestation damages the ecosystem. Earthworks, piled high by heavy machinery to create dams to irrigate forest saplings, destroy surface soil composition, and stop rainwater from reaching the valleys below, increasing their salinity. The area is also made toxic with herbicides used to eradicate local vegetation prior to planting the saplings. Trees do cool the areas around them, but only because they remove precious water from the soil and release it into the atmosphere. Although carbon sequestration (the absorption of CO₂) has a positive effect on climate change, afforestations in desert areas might actually contribute to global warming because of the increased heat absorption due to their darker color, compared with the light-colored steppe, which better reflects heat. The desert's light yellow areas, rather than the thicker greens of the forest, protect it from overheating.

The gift that Ben-Gurion thought Zionism was to nature has seemingly been rejected. Pushing the line of cultivation south contributed to the northward shift of the average aridity line. Although the attempt was to make the desert green, in many places, the green has yellowed. The Bedouins, like other people all along the edges of the desert, now felt themselves squeezed between two major forces pushing in opposite directions—Israeli colonization pushed the desert edge south, while desertification pushed it north.

The next cycle of droughts, culminating in 2010 and 2011, affected the entire region. It also tied together the fate of people living on the opposite shores of the Sahara. Sudanese and Eritreans escaping war and famine along the southern shores of the Sahara—the dry desert-Sahel—were compelled to make the journey north across the desert and ended up incarcerated in prisons in Israel. On the northern shore of the great desert, prisons built in places from which Bedouins were displaced.
The Normalized Difference Vegetation Index (NDVI) is a graphic indicator that measures the coverage and robustness of vegetation. One of its indicators is photosynthesis. This study, undertaken with Jaron Van Den Hoek, then at NASA, was a byproduct of our study of the Gaza/Israel frontier during the 2014 war (see Part 2). It shows that the border of the arid area, now generated by artificial irrigation, no longer overlaps the 200-millimeter isolyme.

1 The border between the Negev (Israel) and Sinaï (Egypt) is distinguished by the heavy grazing of goats and camels on the Egyptian side. On the Israeli side of the border, the exclusion of Bedouin shepherds is indicated by the moderate, but consistent vegetable cover. The presence of vegetation is evidence of the expulsion of the Bedouins from this area. At the bottom of the frame are a number of agrarian settlements established to "fortify the border." Kfar is abandoned because of the harsh climatic conditions and subsequently converted into a detention camp. Initially for Palestinians and then for illegalized African immigrants. Israel's later "prison archipelago" developed around it, is made visible here by small gardens within the prison walls.

2 The cultivation border between a number of Israeli agrarian settlements and the dunes of Nitzana. This is where some of the Jewish settlers who were evacuated from Gaza in 2005 were relocated.

3 The border with Gaza is apparent in the differing agricultural patterns and levels of vigor in the vegetation. On the Israeli side are large, well-irrigated fields, on the Gaza side, small fields are cultivated with less available water. This border area was the site of the 2014 Israel-Gaza conflict.

4 The development town of Ofakim, nestled between the fields of the neighboring agrarian settlements, has a cluster of small urban gardens within it.

5 A group of artificially irrigated agrarian settlements, Revivim, Moshavat Sadet, and Ashdod.

6 Sde Bokeq, a kibbutz practicing experimental desert agriculture and a college specializing in solar research. This is where Ben-Gurion died at the end of his life and where he is buried.

7 The Avdat experimental desert farm, where traditional irrigation methods are used to support cultivation for scientific purposes.

8 Rahat, the largest Bedouin town in the Negev, is an arid island surrounded by the well-irrigated fields of the Jewish settlements nearby. Its urban center and adjacent lands are much drier than the nearby Jewish development town of Ofakim.


10 Area within the former swag, the Bedouin enclosure of 1948–1966, where many of the illegalized Bedouin villages are located. The former swag area is made distinct by the low vegetative vigor associated with its small subsistence fields.

11 The city's settlement in the West Bank, distinguished by the clear vigor of its vegetation — well-irrigated domestic gardens.

12 The forest of Yatsir, where planting started in 1966 and has been ongoing ever since. Its northern edge abuts the border of the West Bank, seen clearly in the immediate reduction of vegetative cover and vigor. (See the image of the Yatsir Forest, above, p. 244.)

13 The air-base area of Neveh is located in the middle of an area demarcated with Bedouin villages (legal and illegalized) within the former swag. Note how the runways are visible as strips without vegetation, but how the gardens in the residential part of the base are better irrigated than the surrounding Bedouin settlements.

14 The city of Hebron. East of the city, where the settlement of Kryal Arba is located, vegetation levels increase due to greater water allocation to the Jewish settlers.

15 The Negev Nuclear Research Center near Dimona. The small spots of vegetation here are the gardens within the secret reactor laboratories where Israel is reportedly constructing its nuclear weapons.

16 The settlement block of Nekdim (home to Israeli politician Avigdor Lieberman), Tekoa, and Khir El-Eisal is distinguished by high vegetative vigor at the edge of the desert.

17 Afforestation within the Jerusalem corridor on both sides of the Tel Aviv–Jerusalem Highway (Road No. 1).

18 The settlement of Mitzpe Adumim, conspicuous by the vigor of its vegetation at the edge of the desert.

19 The Palestinian city of Jericho, a desert oasis nourished by springs from underground aquifers.

20 An Israeli agricultural settlement block and agricultural fields. The surrounding arid area are where the Bedouin communities of the Jordan Valley are located.
This series shows the decline of agriculture in the area of the cemetery (marked by a red square) of al-‘Araqîb from 1990 to 2014. The thinned tree plantation beginning in the early 2000s dissolves farm-plot boundaries as planted trees encroach upon and eventually dominate agricultural fields.

COLONIALISM AND CLIMATE CHANGE

Reading the history of the interaction between climate change and conflict requires a constant navigation between scales: from a close reading of small-scale evidence, local conditions, incidents, and cultivation techniques to examination of environmental conditions that are geographically vast and historically deep. Environmental violence brings together different types of sources and frameworks to analyze them—literature, geology, archaeology, and photography—to name but a few. The shift between these different scales and frameworks reflects the equally complex structure of environmental causation.

Historical change results from the coming together of long-term structural processes as well as from contingent, eruptive, and unpredictable developments. When dealing with the relation between history and climate change, we must be wary of the essentialist approach of “geographic determinism” that seeks to explain conflict and revolts as the inevitable consequence of environmental conditions and their transformations. Different locations, cultures, or states dealt with the challenges of desertification, for example, in different ways. Some areas succumbed catastrophically, while others found ways to mitigate environmental change. At other times, technological inventions, catastrophic defeats, or the introduction of a new plant species led to political and cultural transformations.

Fernand Braudel, the great French historian of the mid-twentieth-century Annales School, proposed to extend the frame of historical investigation to include the environment, topography, climate, and wind over centuries, a historical perspective he has called the longue durée. He pays considerable attention to the thresholds of the deserts around the Mediterranean. But over sixty years ago, Braudel thought of the climate as governed by a cyclical pattern. The history of “man’s relationship to the environment,” he wrote, has been so slow that it is “almost timeless.” But in the era of rapid human-induced climate change, the climate can no longer be considered as shifting along constant cyclical patterns. It is changing at the same speed as human history, racing alongside it, getting entangled and interacting with it in an ever-aggrevated feedback loop of cause and effect, with consequences that have spiraled out of control.

Debates about the origins of climate change tend to foreground the adverse effects of industrialization and the excessive atmospheric accumulation of greenhouse gases produced mainly by the burning of fossil fuels. This was the reason that when ecologist Eugene F. Stoermer and
atmospheric chemist Paul Crutzen introduced the concept of the Anthropocene to name a new geological epoch in which humans are considered as climatic and geological forces akin to earthquakes and ocean currents, they initially proposed dating its beginning to the invention of the steam engine. Climate change in this scenario is the accidental and indirect consequence of industrial development, demographic growth, trade, and transport triggered by the Industrial Revolution in Europe and North America. Even if these consequences were predictable, no one actually wanted the climate to change. Things just happened.

It is surprising that even the most militant environmentalists repeat the structure of this argument and regard climate change as something akin to the collateral damage of history. The collateral argument is familiar to human rights researchers. We have grown to be extremely wary when Western military claims, as they often do, that the large civilian death toll in recent wars is a "collateral effect" of their attempt to target armed groups, of the violent but necessary process of protecting or exporting democracy. Human rights activists learned, perhaps too slowly, not to accept the argument for collateral damage, especially when the killing of civilians is predictable, predicted, and even legally tolerated under such principles as that of proportionality. As I noted in Part 2, sometimes civilian casualties, argued as collateral, are a way for militaries to generate deterrence and govern populations through fear. Perhaps climate activists have something to learn from human rights activists. Accepting the argument for collateral damage necessarily forced human right activists to enter into the economic logic of negotiations about the correct proportions between military necessity and civilian casualties (recall Garfias’s proportionality limit of twenty-nine civilian victims) at a time when a fundamental rejection of that logic was necessary. Post-gobal warming only as the collateral damage of history enables the entire debate to be framed in an analogous form of cost-benefit calculations, the distribution of a global carbon budget, and degrees of acceptable global warming. (The debate in the climate talks in Paris was locked between 2°C and 1.5°C.) This makes a convenient assumption under which we are all perpetrators of climate change as well as its victims.

Seen from the point of view of colonial history, however, climate change is no longer the collateral of history that we have made it out to be. Since the late eighteenth century, colonial settlers, officials, and hom- mes des lettres have debated the relationship between human-induced transformations across the expanding frontiers of colonialism—by such actions as deforestation, afforestation, species introductions, irrigation, and agricultural cultivation—and measurable, year-to-year changes in temperature and precipitation. The term “climate change” was born in late eighteenth-century debates between figures such as Hugh William- son, David Hume, Thomas Jefferson, and Noah Webster who held opposing views about human capacity to affect the climate and the relative advantages of doing so. However, once climate change was articulated as a possible result of human action, it also began to be considered as a potentially beneficial form of control over nature and man, indeed, as a possible tool in the arsenal of colonization. Pushing beyond existing frontiers and tak- ing over harsher, unfamiliar land also required their climatization so as to make them more inhabitable and productive for Europeans. The concept of climate change thus existed in the historical imaginary of the frontier as a project well before it was considered as an adverse, collateral, or unintentional side effect of industrialization. Climate change thus could be thought of as a form of government over both nature and man.

Many of the projects that sought to change the regional climate across colonial frontiers were proven scientifically false. "The rain follows the plow" was the guiding myth of American westward expansion in the nine- teenth century, but it had no scientific basis. Amateur meteorologist James Espy—known as "the Storm King"—proposed that the burning of forests in the Appalachians could help precipitate rain clouds that would be car- ried westward to irrigate the desert frontiers. The transformation of the landscape across the surface of the earth not only had local effects on temperature and precipitation, but is also recognized as having contributed to climate change on the global scale. Environmental scientists today accept that ongoing environmental destruction and monocrop cultivation have significantly contributed to planetary climate change and global warming. Fossil-fuel-enhanced industrialization and urbanization thus are not the sole drivers of climate change, though they are currently the biggest.

The desert thresholds were not the only environmental limit that eighteenth-century and nineteenth-century colonial climate changers had in mind to eliminate or push against. While deserts had to be cooled down and irrigated, the tropics had to be made drier and safer from disease. From the late eighteenth century on, using logging and fires, the thresholds of the tropical forests were driven in the opposite direction from that of the forests (in the same hemisphere, that is) as means of extending agricul- tural lands and of bringing tropical diseases under control. Like deserts, rain forests have been extraterritorial to the states or empires in which
they were located. Forests, since Roman times were perceived as the condition against which human culture, law, and sovereignty were defined. Their human inhabitants were regarded as primitive and animal-like. It is interesting that a recurrent metaphor describing the shift of both environmental thresholds is “savannization” — in the desert, it is used to describe techniques of planting to buttress against desertification, while along the edge of the rain forests, it refers to the slash-and-burn agriculture that creates desertiﬁcation conditions.87

In the European imagination, the line between ﬁelds and forests is sharp, holding apart two simpliﬁed conditions: a systematized monocrop agriculture and an extraterritorial one yet to be cultivated.88 For indigenous people, the transition zones between ﬁelds and forests and between ﬁelds and deserts are deep frontiers where a liminal kind of agriculture slowly gives way to areas that are not cultivated or that are cultivated very little. Even the so-called extraterritorial zones were not completely untouched by humans — indigenous cultures knew how to encourage useful plants to grow in small pockets of the rain forest or how to channel the monitory gush of ﬂoodwaters deep in arid deserts to cultivate a few plant types.89

As already discussed in Part I, one of the most recent colonial massacres took place in Guatemala some thirty-ﬁve years ago (see pp. 121-24). The indigenous Ixil Mayas inhabited the highland cloud forests, an extraterritorial zone that was beyond the last line of plantation and also beyond state control.

The genocidal campaign of the early 1980s broke through this environmental line, destroyed large tracts of forest, and pushed the line of agricultural cultivation deeper into the forest environment. Like the Bedouins along desert lines, the Ixils were massacred and expelled, and the survivors were concentrated in new towns, reducing the extent of territory they occupied and freeing up agricultural land to the exploitation of large plantations. Similar processes took place elsewhere along the edges of tropical forests. From the cloud forests of Central and South America to the forests of Central Africa, from the Democratic Republic of the Congo to Rwanda, and to those of East Asia—Malaysia, Indonesia, Singapore, and Papua — the conﬂict shoreline of the ebbing forest edge was a site where lines of ﬁre and savannization pushed back the forest to make way for monocrop plantations, cattle farms, and mining and oil extraction projects.90 Indigenous people, who were seen as part of the terra nullius of the natural environment, were displaced along with the climate, pushed beyond all these conﬂict shorelines into harsher climates—deserts and forests, but also, in the north, across the lines of frozen tundra.

In Palestine, the environmental and climatic results of colonialism were referred to by the biblical phrase “making the desert bloom,” just as it was by farmers on the American frontier and Italians in Libya. But in the early twentieth century, Otto Warburg, a German professor of botany and an expert in colonial agriculture (and in 1913, the third president of the Zionist Organization), attempted to give the biblical language explicit scientific
Farther south still, any trace of green slowly thins out, with the yellow of dry reeds shading away into the brown and orange spectrum of the mineral geology of the desert, here and there augmented by the florescent blue patches of toxins from industrial zones and the burned sand of military training and testing grounds. Roughly past the 100-millimeter annual precipitation marker, the fields die out. The area is the dumping ground for everything Israel’s economy needs, but that the state wants to keep far away and out of sight. It was there that the state located its most polluting industries, garbage dumps, and radioactive storage sites around the concentrations of illegalized Bedouin habitations. In 1979 when Israel’s largest toxic-waste disposal facility—the Ramat Hovav Industrial Complex—was constructed south of Beersheba, its planners argued that its location was suitable because “no one lived there,” disregarding the Bedouin settlements. Farther south still, Bedouin settlements thin out, and the area is dedicated to military live-fire training zones, as well as serving as the site of a remote archipelago of prisons and detention camps in an area that is often referred to as “desert Siberia.” In it, the military runs a number of little-regulated, out-of-sight detention camps for Palestinian prisoners from the West Bank and Gaza in conditions defined by human rights groups as “illegal and inhuman.” The use of incarceration has recently been expanded into the world’s largest constellation of detention centers for sub-Saharan asylum seekers. Because these refugees cannot be deported back to war zones, they are held in these camps in violation of international conventions on refugees.

Driving between these military live-fire fields, one passes by a series of archaeological sites—ruins of agricultural towns strung along the Nabataean Incense Route. Nothing contributed to Zionism’s self-perception as a climatic force—to the association of the national project with that of intentional climate change—more than the presence of archaeological ruins of these large abandoned cities in the arid part of the Negev—Ha’ula, Memphis, Avdat, Ruhelba, and Shivta. They were built by the Nabataeans around the second century BC, fell to the Romans, and were subsequently expanded by the Byzantines, who turned them into self-sufficient agricultural settlements. Seeds of wheat, barley, and olives and the bones of salted Red Sea fish testify to a rich diet. In the valleys around these ruins there are thousands of ancient terraces, flour mills, cisterns, and wine and olive presses, as well as a strange feature made of repetitive piles of rocks known in Arabic as ruksa, as-’Earab, or grapevine mounds. These cities and farms were abandoned during the early Arab period, between the seventh
and tenth centuries. The retreat was gradual: in Shivta, for example, from 170 buildings at its peak, only 20 to 25 remained occupied in the years prior to its abandonment. The doors of the last homes were sealed. Their dwellers believed that they would return one day. These settlements and agricultural installations have posed a scientific puzzle during the past two centuries, given the area’s aridity.

The scientific debate about the abandonment of the desert cities of the Al Naqab/Negev is somewhat ideologically colored. There are two main schools of thought: one long-held explanation suggests that the desertification of the Naqab—a northward shift in the aridity line—was the consequence of the climate cycles of the earth. This theory was recently supported by geologists and paleoclimatologists who found organic substances—remnants of...
The paleoclimate of the Negev, reconstructed from sections of speleothems— stalactites and other mineral deposits found in caves at different locations in the Negev. On the left is a stalagmite from the border to the southern Negev, at the center is a stalactite from the northern Negev, and on the right is a flowstone from the central Negev. The rings on the speleothems are a geological record of rainfall over the last few hundred thousand years. By dating the different colored rings (the KA unit is per thousand years), it is possible to tell at which points in history the Negev has been wetter and when the sequence of speleothems is narrower, we know this indicates less rain. Testing the carbon samples dating to the numerous wetter periods (thicker rings), Dr. Anton Vais, a research fellow at Oxford, found Mediterranean vegetation species, which helped to calculate that the border between the Mediterranean climate and the semi-desert (the aridity line) was twenty to twenty-five kilometers farther south that it is today. AVOID WASTE

Grasses, scrub, and trees—in rock formations in the arid parts of the Negev. There were not only cyclical fluctuations of the aridity line, but importantly, a consistent northward crawl over the past two millennia: climate change, they concluded, is what affected life patterns in the area, leading to the shift of the historical last line of systematic cultivation. 96

Another school has favored a political scenario. Starting in the mid-1990s, Israeli scientists, led by the botanist Michael Evenari, established several experimental desert farms in the Negev and tried to cultivate them using the agricultural technologies available to the ancients. They have repaired or reconstructed some of the ancient terraces and dams that channeled floodwater into special irrigation basins. Using this method, Evenari and his colleagues managed to collect some 400 millimeters from about 100 millimeters of available annual rainwater. 97 Successfully raising their first crops of wheat, the scientists could argue that the climate in the region must not have necessarily been wetter in antiquity. The ancient agrarian settlements, they proposed, were a result of concentrated hard work and were subsidized by the Byzantines in order to fortify the frontier. This explanation sat well with the Zionist narrative, which employed similar territorial strategies. But there was also an ideological point folded into this narrative. Because the abandonment of the Negev cities took place after the Arab conquest, the scientists proposed, it must have happened due to Arab neglect. In support of that claim, Evenari quoted the English Orientalist traveler Edward Henry Palmer who, while crossing the Negev in 1869, suggested of the Bedouin:

(he) brings with him ruin, violence and neglect. To call him a "son of the desert" is a misnomer, half the desert owes its existence to him, and many fertile plains from which he has driven its useful and industrious inhabitants become, in his hand, like the "South Country," a parched and barren wilderness. 98

The Arabs, in this text, not only inhabit the desert or adapt to it, but are considered to be themselves the agents of desertification—climate changers in their own right—pushing the environmental frontier in the opposite direction from that of the European colonizers, whose labor would always seek to make the desert bloom.

This scenario does not tally, however, with more recent archaeologically evidence, which suggests that soon after the Arab conquest in 640 AD, during the early Umayyad period and up until the mid-eighteenth century, the cities of the Naqib were expanding and proliferating, and improved techniques of irrigation were being introduced. 99 The Israeli scientists who engaged in the desert farming experiments could have also avoided much of their trouble had they carefully studied techniques of Bedouin cultivation, which were directly continuous with those of the ancients. But after the establishment of Israel, most of the Bedouin tribes were forcibly displaced. When Evenari's scientists complained that the labor force assigned to them was composed of "new immigrants from Morocco, Tunis, India, or Pakistan" who "proved rather difficult to manage" and did not allow them to complete their job, it was a neighboring Bedouin tribe, one spared the fate of transfer experienced by so many others, that sent "twenty-one men and their camels and plows" to plow the fields skillfully on behalf of the Israeli scientists. 100 Rather than neglecting the Naqib, the Bedouins were the only people to have actually maintained its ancient knowledge and to have further developed the existing infrastructure of runoff farming, using terraces, dams, canals, wells, and cisterns and often repairing existing ones. Many of these elements could be seen in and around al-'Arabib as historical evidence not only of ongoing use, but of a historical continuity with all previous cultures of the area.
THE TESTIMONY OF THE WEATHER

On December 7, 2009, Nāri al-'Uqbi was called to deliver testimony in the trial adjudicating his land claims. The first of his attorneys, Shay Gabso, aimed to establish that the al-'Uqbi settlement in al-'Arāqib was permanent and that it engaged in agricultural processes of cultivation. Al-'Uqbi testified that he was born in 1942 in al-'Arāqib. His father and grandfathers were born there, too. The al-'Uqbi tribe had arrived in the Negev in the eighteenth century and settled on these lands. Gradually, they learned to cultivate. They repaired the dams (ṣā'īdāt), traces of which they found within the seasonal streams, and planted small orchards of figs, pomegranates, vines, melons, watermelons, and prickly pears. The British and the Ottomans collected taxes, and later the Israeli authorities did the same. Al-'Uqbi's family did not register its land because neither the Ottomans nor the British had ever threatened to take it from them. They simply relied on their traditional land-tenure system.

GABSO I want to bring you back to your childhood, before 1948. What did the area look like in this period, as far as you remember?

AL-'UQBI There were houses dispersed through the area—each family had a house on its plot. Each family plowed and seeded its land. There were stone houses, but also tents. And there were fences around each plot. There were also enclosures for sheep and goats. There were cows, but very few, because cows need much water. Camels were used for plowing. There was a large distance between the houses. My father's house was 200 meters away from the next houses on both sides—his brothers' houses, my uncles'.

DOVRAV (the presiding judge) What else can you remember?

AL-'UQBI My father cultivated the land. Sometimes he hired people to help him. They plowed with camels. My grandfather had twelve camels that were used in plowing and seeding. This took three months: October, November, December. We finished around January fifth. In 1948, my father bought a tractor. I remember it well. It was red... We cultivated chili peppers, Arab cucumbers, pumpkins, those with a neck, pumpkins of the kind you can empty and dry.

GABSO There were stone houses? What kind of stone?

AL-'UQBI Yes, we wet the loess earth (sandy clay) and dried it in the sun—you can make very good thick walls... The house was not only residential, it was also a courthouse, the tribal court. Until 1948, the tribal court was in Beersheba. In 1948, they transferred it into my father's house. The house had the Israeli flag and the sign with the menorah and Herzl's photograph (Theodor Herzl, founder of the World Zionist Organization). I remember that as a child I was impressed with his beard.

Al-'Uqbi’s testimony was corroborated by seven other witnesses who testified in Arabic via an interpreter on October 26, 2009. The state lawyers constantly interjected, objecting to their testimonies as “hearsay.” Judge Dovrat reminded the witnesses that they could testify only to what they had experienced first-hand. The childhood memories of witnesses almost sixty years after they were displaced also considered as “hearsay.” Al-'Uqbi’s team countered that the state had damaged such evidence by not doing anything about this case previously and now contending that they became invalid. This was rejected. Also dismissed was an entire tradition of oral history, some of the important modes by which the history of indigenous peoples is recorded, presently accepted as evidence in former colonial states such as Canada and Australia.

For processes and events not experienced firsthand, Dovrat was willing to allow only the testimony of scientific experts. The trial thereafter pitted the expert for the state, Ruth Kark, a professor in the Geography Department of the Hebrew University, against Oren Yiftachel, acting for the al-'Uqbis. While the oral tradition of those native to the land was largely discredited, the written accounts, often in narrative form, of occasional European travelers, cartographers, priests, spies, and amateur biblical archaeologists who had passed through the Negev in the nineteenth and early twentieth centuries were admitted. Ruth Kark, whose earlier work on the Negev was scientifically sound and made mention of Bedouin agriculture and their process of sedentarization, provided the court with an expert report that was unequivocal in its negation of Bedouin rights. Her report included only documents, maps, and quotes in which the Negev was described as desolate, devoid of settlement and agriculture. On May 13, 2010, the human rights lawyer and our frequent collaborator, Michael Sfard, who replaced Gabso leading the case, cross-examined Professor Kark on her report.

SFARD On page four of your report, in the middle of the page, you refer to the American missionary Dr. William Thompson. [Thompson traveled through the Negev in 1865, two years before the enactment of the Ottoman land law, and passed fifteen kilometers north of al-'Arāqib.]

KARK Yes.
A three-year lease for a land plot in al-'Araqib between Sulem al-Masadi from the Abdunayat family and Ibrahim Abu-Hasan and Salim Abu-Zayd from the Abu-Jafin family. The contract defines the boundaries of the land by noting all surrounding owners. The Hebrew stamp at the bottom left reads: "Beersheba District Court. Examined: January 22, 1906." The document demonstrates the existence of an affective land-tenure system and the density of inhabitation in the area. Right: Tithe tax, 1921. A receipt addressed to Soloman Abu-Mad'in from the British Mandatory Government of Palestine for the payment of tithe tax. It demonstrates the existence of cultivation before the transit to Israeli rule. **ALLISON FAMILY ARCHIVE**
SFARD

Now pay attention. In the third line of your quote, you put three dots. Now, the following is what is written within these three dots: "neither is the country what we refer to in the US as virgin land. It was plowed throughout thousands of years in the same way that it is plowed at present." This is what you turned into three dots.

SFARD kept up the pressure. He went on to present Kark with her previous academic work, where she did mention Bedouin cultivation. Kark continually reverted to the meteorological logic of the "dead Negev doctrine."

KARK

So let me put it to you this way: there is very limited possibility to cultivate in the Negev because of the natural conditions. I brought here maps from the Atlas of Israel that show the isohyets, that is, the rain lines. It is clear that agricultural cultivation is dependent on the level of rainfall, so it's clear that there is a very limited possibility to cultivate there.107

In her March 15, 2010, verdict against the plaintiffs, Judge Dovrat claimed that the petitioners were not able to show that "the area was used for agriculture or residence." She went on to quote Kark: "There was no agriculture and no remnants until the end of WWI. None, none, none." As if shrouding Bedouin agriculture away would make it disappear as a historical fact.

ORIENTALIST METEOROLOGY

The reason that some texts and maps from the nineteenth century did not record agriculture and settlements, Yiftachel explained, was due to "cognitive and cultural filters" that made Western travelers see this area from a narrow European and Christian perspective. "Sparse tent settlements with few stone houses," Yiftachel explains, "did not seem to these travelers to be settlements as they knew them to be from Europe." In the trial, Sfar explained that not mentioning something is not proof that it was not there; people might not notice something, not understand what they see, or decide it was not important enough to note. However, for those willing to read carefully, the accounts of nineteenth-century travelers contained evidence for Bedouin settlement and cultivation and for far more nuanced climatic conditions in the northern Negev than those claimed by the state.

In considering these accounts, we need to develop a form of reading that is both close and distant—close reading in the sense of being tuned to nuanced descriptions of the fragile and shifting environment of the desert's threshold, "distant reading" as understood by literary critic Franco Moretti for analyzing recurrent descriptions of the environment from within larger collections of travelers' texts. In this form of reading it is the patterns that count.

We must also pay attention to the locations traversed, to the season, and to information, if any exists, concerning drought and plentiful years. Indeed, different travelers described the same hills alternately as arid or fertile, desert or sown, dead or alive. State lawyers used the summer travelers and those who passed through during drought years. In the al-'Uqbi trial, Yiftachel presented the accounts of winter travelers. These included the famous priest, botanist, and ornithologist Henry Baker Tristram, who wrote about the area round Beersheba, a dozen or so kilometers south of the al-'Arabib hills, in late January and early February 1858, noting "cultivation of large portions of unfenced land for corn by the Arabs... The rich low-lying flats by the Wadi Seba are plowed, or rather scratched, for wheat and barley." Similarly, Edward Hull, head of a British geological expedition who traveled through the Negev in the winter of 1883–1884, reported on what he saw fifteen kilometers west of al-'Arabib: "the district is extensively cultivated by the Terabin Arabs.... The extent of the ground here cultivated, as well as all the way to Gaza, is immense, and the crops are wheat, barley, and maize must vastly exceed the requirements of the population." The area reminded him of southern Italy.113

One of the accounts on which the Israeli courts liked to rely, and repeatedly did, when contesting Bedouin land claims with descriptions of desert aridity was that of Edward Palmer. We have already encountered Palmer as the Orientalist traveler who claimed that the Arabs were the "fathers" rather than "the sons" of the desert. He must have struck a bizarre figure when crossing the area in 1869–1870 wearing Bedouin dress and presenting himself as "Abdallah Effendi." In Orientalism, Edward Said described Palmer's biblical-archaeological survey of the Negev as suffering from the same Romantic attitude that haunted most contemporary travelers to the Orient, one that masked all differences, pluralities, internal dynamics, and historical complexities of the Arab people that they saw but didn't notice. Said was too kind. Palmer was also possessed by a genocidal hatred of the Bedouins and proposed all sorts of ways to destroy them by unleashing regional wars or starving them out of existence so that "this terrible scourge might be removed." Then, trying to temper what he had written, Palmer embarked
on a fantasy by negation: "I do not advocate a war of extermination against the Bedawin... and I have still, even in the days of nitroailulises [an early machine gun] some old fashioned notions about the sacredness of human life, but I would put an end to their existence qua Bedawin." 114

Palmer's diary was published in 1871 as Desert of the Exodus: Journeys on Foot in the Wilderness of the Forty Years' Wanderings. He was killed by Bedouins when he returned to the region ten years later, "the most unsuccessful of the many who performed similar services for the Empire," as Said curtly sums it up. 115

However, it is not enough to read in Palmer only his racist prejudice. We need to sieve out his writings, reading through them or in spite of them, for some account of the environment and the weather. It is important to confront Palmer's text in this way precisely because the desolation and ruins it describes have become, for the Israeli legal system, a benchmark for the description of the Naqab in the nineteenth century. At the al-'Uqbi trial, Judge Dovrat quoted a previous ruling handed down by the Israeli Supreme Court. 116 "The condition of the Negev in 1870 was researched by the scholar Palmer who traveled in that area and closely studied the Negev. He found wilderness, ancient ruins, and nomad Bedouins, who did not particularly cultivate the land, did not plow the land, and did not engage in agriculture at all." The ruling thus repeated the "dead land" justification for the displacement of the Bedouins, citing "this, in conjunction with [Palmer's] observation regarding the nomadic characteristics of the Bedouin tribes, and the fact that the region is usually dry and without rain most days of the year." 117

Still, there is some important information to be gleaned from this text if we read it not against or with, but for the grain—that is, for traces of cultivation. This is important also because Kark, too, presented Palmer's account in support of her position that the area was desolate. The following paragraph is the one to which they referred. In this paragraph, after a day that saw some wandering and a close brush with armed people, Palmer lets loose with a biblical fantasy:

Long ago, the Word of God had declared that the land of the Canaanites, and the Amaelites, and the Amorites should become a desolate waste; that "The cities of the Negev shall be shut up, and none shall open them" (Jeremiah xix. 39) — and here around us we saw the literal fulfillment of the dreadful curse. Wells of solid masonry, fields and gardens compassed round about with goodly walls, every sign of human industry, was there, but only the empty names and stony skeleton of civilization remained to tell of what the country once had been. 118

"Stony skeleton of civilization" sounds conclusive, and, as Kark said, Palmer did describe "ruins, and remnants from ancient settlements." However, two pages on, it seems that it wasn't only the fulfillment of a biblical curse that made the area arid and desolate, but rather something more common in these areas—a severe drought that had struck the region in the very year of his visit.

Today, we can try to reconstruct Palmer's whereabouts by locating places described in his book. On page 390, we read that Palmer had started the previous day in Beersheba rather late: "At one o'clock we left Beer-sheba, and... proceeded the ruins of El Hauri, where we were to have encamped." 119 This is easily reconstructed: moving northeast of the old city of Bir el Saba, we drive along the Wadi Khallil (Nahal Hevron, in Hebrew),
Palmer's likely route from Beersheba to Hura marked on Google Maps. Al-'Araqib is marked in red frame on the top left and the West Bank wall on the top right. The aridly tree is marked in white.

or the ancient "way of the Patriarchs"—today, more simply, Route no. 60—that connects Beersheba through Hebron to Jerusalem and Nazareth. After a three-hour camel ride and a diversion to the wrong site—fifteen to twenty kilometers, say—Palmer's expedition reaches "Haurâ at sunset and sets camp near some ancient ruins. It is there that he has his biblical vision regarding the destruction of the cities of the Negev. On today's map, he is likely a little west of the Bedouin town of Hura to which the al-'Uqbîs were displaced in 1991. In 2014, an archaeological excavation conducted on site unearthed a Byzantine monastery with wells, a church, and small gardens from the sixth century. Some of its ruins could have certainly been seen by Palmer, but they were certainly not "biblical ruins." The place is precisely twelve kilometers east of al-'Arqîb. A couple of pages on, we read: "The next day we entered Palestine and left the desert region of the South Country." Palmer is crossing what he identifies as the threshold of the desert—then understood as the southern border of Palestine. Walking north of Hura, along the ancient route, Palmer has just passed the location where, 130 years later, the Wall separating the northern Negev from the West Bank would be built. In meteorological terms, Palmer’s route tracks the contemporary 200-millimeter isohyet, which curves up the Hebron hills at that location. This means that he is on the same isohyet as al-'Arqîb, and the meteorological conditions described should be roughly similar. On the same page, we read: "the brown mould beneath our feet was hard with the fibre of dried vegetation."

"Brown mould" is interesting. Timeless desolation does not leave "fibres of dried vegetation" on the ground. What happened that year? A search of the historical record reveals that Palmer's travel during the agricultural year of 1869-1870 coincided with a tenfold increase in the price of grain. The export of grain throughout Palestine and Syria was prohibited—a clear indication of failed crops and severe drought. The climatic conditions and barren state of the area on which Palmer reported and that the Israeli court took for permanent facts—"dry and without rain...wilderness, ancient ruins and nomad Bedouins"—were likely the temporary result of a severe drought that struck the area that year. The following year, the rain returned, and the export of grain was again permitted. Rather than describing timeless desolation, Palmer's book in fact confirms Nûri al-'Uqbî's testimony about the presence of agriculture in this area—"brown mould...of dried vegetation"—as well as the pulsating character of the desert threshold, where in a good year, one could see "miles around with grass, flowers, and herbage" and in another the desolate wilderness.
THE EARTH PHOTOGRAPH

While it is on the surface of the earth that the entanglement of land use, politics, conflicts, and climate change is played out, it is from the aerial perspective that it most clearly comes into view. The surface of the desert appears to be different, depending on the season when the photographs were taken. In late summer, the vegetation is closely shaven off the surface; the territory appears translucent, revealing features on and under it that would otherwise be obscured by the light plume of seasonal weeds. The enhanced shadows of early mornings or late evenings can reveal subtle undulations in the topographical surface, traces of erasure that would not be visible from the ground. The relative dryness of the terrain conserves traces better than any other environment. The surface of the desert thus resembles a photographic inscription, exposed to the direct and indirect contacts of human and climatic forces in a way similar to how film is exposed to light. This makes aerial images artifacts of double exposure: they are photographs of photographs. For those willing and able to read its surface closely, the desert can reveal not only what is present, but also the subtle traces of what has been erased: traces of ruined homes and small agricultural installations, of fields and wells that can sometimes be noticed under the grid of newly planted forests, as well as the dark stains of long-removed livestock pens.

Beyond the threshold of the desert, climate and photography interact in other ways, too. There is an inverse relation between humidity and visibility: the farther south one flies, the drier the air and the thinner and more conducive to vision and photography it becomes. It is for this reason that the only star observatory in Israel is located in the arid part of the Negev. Its telescopes traverse the same medium of desert air, but in the opposite direction. From 15,000 feet, it is not only the surface of the earth that is being photographed, but also the air that is between it and the lens. The thicker and more humid the air, the less focused the rendering of the surface becomes. Atmospheric blur and distortion are not only reductions in information that make interpretation necessary, but, inversely, a source of information themselves—an indication of humidity.

But reading aerial photography must not only concern itself with reading the surface captured digitally or on film, but also with the technology and politics that placed the camera up in the air in the first place, and it is often the military or other state agencies that have generated these images. The Negev desert is currently the largest and busiest training area for the
Israeli Air Force and has one of the most cluttered airspaces in the world. This airspace is partitioned into a complex stratigraphy of layers, air boxes, loops, and corridors dedicated to different military platforms: from bomber jets to helicopters to drones. This complex volume is an integral part of the architecture of the Negev.

But it was not only the Israeli Air Force that has taken aerial photographs there. Two sets of aerial photographs are important in relation to Bedouin land claims. The first was captured during the summer of 1918, at the end of World War I, by the German Imperial Air Force, and the second by the British Royal Air Force in the winter of 1945, toward the end of World War II. The reason that the area had been overflown by both militaries is that during World War I, the threshold of the desert was a military frontier and a battle zone. In World War II, it was expected to be one. The black-and-white military sequences did not aim to record Bedouin life, agriculture, and cultivation, but did so inadvertently, mainly at the edges of military sites, in the margins of the photographs, always slightly out of focus. These two sources document the state of the Negev during two different periods and in opposite seasons, capturing the threshold of the desert in each of its alternate states, arid (summer 1918) and in cultivation (winter 1945), and are thus important resources in confirming Bedouin presence and land use across time and different seasons.

A darker circular stain indicates the earlier presence of a livestock pen (kisse) in al-'Araqib, 2016. The stain is the result of the bodily fluids (urine and excrement) from a goat tied to the central pole. The level of dark saturation is usually an indication of how long ago the pen was removed. This use seems to have been destroyed more than a year previously, washed out by several periods of rain. The stains can remain in the earth for several years and when found can be seen as some of the clearest indications that Bedouins have lived on site. This crop is extracted from the kite image on page 220.

To understand what is made visible within them, the photographs need to be put in context and compared with contemporary aerial images, as well as with images from the ground. These days, one can easily access satellite images of the area. But as I mentioned in the Introduction, the publicly available satellite images of Israel are degraded, as a result of Israel’s lobbying with the US administration, to the coarse resolution of one meter per pixel, one in which Bedouin villages lie under the threshold of visibility. However, this does not mean that they are invisible to the state agencies that undertake continuous high-resolution aerial surveys of these sites, closely monitoring their expansion, but that the aerial perspective is not available to the inhabitants of the villages. Google Earth and other mapping software, in line with the policy of the Israeli state and its cartographers since 1948, does not mark the illegalized villages or their access roads. They have also been written off all travel maps, to the extent that travelers, guided by GPS navigators, often encounter these communities unprepared.

Aerial photographs would have provided useful maps to help plan and counter state claims for land. But taking aerial photographs requires the resources to rent an aircraft and specialized photographic and navigational equipment. These were in place for Fazal Sheikh when he took the aerial images for his “Desert Bloom” series in 2010. However, such an endeavor is too complicated and pricy to repeat, and Bedouins have little trust in photographs from airplanes, which they associate with the military and the police.

Instead, a collaboration between the al-'Araqib village council, Forensic Architecture, Zochrot, and Public Lab took aerial images using kites. Public Laboratory for Open Technology and Science is an organization that seeks to promote community-based environmental monitoring from the air. It was founded in the wake of the 2010 BP oil spill disaster to break the information blackout that was imposed by the oil giant and US federal authorities on photographing the spill from the air. Public Lab works to empower communities to undertake their own aerial photography using improvised “community satellites” made of standard digital cameras tied to kites or small helium balloons. In al-'Araqib, together with Public Lab, we arranged a number of photographic workshops and worked with the community, mainly children, on undertaking kite surveys of this and other illegalized villages.
Kite kit. The camera is attached by rubber bands that keep pressing the photo button. The water bottle protects the camera at landing or if it falls. The telephone number is provided in case the camera gets lost. 

Alina Schmid, An Fergusson

The GPS data available in the standard camera or smartphone attached to the kite facilitated the extraction of these images into 3D models using photogrammetry. This facilitated their analysis and interpretation. Al-Uqair, 2010.

Artel Cane with Artel RESSAR, PARLUE Lab, FORNIX ARCHITECTURE, ZOObest, Al-Uqair, Al-Uqair Village

Nir al-Uqair undertaking a survey with a helium balloon, used as an alternative to a kite when there is less wind, in al-Uqair, 2016. Etal Weinman
MILITARY ARCHAEOLOGY

The contemporary kite survey not only provided a precious record of al-'Araqib just before the last of its remnants—stone houses, dams, wells—were buried under the afforestation earthworks; it also helped us read the older set of aerial images. The Bavarian state archive in Munich contains 2,872 glass plates of aerial photographs of Palestine dating from 1918. Most were taken by the Bavarian Squadron 304 (Königlich Bayerisches Fliegerbataillon 304) which, together with five other German squadrons (about eighty-five aircraft in total), was part of the army of imperial Germany that flew in support of the Ottoman military. These were the early days of aerial reconnaissance, a technology that became operational only toward the end of the war.

The context was the British invasion of the Ottoman Empire. In 1917, as the imperial British Egypt Expeditionary Force (EEF) progressed north from Sinai, the Ottoman armies fortified along the line they perceived to be the threshold of the desert—from Gaza through Beersheba to Hebron, about fifteen to twenty kilometers of today’s 200-millimeter isohyet. Their calculation was simple: attrition along the desert edge would keep the European soldiers in the arid part, with less water and pasture to irrigate and feed the tens of thousands of horses and mules on which their military campaign depended. The strategy was successful, and the EEF got bogged down south of Gaza. But the British forces finally broke through Beersheba, taking the town in a massive charge on the last day of October 1917. Some of the Ottoman units managed to escape and retreated a few kilometers north, stabilizing a second line of defense right through the hills of al-'Araqib. From November 1 to November 6, the armies fought “several sharp little actions,” and the EEF managed to withstand an Ottoman counterattack along the al-'Araqib stream. The battle coincided with another major political development. The Balfour Declaration—promising a national home for the Jews in Palestine—was signed on November 2 and published on November 9, while the imperial armies were clashing along the aridity line in al-'Araqib.

The Bavarian aviators of Squadron 304 joined the retreat of the Ottoman military. Understanding they were fighting a lost war, the pilots also took to photographing archaeological and religious sites with no strategic importance. This made them among the first to use aerial imagery for archaeological purposes. Their last task in the summer of 1918, a year of constant defeats and retreats, was to return and overfly British military
positions in the Negev. Most of their photographs are oblique shots taken from hand-held cameras as the airplane tilted its wings. On September 20, 1918, a few days after the last documented photograph was taken, they surrendered to the British at the Afule airstrip in the northern valley. Surprisingly—perhaps because the significance of aerial imagery was not fully understood by all ranks of the British military at the time—they were allowed to keep their glass prints and brought them back with them to Munich, where they are now archived.12

Despite exhausting the archive and its archivists, the closest photographs to the al-'Araqib hills I could find were about one kilometer away in each direction. Because the surface of the desert appears barren in these photographs, the Bavarian images were presented by state lawyers seeking to demonstrate that Bedouins never settled in these parts.13 Like Palmer’s

Map of the front line between the British-led Egypt Expeditionary Force (EEF) in red and the Ottoman forces in al-'Araqib (in green) before the EEF attack on November 6, 1917, drawn by Cyril Falls and A.F. Beck, 1939. This map reconstructs the battle lines on land around al-'Araqib I have marked the location of the al-'Araqib cemetery. In 1917, it had been in existence for merely three years. The front line closely overlaps the contemporary aridity line and the al-Uq匕’s claim area.

View of Tell al-Khuweila (today the kibbutz Lavan), December 1917. Courtesy of the Australian State Archives. This page is organized around a photograph of the hilltop of Tell al-Khuweila, where a battle took place between the EEF and a dug-in unit of the Ottoman Army on November 1917. Officers drew battle plans directly onto photographic prints. Military photographers included objects in the foreground of their photographs for orientation. Here, the photographer positioned a water hole in the foreground, inadvertently confirming the presence of Bedouins in the area.

testimony from the drought year of 1969, this, too, is misleading. The photographs were taken in the summer months at the end of the war. The Bedouin tribes had been expelled from the area by the Ottomans because, after the fall of Aqaba to Bedouin forces led by Auda ibu Tayi and T.E. Lawrence “of Arabia” in July 1917, the Ottomans believed, not without reason, that the Negev Bedouins harbored animosity toward their empire and sympathies toward the British.

Reading these images requires a careful study of their surface at the highest possible magnification. It is then that these photographs start to reveal elements that are typical of Bedouin life at the threshold of the desert. These include structures and ruins, fields of cultivation next to the streams, and, significantly, the same indicative sign of round livestock pens of the kind still found today.
Tall al-Shallar, Bavarian Squadron No. 104, August 24, 1918. This site is about one thousand meters northwest of al-Arajud. Although identified as Tall al-Shallar in the German title, the site photographed is a few kilometers to the east of it, along Wadi al-Shallar. Today, within the area of the photograph's frame, there is the Bedouin town of Rahat, established in 1912, and Kibbutz Motza, established in 1968. The rigid image contains traces of abandoned Ottoman trenches and fortifications. Marked within the white frames and reproduced in the enlargements opposite are possible traces of Bedouin settlements consistent with Bedouin tent use at the threshold of the desert.
LIFE AT THE THRESHOLD OF DETECTABILITY

A systematic air survey of Palestine was conducted only toward the end of World War II, when the techniques and technologies for producing photographic series that could be tilted into a cartographic grid were developed as part of the war effort. The PS series (named after Fort Said, the airport at the north of the Suez Canal from which the aerial flights took off, but often mistakenly referred to as the Palestine Survey) was produced between December 1944 and May 1945 by RAF squadrons transferred from the European front. During World War II, reconnaissance planes could fly longer and higher, and the cameras were now integrated into the aircraft's structure.

The photographic mission progressed from south to north. The reconnaissance pilots overflew al-'Ar'aqib on January 5, 1945. After the survey was completed, the Haganah, the largest Zionist paramilitary force, managed to convince a sympathetic archivist to smuggle some of the negatives of the aerial photographs out of RAF archives. They printed and returned the originals before their absence was noticed. A number of these reproductions were included in the “Arab Village Files”—intelligence documents on Arab localities that were used by the Haganah in 1948 to occupy and ultimately expel the villagers and that are now available in Israel’s cadastral center in Tel Aviv—providing a benchmark record for the condition of Palestine before the establishment of Israel and, ironically, evidence for the existence of these villages.

January is the peak of the rainy season. The black-and-white photographs captured the northern threshold of the Negev in a state of cultivation, almost completely covered with a patchwork of small agricultural fields. The photographs were submitted in the al-'Uqbi case on September 15, 2009, as a part of an expert report prepared by Shlomo Ben Yosef, a former aerial photography interpreter for the Israeli intelligence who was hired by the al-'Uqbi legal team. In his report, Ben Yosef confirmed “continuous agricultural settlement in the area of the land claim” and identified tents, hard structures, and roads, but Judge Dovrat accepted the state claims that the photographs were inconclusive. Mobilized against the claimants was the fact that Bedouin life leaves only gentle marks on the land and the inability of film to render these marks clearly. In the way that Western agricultural settlements would render. Analysis of aerial images also requires some understanding of the material properties of negatives. From a cruising altitude of 15,000 feet, each of the nine-inch (twenty-three-centimeter) square films used by the RAF captured an area of about three-and-a-half kilometers square. The resolution of analog aerial photographs is measured by a unit called “line pairs per millimeter” (lp/mm). It designates the number of pairs of white and black lines that could be captured within every millimeter of film. The Kodak Aerocon High Altitude panchromatic negative film used for aerial photography in full sunlight conditions at the end of World War II had a fine-grain resolution of thirty-five lp/mm—that is, it could potentially show seventy lines (half black, half white) within every millimeter of the negative. The width of a grain—the narrowest that a line could possibly be—is approximately 1/70 millimeters on the negative, which translates to 214 millimeters—roughly 20 centimeters, or 0.2 meters, on the ground. However, the 15,000 feet of atmosphere between the ground surface and the film surface reduced the effective resolution of the film to 50 centimeters, which means that the grain represents an area of half a meter in diameter on average on the ground.

The images were taken at the beginning of January 1945, at the same time that the Allies were preparing to charge across the borders into the territory of the German Reich. This was barely three months after the aerial photographs of Auschwitz, described in the Introduction, were taken. Both sets of photographs were shot from the same altitude of 15,000 feet with similar optics and using similar film.

The effective resolution of the aerial images of the Negev and those of Auschwitz were considered by aerial image analysts to be the same, and so was the problem of identifying those elements close to the “threshold of detectability.” I began this book with the problem of confirming holes in the roof of a concrete structure. In the RAF photographs of the Negev, the holes of wells and the gentle mounds of groves were the crucial elements to identify, close to the size of the grain in the images. Here, too, it was necessary to consider both the materiality of the objects represented, a well or a hole, and the materiality of the surface representing it, the photographic negative.

The translation from the surface of the terrain to the surface of the film is referred to as “ground truth”—a process used by meteorologists, remote sensing, or aerial interpreters, to calibrate the analysis of images because there is never a one-to-one relation between aerial photographs—indeed between any photographs—and the reality they capture.

To arrive at ground truth, an aerial image interpreter must measure and compare the ground elements with the elements that compose the image. Kite photography lends itself to establishing ground truth because the
The al-Tali village and cemetery in al-'Araqib. The kite imagery is superimposed over RA Photographic Image 9231 and 9234 from 1948. The kite imagery is composed of photographs taken in two seasons, when the threshold of the desert is alternately dry and green.

1. The stone house (āshīqiyū) of Salim Salim al-Shahri al-'Uqbi, No. 1 al-'Uqbi's maternal grandfather.
2. The stone house (āshīqiyū) of Abu Zawari (the Beri) from the al-Tār family.
3. The al-Tār cemetery.
4. The house of Suleiman Muhammad al-'Uqbi in al-'Arqula. The stone in the image below reads: "This is the house of Suleiman Muhammad al-'Uqbi (1914-1993). The house was built in 1936 and demolished after he and his clan were expelled in 1950. The house had hosted the tribal court in the first years of the Israeli state until the expulsion." In the background of the image is the recently planted Gad TV Forest.
5. The well of Suleiman Muhammad al-'Uqbi, No. 1 al-'Uqbi's paternal grandfather.
aerial survey is undertaken while the feet of those taking the images are firmly on the ground. Every element captured in the aerial image can be simultaneously experienced on the ground.

Aerial images, such as the RAF photographs from 1945, are not unmediated copies of the world, but products of material relations between objects: one composed of celluloid plastic coated with gelatin emulsion with silver halide crystals, the other of stone, earth, and vegetation, a relation mediated by the prevailing conditions of the climate between them.

The process of establishing ground truth thus combines an archaeology of material traces on the ground with an archaeology of the material properties of the photograph.

Undertaking this combined analysis, it becomes evident that the 1945 photograph brings together three distinct, but interrelated threshold conditions. The first is the threshold of the desert—beyond which lies uninhabitable aridity. The second is the threshold of the law—the line beyond which lies an extraterritorial zone where land rights no longer apply. And the third is the threshold of visibility—beyond which people, agriculture and political cultures can be rendered unseen and where dispossession is fuelled by denial.

Three years after Nuri al-'Ughi lost the trial, the 1945 RAF aerial photograph of al-'Araqib surfaced in a different context. A reading of it was used as justification for the eviction and continuous demolition of the remaining al-'Araqib settlement from the cemetery. The claim that the al-'Ughi cemetery did not exist on the 1945 photographs was made in a report by an Israeli organization called Regavim, funded by government bodies to "establish state sovereignty and government control over state land and act against 'illegal land grabs' by Palestinians." In the Negev, it concentrates on "Bedouin trespassers." To achieve this aim, it spies not only on Bedouin construction, but on anyone acting in solidarity with the other side.

It was this organization, mentioned in Part 2, that paid for private detectives to go through Michael Sfrid's office trash while he was working on the al-'Araqib case as well as other land claims.

In December 2021, the group published a report that used a series of aerial and satellite photographs, the oldest being the aforementioned January 5, 1945, RAF image, to claim that the al-'Ughi cemetery was not present on the site before the establishment of the state and that therefore burying the dead there was itself an act of invasion of state land. The report demanded that the state immediately evict the remaining members of the al-'Ughi family still living there.

I ordered the relevant 1945 photographs from the Israeli cadastral center and received them as high-resolution scans. Overlaying the twists and turns on the al-'Araqib stream—the only identifiable feature on the site after almost seventy years of development and transformation—I was able to locate the present extent of the cemetery within the 1945 photograph. The reading of the 1945 photograph was undertaken while walking the ground of al-'Araqib by continuously comparing it with the kite photography produced with Public Lab. In a small part of where the al-'Ughi cemetery can be found on the ground today, the 1945 photograph there is a small bounded area of lighter ground that stands out in contrast to its surroundings. Well-trodden paths appear lighter in aerial photography; planted areas darker. The extent of the lighter surface is smaller than the contemporary extent of the cemetery, but in 1945, the cemetery obviously would have been smaller.
Al-Tori cemetery, al-‘Araqib. The white frame marks the approximate location and size of the cemetery in 1925. [IMAGE credit: PUBLIC LAB. FORENSIC ARCHITECTURE, ARIEL CLAIR, ZACH MOTE, AL-TORIQ VILLAGE]
On the 1945 photograph, these would occupy the size of a single grain, or at most, two silver halide grains side by side. The fact that the graves attributed to the period before the establishment of the state were unmarked and undated was used by all those state agencies that tried to deny the al-Turis’ claims. But in the lighter, distinctly bounded area there are a number of darker grains likely indicating the shadow of distinct objects. The process of establishing ground truth allows us to read the graves back into the grain. On the other hand, it also suggests that the authors of the Regavim report and the state that supports them—like many colonial travelers and cartographers—exercised an active form of “not seeing,” of visual denial undertaken simultaneously both in the image and on the ground.

The white spots left on colonial maps of the seventeenth and eighteenth centuries were means of erasure: acts of “whiting-out” that led to the wiping out of entire native cultures. Those promoting aerial and satellite photographs over cartography tend to argue that the former are objective and neutral renderings of the surface that capture all things without the cultural prejudice of cartography. But photographs, whether from the air or from the ground, require close reading and interpretative labor, which can be politically and culturally conditioned. Reading the climate and its history requires putting into relation information of different kinds and a form of reading that is closely tuned to grain: in its cultivation, in texts, and in the materiality of photographic negatives.

The 1945 photograph of al-Araqib is a still frame in a process of continuous transformations. With every tidal cycle of the desert’s ebb and flow, another image is created. When the desert ebbs and the green rolls south, we can measure the extent to which the line of colonial afforestation and cultivation has been expanded; every summer, yellow tones flood slightly farther north, revealing new traces of eviction on the bare surface of the earth.
POSTSCRIPT: THE SLOW VIOLENCE OF THE “SPLIT SECOND”

Shortly before dawn on January 18, 2017, a large police force raided the illegal Bedouin village of Umm al-Hiran in the northern threshold of the Naqab/Negev in order to demolish several houses. This raid was part of an ongoing attempt to remove the entire village, clear the area, and build a new community settlement for orthodox Jews. Two people were killed during the operation: a villager, Yaqub Musa Abu al-Qian, and a policeman, Erez Levi. The latter was part of the force that came to demolish the house of the former.

Shortly after the incident, Israel’s Public Security Minister referred to it as a “terror attack” claiming Abu al-Qian intended to murder as many policemen as possible. The chief of police further suggested he had “links to ISIS.” But local residents and activists who were on site when the incident took place claimed that the policemen shot Abu al-Qian, a local teacher, without provocation. Following this shooting, Abu al-Qian lost control of his vehicle, which accelerated down the slope toward the policemen, running a group of them over, killing Levi, and possibly wounding another.

Forensic Architecture collaborated with Activestills, a collective of documentary photographers, to undertake an emergency investigation in order to challenge the police version and open the case up to further investigation.

We started by synchronizing two videos shot on the ground by a member of Activestills with a thermal imaging video of the incident shot by a police helicopter. The aerial video was released by the police to support their version of the events. The videos shot on the ground did not visually record the incident but did capture the sound of the first burst of gunshots. We synchronized and overlaid their sound track onto the silent aerial footage. The metadata on the ground–videos helped precisely time the incident.

Our analysis showed that Abu al-Qian’s vehicle was proceeding slowly in the general direction of the policemen when it was shot three times. The video determined that the shots were fired in the direction of the vehicle by examining the form of the heat clouds that were seen exiting the policeman’s gun (image 1). The initial three shots were followed by a burst of four more gunshots. Four seconds after the first shot was fired, Abu al-Qian’s vehicle changed course and gained speed toward a group of policemen. We established that the angle of the slope in the direction of movement was about ten degrees. The steepness of the slope might have helped the vehicle gain speed. Six seconds after the first shot, Abu al-Qian’s vehicle is seen hitting a group of policemen (image 2). This was immediately followed by another
long burst of gunfire. Thirteen seconds after the first shot Abu al-Qi'an's vehicle was brought to a standstill. During the last seven seconds of his drive, Abu al-Qi'an's vehicle horn is continuously sounding, suggesting he might be lying against the steering wheel, unconscious. After the car was brought to a standstill five or six policemen are seen surrounding it. Thirty-five seconds later we identified the sound of a single gunshot. This last shot could have occurred somewhere else but it is consistent with what Israeli security agencies call "verification shot" - the shooting of already incapacitated assailants. At this early stage of this investigation, it was too early to know. We suggested further investigation was necessary and demanded that the report on the postmortem autopsy be made public.

We released our analysis on January 19, a day after the incident. The police responded by saying that the first three shots were fired in the air. They also tweeted about our analysis:

Tendentious editing will not rewrite reality. The documentation of the incident proved intention to murder policemen. This has one name: terror. No clips that distort data can change that.

Later the police admitted that the first three shots might not have been fired in the air but at "the wheels" of the car. Leaked results of the autopsy undertaken the following day revealed that Abu al-Qi'an was shot in the right knee. This might support a scenario in which Abu al-Qi'an lost control of his vehicle. The autopsy also showed Abu al-Qi'an died after bleeding for twenty minutes without medical care, despite the three ambulances present in the area.144 In late February, based on our and others' analyses, the police finally retracted their version that it was a terrorist attack at all. We are now seeking a moratorium on all demolitions in the Negev.

I added a description of this ongoing investigation at the end of the book, well after it was already sealed (thanks to the committed Zone team), in order to demonstrate an important point about counterforensics: the slow violence of environmental transformation is convertible to, and can always flare up in, kinetic violence.

In justifying the shooting of Abu al-Qi'an, the police will no doubt revert to their duration of convenience - "the split second" - the time in which a policeman must decide how to act to avoid the threat of a car approaching. The unspecified duration of the "split second" is also the common temporality of forensics. The question must, however, always be: what ideology, politics, and "common sense" is already programmed or naturalized into the "split second". In this case, it seems to be preconditioned by a conception of the Bedouins as squatters, as threats and enemies to the state. Refracted within the "split second" of the decision to shoot at a slow moving vehicle is therefore the long duration, now generations long, of the violence of colonization and environmental transformation.

Acknowledgments

My book acknowledgments are becoming longer, perhaps because the infrastructure involved in their production has become increasingly complex. This book relied upon a particularly long process and the participation of many people. Despite my immense gratitude to those whose collaboration taught me so much, I will attempt to keep it as short as possible (but not shorter).

Forensic Architecture was set up in 2010. In 2011, it gained support from a four-year European Research Council (ERC) grant. Susan Schuppli and Paulo Tavares helped write the application for it. Susan became the first project coordinator and senior research fellow on it. In the latter role, she undertook research on media forensics. The other research fellows were Anselm Franke, who cocurated with me the exhibition Forensis, Thomas Keenan, with whom I coauthored the book Mengele's Skull: The Advent of Forensic Aesthetics (Berlin: Sternberg Press, 2012), Adrian Lahoud, Alessandro Petti, Ann-Sofi Rönnskog, and John Palmesino (Territorial Agency), and Srdjan Jovanovic Weiss. Francesco Sebregondi, a young graduate from our MA in Research Architecture Program, was hired as an administrator, but soon became an integral part of the research team and the project coordinator after Susan. In 2014, he helped secure another ERC grant to develop PATTERN, crowd-sourcing, data-aggregation, and visualisation software for conflict mapping, and was in charge of the project until its successful release as open-source software. Christina Varvia, who oversaw the video analysis in our Black Friday investigation of the Gaza war of 2014, became the project coordinator after Francesco. Further financial support for Forensic Architecture came from additional ERC grants (a Proof of Concept Grant in 2014–2015 and a Consolidator Grant in 2016–2021), the Porter Foundation, the Sigrid Rausing Trust, and the Oak Foundation.

Some readers will recognize elements of this book from previous publications or exhibitions. The extensive reframing of these was essential in order to outline the methodological and political proposition that forensic...