Forensic architects deal with “the application of architectural facts to legal problems,” as one practitioner puts it. These facts, according to a firm providing such services, are the “cause and origin of architectural defects such as construction, windows, wall and roofing failures; floor problems; accessibility issues and architectural design errors.” The legal context is most often an insurance dispute, for which forensic architects provide reports or testimony under oath. There were building surveyors for almost as long as there were builders, but according to Dale Paegelow, a forensic architect who in 2001 self-published something of an introduction to the practice, the term “forensic architecture” emerged only in the early 1980s. It is hard to verify this claim or information regarding the number of practitioners who refer to themselves as “forensic architects,” because there are no professional registration bodies, no courses in the subject, and there is no official accreditation. However, judging by the number of corporate firms that have recently started advertising forensic services, their numbers seem to be growing, something that might indicate the expanded role of insurance in the actuarial and litigational culture of the contemporary building industry. Structural and infrastructural analysis are also key to risk analysis in its evaluation of damage yet to come—“low-probability, high-impact disasters”—caused by the forces of man, nature, or, increasingly, their combination.

Because forensic architects are the students of architectural failure and because their service is often mobilized on behalf of clients and against designers, they are not particularly popular in architectural circles. The practice occupies a marginal place in the professional landscape and is ignored by virtually all architecture schools worldwide. For architects, building surveying might seem too ordinary and unimaginative a practice, but surveyors understand a fundamental thing about buildings often lost on architects: buildings are not static entities. Rather, they continually undergo dynamic transformations. These transformations are not aberrations of an ideal state embodied by the hard lines of a drawing, but are inherent to all built structures. Each of the different materials of which
a building is composed—steel, plaster, stone, glass, concrete, wood, and, increasingly, plastic and silicon—constantly permeate, move, and adjust in response to environmental forces. Shifts in weight distribution—indicative of charges in the way a building is used—affect the levels of floors and beams. Computers and servers generate excess heat that affects ceiling panels, bending them out of their clips or screws.

Questions regarding the structure—often understood as “the bones” of a building—are not the only ones that concern forensic architects. The performance of ever more intricate mechanical, electronic, or infrastructural systems is increasingly subject to the study of flows and blockages. Records of the atmosphere’s interaction with buildings are deposited in layers of dust and soot on their façades, and their microstratigraphy can provide a rich archaeological resource for a study of urban air, containing information regarding changing levels of CO₂, lead, or toxins in the atmosphere—a vestige of a history of industrialization, transportation, and attempts at regulating them. Some of a building’s transformations occur well below the threshold of human perception and along extended time scales: it takes years for an air bubble trapped between a wall and a fast-drying paint to make its way up the building façade. Its expansion and contraction, the path and the speed of its crawl, indexes year-to-year changes in temperature and humidity, changes in the climate and efforts to regulate it.

Building surveys might not always, or not yet, be so tuned to the sentient materiality—indeed, the hyperesthesia—of buildings. Still, they do understand decay as a process of form making that shapes the building beyond the control of the architect and often despite it. If material deformations are a building’s response to changing environmental force fields, then, inversely, the formal mutations a building undergoes are processes of recording: deformations as matter in formation are also information. From this perspective, buildings are not only objects to be repaired, restored, and lived in, but also sensors of the environment outside themselves (and this before and regardless of the digital computerized sensors of smart buildings that might be placed within them).

Every material object can be read as a sensor, but buildings might be among the best sensors of societal and political change. There are several reasons: buildings are immobile, anchored in space; they are in close and constant interaction with humans; they are exposed both to the elements outside them and to an artificially controlled climate within. And this besides embodying, of course, the political, social, strategic, and financial rationalities that went into their conception.

Architecture and the built environment thus could be said to function as media, not because photographs of buildings might circulate in the public domain, but because they are both storage and inscription devices that perform variations on the three basic operations that define media: they sense or prehend their environment, they hold this information in their formal mutations, and they can later diffuse and externalize effects latent in their form.

However, the built environment is not only a passive sensor of environmental and political change. It interacts with and affects the very processes it records. For one example, buildings record the climate but the energy they consume is also among the biggest contributors to climate change.

Buildings and cities, some geologists lately have suggested, have added the most recent layer to stratigraphy that makes the rock record of the earth. Spread the material that composes them evenly across the dry surface of the earth, and it would pile almost a meter high. When seismic events take place, the human-made crust of the top surface might crack like all the other layers. Moving through the deep surface of the earth, supersonic cracks tear through not only rock but also the thickness of the atmosphere as if it were a solid medium. Geologists depend on earthquakes to reveal hidden layers of rock. A structural crack reveals information about the way a building was assembled, otherwise buried under stucco or cladding. Cracks are material events that emerge as the result of force contradictions. They progress along paths of least resistance, exploiting and tearing through different material substances where the cohesive forces of aggregate matter are at their weakest. Each crack is a unique result of a specific disposition of a force field and material irregularities on the micro level. Cracks can move slowly, linger for years in a state of potentiality, or accelerate and tear a building apart when force contradictions can no longer be absorbed. Leonardo Da Vinci filled his notebooks with the studies of cracks. In giving practical advice to builders, he mapped the conditions that produced them—an interaction between topography, the rock on which the building rests, its orientation to the sun, the materials used, the construction process, and errors in its construction. It is cracks rather than buildings that are the most precise records of their environment and its changes. Elsewhere, he recommended staring at cracks for training the imagination.

In considering buildings as historical documents, forensic architecture has a claim to the history of architecture, especially at a time when the field has largely disavowed the materiality of buildings in favor of the history of architectural practitioners and the documents that they leave behind. It can also potentially extend architecture’s historiographical methods, because
it gives accounts of the history of buildings as material things beyond the history of their human conception with a biography that is beyond that of an architect. What forensic architects call “the structural history” of a building includes terms such as “environmental root causes,” “architectural pathologies,” “crises,” “building failures,” and “transformative structural events” that almost conically connect the material history of buildings with the conceptual terms of “historical materialism.”

It is in this way that forensic architecture is able to invert phenomenology’s categories of perception and experience: it is not concerned with how we might experience a building, but rather, fundamentally, with how a building might experience its users, how it might sense the way they move and act within and around it. This is not to make an anthropomorphic point: buildings sense not in a human, but rather in a building sort of way. The same principle, as I will later show, can also be extended to built environments and larger territories across the dry surface of the earth. They also act as political sensors to be read.

Forensic architects employ buildings as instruments of historical measure, but reading environmental, historical, and political processes from built form is never straightforward. What could be learned from the processes of degradation or from the traces of violence is partial and murky. If they are to be considered as sensors, buildings should be understood as chaotic, nonlinear ones, with inscription being weak and the reading process always indeterminate. The dynamic transformation of their composite materials, which sometimes perfectly align, most often not, is not linear and therefore cannot translate environmental forces into material transformations in the same fashion that quicksilver in thermostats, for example, translates temperature into volume. Buildings register some forces and erase others, and any attempt at interpretation must acknowledge the limits of material registration and requires careful reading against other data. To read buildings as sensors, we need other sensors — optical, chemical, and photographic — and these are themselves conditioned in all sorts of other ways.

As a historical method, forensic architecture, as currently practiced, is limited in other ways, too. The causal threads that building surveyors currently take into account for the purpose of insurance cases, for example, are extremely short and close at hand. When surveyors study cracks or other failures in the structural history of buildings, they interpret their findings in relation to a narrowly circumscribed set of structural conditions in which material deformations are traced back only to the most proximate of physical causes, leaving out other causal relations.

CRACKS: LINES OF LEAST RESISTANCE

On April 23, 2013, cracks appeared in the floors and walls of a building used by the Rana Plaza factory, a garment industry “sweatshop” located in the deregulated Export Processing Zone (EPZ) of Dhaka, Bangladesh. Municipal building surveyors came to inspect. They photographed and marked the cracks with thick felt-tip lines and recommended the factory’s closure. A crack is merely the potential for something to occur. It might linger for years or expand suddenly and tear a building apart. The Rana Plaza factory’s owners, hard pressed to deliver goods cheaply to Western labels on contract, assessed the risk of collapse in relation to the risks of delay on contractual obligations. The management, located off site, ordered the workers in. At 9:30 a.m., an hour after the start of work, the cracks expanded, cut through the building, and brought it down. More than 1,127 workers, mostly women, died and a further 2,500 were injured. It was the deadlest accidental structural collapse in history.

The legal process dealing with the collapse involved building surveyors both as witnesses and among the accused. But the trial engaged only the construction quality of the building, the thickness of reinforcing bars in the concrete columns, the floors illegally added, and the loads of the industrial machinery that the building was never designed or given permits to hold. However, the collapse also exposed a form of economic violence. Dhaka-based architect Sajjad Khan explained that it was created by “a combination of two failures: the failure of the construction of the building” and a political failure to protect workers from exploitation. The trial addressed only the first of these. Left out of the trial were the factory owners, who through a tangle of subcontracting chains to multinational corporations, had brought prices down and productivity up through deregulated labor conditions that helped feed an endless appetite for cheap fashion.

In 2008, cracks started to appear in homes, public buildings, and streets in Silwan, a Palestinian neighborhood located next to the Old City of Jerusalem. In 2009, the floor of a UN girls school collapsed; in 2010, cracks appeared in the main street; and in 2011, serious damage was inflicted to the ground near Amin-Silwan Mosque. Shortly beforehand, a Jewish settler association called El-Ad had started the illegal excavation of tunnels through parts of an Iron Age site it believed to be the biblical “City of David,” claiming its subsoil to be a holy site and those surface dwellers above it “squatters” to be displaced. This excavation, undertaken beneath the Palestinian homes without the consent and regardless of the protests of their owners, was echoed above ground, with El-Ad supporting settlers seizing or fraudulently buying,
inhabiting, and fortifying residential buildings throughout the neighborhood. What started as illegal excavation turned into a project funded and recognized by the Israeli Antiquities Authority and the municipality of Jerusalem.

The tunneling displaced layers of Muslim archaeology deemed irrelevant by the diggers. It also removed layers of aggregate earth that normally would have absorbed vibrations underneath building foundations. Small seismic cracks that might begin in the limestone bedrock could now shoot up through archaeological strata to the surface, splitting the old, battered asphalt of roadways never maintained by the municipality. The cracks continued moving through the neighborhood’s buildings, appearing and disappearing as they cut through different material elements. One crack might enter a building’s foundation, crawl up a concrete column, moving along paths of least resistance, finding uneven or imperfect parts of the concrete casting, perhaps the place where a forty-year-old cigarette butt might have been thrown into the cement mix during the process of construction.

In 2008, a case was presented in the Jerusalem District Court and later in the Israeli High Court. Photographs of the cracks were presented. The historical and political context of the ongoing occupation of Palestine, above and below the surface, was mentioned, but never heard. After ordering a short suspension of the excavation, the High Court rejected the residents’ petition, accepting the state’s claim that the cracks were unrelated to the excavation, but likely the result of “poor and illegal construction” (without permits, there is hardly any “legal” construction possible) and authorized the continuation of the subterranean colonization. On a recent visit to the site, Jerusalem’s mayor said: “When you stand in the City of David we see layer after layer of foreign occupation, and when we reach the bedrock—there we find the Jewish layer. After the heads of states visit here there would be no doubt who are the true owners of this city.”

CONFLICT SURVEYORS

The challenge of this book is to demonstrate the ways in which forensic architecture can exit the specialized framework of insurance disputes and extend the lifies of causality originating from architectural failure. One of the most important contexts in which an expansion of the terms of forensic architecture is relevant and urgent is that of armed conflict. Because most warfare now takes place in urban environments, homes and neighborhoods bear the consequences. Buildings can thus become the medium upon which traces of fighting are left and from which incidents can be reconstructed.

An explosion causes a rapid release of energy in several forms: sound, heat, and shock waves. Highly compressed particles of air propagate radially outward from the explosive source at supersonic velocities. Walls bend inward and break, initiating a progressive collapse. Air rushes in to fill the vacuum, carrying high-velocity lethal debris and flying bits of glass. Most people dying in contemporary conflicts die in buildings, primarily in homes. When the dust settles, the way it has settled can become evidence.

But the built environment cannot merely be considered as the location of conflict or its incidental, collateral damage. Rather, urban and environmental destruction is often the very target of violence. The transformation of the environment, buildings, and infrastructure is a means of exercising control, facilitating displacement, or offering resistance. Architectural analysis can provide an alternative pathology of contemporary conflict because it enables a different perspective on the context and conduct of armed conflicts.

Cities are composite assemblies of structures, infrastructure, and technologies, of social and political structures, with some plant and animal life, as well. These elements are in continuous interaction, sometimes in conflict or competition with each other. Warfare in urban environments is equally complex. It is not always manifested as a clash between two armies in a built-up area, but as a set of asymmetrical and diffuse encounters between large multiplicities of groups—militaries and guerilla forces, often different and rivaling, contract security providers, NGOs, and media organizations—in an environment that is largely civilian and with repercussions that are immediately political.

The urban environment is highly sentient in both material, analogue, and digital terms. It is a dense media environment saturated by optical and other sensors’ photographs, noise, meteorology and pollution detectors, security cameras, fixed-orbit and image satellites, and smart phones. A conflict involves thousands, sometimes tens of thousands, of people.
entering into an unfamiliar environment that is also home to hundreds of thousands, sometimes millions of people. When this takes place, all elements of the city start recording, each in its own way. Buildings record vibrations and the force of impacts. Plants record—crushed fields around a city’s agricultural outskirts register the movement of military vehicles on them when they stop photosynthesizing, a signal that is captured by remote sensors orbiting above and beamed back to earth. Air-quality sensors pick up increases in traffic as tanks roll in or refugees escape. People remember—in processes that, as I have already shown, are often complex and not straightforward—and increasingly use their camera phones to record the events around them, uploading images, sound, and video online. Each of these sensors is indeterminate, and patient investigative labor has to be invested in reading anything from them and then later also in cross-referencing and pulling the data together.

In this context, the work of forensic architects might seek to adopt the imaginary gaze of a future archaeologist looking back at the present. The archaeology of the present is not only physical, but requires all sorts of digital sensors. As in archaeology, rarely are single buildings significant in themselves. They are rather entry points through which one must navigate, connecting and composing sets of relations between different structures, infrastructures, objects, environments, actors, and incidents. "Evidence assemblages" must necessarily establish relations between, say, digital photographs, material ruins, remains of ammunition, and human testimony.

The "architecture" in "forensic architecture" thus means several distinct things. Architecture is alternately the object of investigation, the method of research, and the mode of presentation. The first is the most obvious: the bruised materiality of buildings is at the focus of our investigations. Architecture in this context is what lawyers call the "primary evidence." But in the forensic context, architecture can also be a mode of research, the means of locating disparate bits of evidence and data and composing the relations between them in space. In this context, architecture is considered as "secondary," or "illustrative evidence." Though forensics is generally understood as a shift away from the ambiguity of testimony toward material evidence, forensic architecture, as we have seen in the introduction, can help create a synthesis between testimony and evidence. The architectural models we construct, often made together with witnesses or victims of violence, help people recall incidents obscured by the experience of extreme violence and trauma. Architecture in this context becomes a mnemonic device. Architecture can also be useful as a mode of presentation: architectural models and
Staro Sajmište (the Old Fairgrounds), on the outskirts of Belgrade, was inaugurated in 1938 as the site of an international exhibition. A series of pavilions — each representing a state or a company — was built around a central tower. At the end of 1941, following the German occupation of the kingdom of Yugoslavia, the fairgrounds reopened as the Semlin concentration camp, where both Jews and Romas were detained and murdered, the former in the first systematic use of gas vans. The site later became an internment camp for Communists, partisans, Chetniks, and other "enemies of the state." The logic of visibility that dictated the layout of the exhibition site also suited the panoptic regime of the camp. No major structural transformation was necessary, except for a high fence that was erected around the compound. After the war, the remaining structures of the Sajmište complex became the home of several generations of people and included artists' studios, workshops, and small industries. The fence around the former camp area was taken down. Some of the abandoned structures were occupied by a Roma community that included survivors of the Nazi persecution and their decedents. Since the war, Belgrade's urban expansion has placed Staro Sajmište at the heart of the city as a kind of extraterritorial island in which alternative culture could flourish.

Recently, another transformation of the site was announced: its planned conversion into a Holocaust memorial center and a museum. One of the reasons was that as a candidate country for admission to the European Union (EU), Serbia was required, among other things, to abide by the Stockholm Declaration, which demands "the adequate commemoration of the Holocaust sites on its territory." The impending transformation would turn the site back into an exhibition ground, and the fence would have to be erected once more, now to protect the museum. Disturbingly, these plans necessitated the displacement of local communities including, pervasively, the Roma people who were themselves victims of the Nazis. The first evictions began in the summer of 2013. It is an unacceptable contradiction, we thought, to see a Holocaust memorial built on forcefully cleared ground. Forensic Architecture's investigation of the site was part of an attempt to help the residents protect their homes in the belief that commemoration does not necessarily contradict ongoing inhabitation.

In the spring of 2012, in an investigation coordinated by Susan Schuppli, Forensic Architecture collaborated with forensic archaeologist Caroline Sturdy Colls and the Belgrade-based Monument Group in undertaking a study of the remnants of the site, above and below ground. Sturdy Colls, in previous years, had developed a method of "noninvasive" archaeology involving the use of remote sensing and ground-penetrating radar (GPR), an instrument that transmits pulses into the ground to a depth of up to fifteen meters to detect minute differences in densities. In the fuzzy three-dimensional model of the subsoil she produces, one can identify irregularities in soil structure indicating buried objects and voids. Subterranean objects do not have
sharp, clear borders. They are made visible only as a gradual increase in the density of the medium of the earth. Their identification often depends on probabilities and interpretation. Objects can be confirmed only when excavated, cleared of their excessive earth, and their borders reestablished, but much information is lost. This is the reason that Colls's remote sensing archaeology has been used in examining Nazi concentration camps in Poland, where rabbinical authorities forbid material exhumations.

The survey included a work with ScanLAB, a London-based laser-scanning practice that recorded the entire site underground. When a laser beam hits an object, it returns the signal to record the location of a point. A point cloud is a spatially distributed group of coordinate points that produce a photographic space within which one can navigate virtually.

The underground and underground scanning resulted in an archaeological report that presented the site as a long process of ongoing transformations, encapsulating all its periods of use, structural additions, and alterations without privilege. The constant transformations, deformations, restorations, and conversions captured the unique history of the site.

The report confirmed a counterintuitive fact: Staro Sajmiste stands today thanks to its ongoing inhabitation, which has sustained it for the past sixty years.

Survey Area 1. A GPR survey undertaken in search of mass graves (none were identified). Feature A is likely a water pipe from the era of the camp. Feature B is a path bisecting the survey area. Feature C is likely a back-filled ditch, but its purpose is unclear. Colls explained that its form and depth are also consistent with burial structures of much earlier periods, such as a tumulus, or a Neolithic round barrow—a mound of earth and stones raised over graves—specimens of which are known to exist in the region. This feature, if indeed correctly identified, predates all other periods and complicated the history of the site.

FORENSIC ARCHITECTURE, CAROLINE STURDY COLLS

German Pavilion, 2012. Vertical section through 3D laser scan and GPR data. The photographic point cloud is the result of the scan. The rectangular surfaces in blue are GPR scans of the subsoil. The GPR survey established the presence of two buried structures from the camp period, now in-filled, as well as the sewage system on the bottom right. Sewage is important because following it allows us to connect contemporaneous structures. FORENSIC ARCHITECTURE; ScanLAB, CAROLINE STURDY COLLS

As Sturdy Collins put it: “the people who have lived in these buildings have played a role in preserving them. Many of these buildings wouldn’t be here if people hadn’t lived in them.” On October 5, 2013, we convened a public forum to present the archaeological report inside one of Staro Sajmiste’s most infamous structures— the former structure that at the time of the fair was the German pavilion and that during World War II had served as accommodation for the camp’s inmates. In this context, we also introduced a proposal titled “Living Death Camps” in which rather than evict the people living and working in Staro Sajmiste, commemoration would be best served by supporting the community and its material necessities of ongoing life.27
FORENSIS

This book records the work of the research agency known as Forensic Architecture. Although the name refers to the work of building surveyors, our agency is composed instead of an interdisciplinary team of architects, filmmakers, artists, scientists, and lawyers. Our products are evidence files in the form of building surveys, physical or digital models, animations, video and maps of various forms. When we work in a legal context, it is often for prosecutors in international law or human rights cases, but our work is not limited to the legal domain—we also produce evidence for citizen-organized truth commissions and tribunals and human rights and environmental protection agencies. Our investigations seek to extend beyond the procedural limitation of each of the forums in which we are asked to present evidence. We try to present incidents in their historical and political contexts—to reconstruct around them the world that made them possible. A full account of our investigations is on our website. Summaries of a few of them have been reproduced as short texts here.18

We use the term “forensics,” but our work actually seeks to invert forensics as currently practiced and return the forensic gaze, otherwise the mode by which state agencies, such as the police or the secret services, survey the people they seek to put under control. We use forensic architecture to monitor state agencies (and sometimes corporations), challenge their claims and, as much as possible, their near monopoly on information in war. The inversion of the forensic gaze is captured in a neologism that Thomas Keenan, following Allan Sekula, called “counterforensics.”19 The state has monopolized both killing and identification; hence, counterforensics turns the state’s own means against the violence it commits. While forensics is a state tool, counterforensics, as we practice it, is a civil practice that aims to interrogate the built environment to uncover political violence undertaken by states. The call to “take over the means of production” means for us to take over the means of evidence production. Here, forensics is not only the technical, neutral domain of expert specialists, nor is it the application of empirical science within a well-established court system and its protocols, but instead an engaged civil practice that seeks to articulate public claims using architecture.

Turning forensics against the state is essential because of the intertwined nature of state violence, which, as previously mentioned, is both violence against people and things and also against the evidence that violence has taken place at all. It is important to confront secrecy and denial not only for the sake of historical truth, a reckoning with the deeds in the past, but because they give legitimacy to state violence and are the conditions that enable its ongoing perpetration.

To salvage the word “forensics” and wrest it from the grip of state agencies and bureaucratic processes, we found an important operative concept in forensis, Latin for “pertaining to the forum” and the origin of the term “forensis.” When the Roman orators of the first and second centuries—Quintilian and Cicero, for example—used the term, they referred to more than just the legal sphere.20 The forum was a chaotic and multidimensional domain of economy, circulation, politics, and judgment in which both people and things participated and were presented. Small things, such as coins or daggers, could be physically displayed, but things abstract, far away, or too large, such as rivers, territories, wars, towns, famines, or empires, had to be made vivid by the power of representation or aural demonstration—by what Quintilian referred to with the rhetorical trope of “prosopopoeia”—the attribution of a voice to inanimate things.21 In discussing “giving a voice to things to which nature has not given a voice,” he wrote of the power of prosopopoeia not only as having the power to “evoke the dead, as forensic pathologists still do in courts today, but also as ‘giving voices to cities and states,’” something that is directly relevant to the practice of forensic architecture.22 Conviction, he believed, requires not so much the objective weighing of facts as the placing of an invisible reality before the public’s eyes—something achieved by what he called energia, “vigor of style”—a manner of presentation “in which the truth requires not merely to be told, but to a certain extent obstructed.”23 Today, contemporary modes of prosopopoeia and energia animate material objects by converting them into data or images and placing them within a narrative. Despite its origins in the imperial context of Rome, we found in forensis a productive category that helped us define our practice as a mode of public address and a means of articulating political claims using evidence grounded in the built world—which is most of the world, by now.

The problem in the history of forensics as a term and as a practice is that throughout the process of its modernization, it followed a trajectory of linguistic telescoping. The forum for its use gradually started referring exclusively to the courts of law and “forensics” to the use of science, primarily medical science, in them. The critical dimension of forensis—its public, political element—was lost in the process. Forensics has instead become the art of the police. Indeed, the modern history of forensics is the history of the techniques by which state agencies monitor, survey, and
govern their populations, enforce order, and regulate deviations. Its spectrum extends from the nineteenth-century pseudosciences of phrenology, through the biometrics of fingerprints, Alphonse Bertillon’s type police, and the colonial archives, to the image surveillance, digital eavesdropping, and pattern analysis of the present moment. It is in this way that forensics embodies what Allen Feldman has called the “police concept of history.”

Forensics has three sites of operation, namely, the field, the laboratory (in our case, it would be the studio), and the forum. The field is the site of investigation. It is the place where violence takes place and where traces are left. The lab is where material is processed and composed into evidence, and the forum is where it is presented. Sometimes we must follow these spatial, institutional, and epistemic designations, namely, collect evidence in the field, process it in our studio, and present it in institutions of bureaucratic justice such as international and national courts and tribunals or the UN. Civil practice can of course also be performed in state and intrastate institutions, but in practicing civil forms of forensis, we cannot always rely on such forums. None of these forums is universally accessible—all are conditioned by institutional, legal, political, and geopolitical considerations. We can thus not limit the presentation of our evidence to any single context, but must seek to migrate it between several different forums. At other times, we must search for alternative, informal forums. Tactical and operative, they can take place in the field and on the street. At yet other times, when the necessary forums do not exist, we must conceive, assemble, or construct new ones. (See Part 3, “Ground Truths.”) In the latter case, we have used the literal meaning of the term “architecture” in “forensic architecture”—we have designed and built places of assembly where there were none. The stereocopy of forensic architecture has in this case simultaneously looked backward and forward—to debate events in the past, it assembled forums in which this can happen.

The general aim, whether we can yet achieve it or not, is to erode the differences between the domains of field, lab, and forum. In the field, rather than evidence being assembled by professional human rights workers traveling to examine what has occurred on the ground, there is now a multitude of independently generated and processed evidence, such as filmed and written testimonies posted on blogs or social media websites. This material is produced on the terms of those experiencing violence. The field is also not a neutral, abstract grid on which traces of a crime can be plotted out, but is dynamic and elastic, a space that is shaped by conflict and violence and that also shapes the conflict that takes place in the forum.

The laboratory itself gets diffused when stages of investigative work—
the exposure, documentation, collation, validation, and analysis of evidence, using satellite images or video analysis—is crowd-sourced. In this context, the classic terms of verification, expertise, provenance, and the chain of custody are replaced by the multiple checks on truth and accuracy provided by the crowd. Such forums also allow us to develop our open-source crowd-sourcing software, PATRN, to support such developments. (See pp. 115–17.)

Finally, forums are no longer confined to arenas such as buildings, but become increasingly diffused across a wide spectrum of channels and media forms. We share the techniques we develop, publically on our website and in workshops with activists. Exhibitions in cultural, architectural, or art institutions allow us to present our work in its historical and theoretical context and to generate debate around these issues.

Forensic speech is traditionally undertaken as a relation between three elements: an object or a building “made to speak,” an expert who functions as the translator from the language of objects to that of people, and the forum or assembly in which such claims can be made. To refuse a forensic statement, it is necessary to dismantle this triangle of articulation, which means to demonstrate that the object is inauthentic, that the interpreter is biased, or that the translation is unfaithful. But the relations between these component parts have themselves become complicated. Objects are animated in the process of presentation: skulls, buildings, and ecosystems are referred to as if they were human subjects; the interpreters.

Forensic anthropologist Fredy Peccinelli demonstrates the impact of a bullet fired from a gun on a skull. When a gunshot hits a skull, he told us, the speed of the cracks traveling round the circumference of the skull is faster than that of the bullet, so they beat it to the other end. Upon exit, the bullet impacts an already cracked surface. (Photo from Second Talents and Talal, Wheat, the Material Ecology of Injury, 2010)
meanwhile, are no longer necessarily human experts, but automated or
semiautomated technologies of detection, calculation, and imaging, while
the forums expand to a multiplicity of modes of articulation.

Although forensics is associated with the horror of crime-scene inves-
tigations, with dead bodies and destruction, as a mode of public presen-
tation, it can sometimes be reminiscent of the genre of comedy. To say
that something is comic does not necessarily mean it is funny. Forensics
is comic because it enacts a fantasy distinct to the genre: that of speaking,
acting objects. Evidence never speaks for itself, but speak it does, through
its surrogate experts. Forensics is the mode by which the present theatre
of horrors is performed by objects in front of a public. Comic moments—a
man speaking to a skull and expecting it to speak back, say—can obvi-
ously exist in the greatest of tragedies, and forensic anthropologists pre-
senting human remains in court continuously perform variations on this
trope. They treat human remains as if they were witnesses, presenting
themselves merely as translators or interlocutors. In our presentations, we
simultaneously employ figures of speech that animate the inorganic, make
claims with and pose questions to objects large and small, ventriloquize
not skulls, but physical and digital objects—buildings, neighborhoods,
software, territories, and digital networks.

COUNTERFORENSICS

The advance of state forensics has also given rise to a multiplicity of coun-
terforensic techniques that seek to hide from, evade, or disrupt the abil-
ity of states and corporate entities to collect traces. These extend from
migrants using razor blades, fire, or acid to destroy their fingerprints to
avoid identification and deportation to forms of digital camouflage against
computer surveillance. In all these cases, counterforensics seeks to under-
stand and map the logic of surveillance—in order to be able to interfere with, camouflage itself
from it, or render it inoperative.26

This depends on both opacity and transparency, with the former being
the condition for the latter: camouflage from state and corporate surveil-
ance, data protection, and anonymization, as anyone working in this field
knows well, is the necessary prerequisite for the exposure of political crimes.
In addition to investigating the means of state investigations, foren-
sic activists must examine the politics of the forums in which evidence is
presented. No forum is neutral. Each is a product of and situated within a
specific political reality, and each operates according to different sets of
protocols. Each forum differently frames evidence's condition of visibility—
what can be said, shown, and heard. Internal autocritique of our own
actions and decisions is essential to mitigate collusion and determine when
we might need to change course. While courts are important sites of polit-
ical struggle and for gathering historical research, the danger is that a legal
process can also sometimes supplant political action.

We must also learn to engage critically with the juridical and norma-
tive frames of human rights and international humanitarian law (IHL or
"the laws of war"). Such frames cannot by themselves address systemic or
structural violations. Merely insisting on normative regulation can end up
reinforcing the status quo. Defending rights from within existing social,
political, and legal frameworks can be counterproductive if the struggle is
to replace the powers that have established these frameworks in the first
place.27 The legal cases are only as good as the political processes of which
they are a part. Furthermore, unlike in the context of domestic crim-
inal law, in which evidence is presented in existing and well-established
forums, in the context of state violence, jurisdiction does not always exist,
and often there are no obvious forums to address.28 Most of our investi-
gations take place in frontier zones with conditions of extraterritoriality
that are outside established state jurisdictions and their frames of crim-
nal justice. These are sites where sovereign jurisdiction is unclear (such as
in the Mediterranean Sea), has disintegrated (as in some parts of Somal-
ian or Yemen, where militants headquarter and drone assassinations take
place), or has been suspended and is under siege (in Waziristan, Gaza, the
West Bank, or the remote highland frontiers of Guatemala in the 1980s).

To that extent forensics is forensic where there is no law.

Those who confront political injustice in the name of the principles of
international law and human rights also need to be cognizant of the way
these laws and directives can themselves become instruments of war. His-
torically, human rights and international humanitarian laws were formu-
lated by states and promoted by organizations such as the United Nations
and the International Criminal Court or the International Committee of the
Red Cross (ICRC) in order to regulate and moderate the way military wage
wars. Interpreted and repurposed by military lawyers, however, these legal
codes might also become the means by which militaries design and dis-
pense violence. The strategic benefit that militaries can claim from moder-
ation is understandable: Western militaries, increasingly bogged down by
a raft of urban insurgencies, are keen to minimize civilian casualties on

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occasions when they believe that moderation might allow them to govern populations more efficiently or to win over the "hearts and minds" that have continually eluded them since the Vietnam War. But legal advice and court rulings on some forms of torture, targeted assassinations, and settlements in Israel, have given these forms of violence some legitimacy in the name of humanitarian principles.24 In some historical circumstances the ethical power of human rights claims also involves the dangers of advocating Western military intervention, purportedly to stop mass atrocities.

Indeed, new frontiers of military practice are being explored via a combination of legal and military technologies that use the law as a weapon of war. There are multiple ways in which contemporary warfare is conditioned and empowered by legal and regulatory principles, rather than simply contained and justified by them. A statement recently made by Stephen Preston, the Pentagon's general counsel, exemplifies the advantages of legal warfare:

We know that the law of war poses no obstacle to fighting well and prevailing. Nations have developed the law of war to be fundamentally consistent with the military doctrines that are the basis for effective combat operations. For example, the self-control needed to refrain from violations of the law of war under the stresses of combat is the same good order and discipline necessary to operate cohesively and victoriously in battle.20

These points above are only some of the ways by which human rights principles, generally understood as counterhegemonic instruments for addressing historical injustices, can be deployed to enhance and legitimize domination and violence. It is our opinion that legal and human rights activism should confront and limit military and state power, not become instructions for exercising it. Forensic warfare, waged by militaries, does not use the law only as an instrument of war, but also extends the conflict into the quasi-judicial domain, where legal categories are employed in a battle over legitimacy. States can mobilize large resources to construct their claims. Militaries maintain their technological and optical advantage and make public every image and bit of footage that serves their aim and deny access to the rest under a variety of "national security" rationales. Through their press offices or websites, Western militaries frequently upload battlefield videos shot from airplanes, drones, or warheads. These highly selective and vetted perspectives on the battlefield always highlight the violations committed by the other side or moments when the military is seen caring for civilians. At the same time, these very militaries work hard to disrupt the possibility of anyone else monitoring their own violations.

The emergence of international tribunals throughout the 1990s—the International Criminal Tribunal for former Yugoslavia (ICTY) in 1993, the International Criminal Tribunal for Rwanda (ICTR) in 1994, and the International Criminal Court (ICC) in 1998—not only provided some of the first forums for international criminal legal process after the Nuremberg trials in 1945 and 1946, but has also led to the popularization of the principles of international law. Different parties to a conflict started mobilizing legal categories such as "war crimes" or "disproportional attacks" as slogans. The form of legal activism that emerged in the shadow of "forensic warfare" has been referred to by Western militaries and security think tanks as "lawfare," which they define as "the strategy of using—or misusing—law as a substitute for traditional military means." Lawfare it is argued, has become "an indelible feature of 21st-century conflicts."21 It is a kind of warfare, they explain, that takes place above the level of the state, in international institutions, and below it, in forums of civil society. This development has made Western states and their militaries vulnerable in the very fields and forums they imagined to control.

War, law, and politics thus do not occupy separate spheres, but rather overlap and interact with each other. International law, human rights principles, and the systems of institutions that exercise and enact them have become part of political struggles, a battlefield on which the law is used by both sides. This fact is bound to disappoint those who imagine that law equals justice. Instead of feeling betrayed by the law, when it provides no remedy, it is more useful to see it as a tool whose effects can be captured by Plato's notion of a pharmakon, a substance that is both a cure and a poison. Activists must negotiate these problems by recognizing both the potential and the dangers of human rights principles and of international humanitarian law and be vigilant and realistic about what is possible to achieve with them.

In forensic, then, we find both an operative concept and a critical practice—the word critical here indicating something that is vital and dynamic as well as our willingness to interrogate our own position. Our investigations have subsequently simultaneously aimed at state violence both on the battlefield and as embedded in the law.
In the early hours of January 9, 2009, a missile was fired at the Salha family home in Beit Lahiya, northern Gaza. The charge penetrated the roof and landed on the floor in one of the rooms. Three minutes later, a bomb struck and destroyed the house. Six people were killed, all women and children. The first strike was "a knock on the roof," one of several methods—telephone calls, SMS messages, leafleting, and warning shots being others—used by the Israeli Army to warn Palestinian residents of an imminent attack. The warnings began after advice from Israeli military lawyers specializing in international humanitarian law as a way of legitimizing bombing in civilian neighborhoods. Once a warning is delivered, Palestinians have a choice: risk an escape outside or stay. Israeli lawyers and spokespeople justify large civilian death tolls by claiming that such warnings were delivered and implying that they shifted the responsibility for their own death to the people warned. But these warnings, though following the due letter of the law, can be part of the problem and exemplify the danger of using the laws of war as strategic manuals. Warnings are in effect used to clear entire areas and create "sterile combat zones" in which anyone who remains is no longer protected as a civilian, but rather subject to a shoot-to-kill policy. According to legal advice given to the military in 2008, warnings render the killing of people who do not heed them legitimate, because by not evacuating, they could be designated as "voluntary human shields." The military has since withdrawn this line of legal reasoning, but still goes on employing warnings in a manipulative manner, and warning missiles still lead to the death of dozens of civilians within their homes.

Forensic Architecture's investigation of warning strikes was undertaken together with the Palestinian, Gaza-based, human rights group Al Mezan, as part of the UN's Special Rapporteur on Human Rights and Counter-Terrorism report on drone warfare.

On Wednesday, August 28, 2013, we interviewed two of the surviving members of the Salha family in Gaza, Fayez Salha and his son Noor Salha, by live satellite link from Al Jazeera's London studios. Al Jazeera was then preparing a documentary on the work of Forensic Architecture, and we were interviewed on camera. Together with Fayez

"She called me on the telephone and told me that the house had been hit, so I told them to get out of the house and head toward the closest school." What the family members did not know was that from the moment of impact, they had a mere three minutes before the house was to be destroyed. After moments of terrified confusion, the family

A KNOCK ON THE ROOF

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At 3:30 a.m., a blast woke the family up. Noor saw smoke coming from the library. The family thought they were under attack. Noor’s mother, Randa Salha, called her husband, Fayeza Salha, who was on duty as the guard of a UN school. Fayeza Salha:

“She called me on the telephone and told me that the house had been hit, so I told them to get out of the house and head toward the closest school.” What the family members did not know was that from the moment of impact, they had a mere three minutes before the house was to be destroyed. After moments of terrific confusion, they began to leave. Losing precious time, the family gathered by the stairs, ready to leave, but, according to Noor, his mother wanted the family to separate into two groups. Noor Salha: “We separated into two groups, following the order of the Zionist [The Israeli military], who insisted there should be no more than five or six people together in the street at one time.” Noor left the house with four of his relatives in the first group. They were the only ones to survive. As Randa Salha led the second group of six down the stairs, the bomb hit. They were all killed.
ENGAGED OBJECTIVITY

Whether searching for historical traces in the materiality of buildings or of bones, the prospect of a political activism that relies on technology and incorporates scientific investigation often raises concerns about the "power" or "tyranny" of experts, about the dangers of becoming detached from direct experience and of replacing unmediated empathy with the cold, misanthropic gaze of the natural sciences. However, throughout our investigations, the experts we encountered were nothing like the authoritarian figures who are featured in such concerns. Rather, they often were part of a network of independent and sometimes also politically vulnerable organizations. Many worked voluntarily because they were motivated by political commitments.

Although expertise is often understood to be preconditioned on a position of neutrality in relation to the subject matter investigated, neither we nor any of our collaborators ever have claimed such a position. No uninvolved investigator would have bothered to go the lengths we have without being committed to the victims whose truth was being undermined or denied. In this form of "engaged" objectivity, political motivations must not be an obstacle to gathering knowledge, but rather the precondition for attaining it.

The experts for the state whom we encountered—lawyers, researchers, or propagandists for hire—were also politically and ideologically conditioned, they worked in support of the state’s hegemony in matters of evidence, and generally had better access to resources, technology, and imagery to promote their aims. There was no question of political neutrality on either side, although often when working for the status quo, those confronting us would understand their positions to be neutral because the existing state of affairs seemed to them to be natural. The concept of forensic architecture is a good model for connecting political practices and activism, because it is structured by the necessity of taking sides, of fighting for and defending claims. Having an axe to grind should sharpen the quality of one’s research, rather than blunt one’s claims.

Wearing one’s political passions too openly, however, can make one vulnerable, as I keep on being reminded whenever past statements, publications, or even petitions I signed are mobilized against the investigative work of Forensic Architecture by those finding ad-hominem attacks to be more efficient than confronting our findings. Likewise, some theoretical formulations on the topic of “forensic aesthetics” or the “necessity for the truth to be produced and staged” (as developed throughout this and previous books) might leave one exposed on the witness stand, as a British barrister with whom we worked and to whom I once presented a book on the subject of forensic aesthetics sarcastically commented: “Just please don’t repeat that on the stand.” The words “aesthetics” and “art” are associated in the legal context with manipulation, emotional or illusionary trickery, and certainly with a lack of seriousness that might divert the quest for truth away from supposedly unmediated experience. Aesthetics is antithetical to the legal conception of truth as simple and objectively given, he explained. All forensic practitioners are keenly aware of that paradox: we know how essential aesthetics and the imagination are to the investigative and interpretative labor necessary to ascertain the most simple of facts, as well as to the production and presentation of a truth claim, but likewise, how important it is to refer to the truth as something much more obvious, something that is simply there.

There is another reason why our reports have been challenged and on one occasion suspended (pending a further decision that never arrived, see “White Phosphorous” below). Attorneys for the state claimed that architects do not possess the “relevant expertise in relation to conflict analysis.” We argued in response that architecture is a crucial analytical frame to apply when buildings, ruins, and cities are concerned. Similarly, we argued, at a time when there are so many images and so much footage coming out of war zones, the work of the image practitioners on our team—the filmmakers, photographers, and artists—is evidently essential.

Another set of objections was articulated on technical grounds. The material we produced did not always have predecessors in being previously admitted as evidence by legal forums. Presentation of new evidence from sources such as those derived from new media, video analysis, interactive cartography, animations, and simulations almost always encountered objections, and when admitted, it was only after some struggle. We learned to prepare our evidence files to show both what we know and how we got there. Whenever such struggles had to be fought, they were worth fighting for reasons beyond introducing a bit of evidence that would make a specific point in a specific context, because when courts did admit such analyses, they also created precedents that would potentially allow others and us to present such work in the future, something that could expand what might be considered as evidence.
WHITE PHOSPHOROUS

During the 2008–2009 Gaza conflict, photographs and videos recorded a hitherto little-known type of airborne munitions—low, luminous clouds, often less than 100 meters above the rooftops, appearing together with the thunder of an explosion. The clouds’ multiple smoke tentacles then descended slowly to the ground in a conelike fashion. Other photographs taken from the ground showed the cloud tentacles burning through all surfaces they encountered, including skin and bone, causing death and severe injuries and often igniting secondary fires of the kind that couldn’t be put out with normal fire extinguishers. Inhaling the fumes was toxic.

These strange clouds were the result of white phosphorus shells fired from artillery batteries into the cities and camps of Gaza. Each cloud could envelop an entire neighborhood. On one occasion, they set ablaze a United Nations school where civilians were seeking shelter. Israel initially denied the use of such munitions—"We categorically deny the use of white phosphorus"—but when many images of the clouds started circulating in the public domain, they could no longer deny the existence of white phosphorus’s existence and claim that the military uses it only "in compliance with international law" as a "smoke screen" to mask force maneuvers in uninhabited areas. However, it was employed over civilian neighborhoods at night, when smoke screens would be useless, and at times when there were no forces anywhere on the ground, rendering the military explanation ridiculous.

Our investigation was undertaken on behalf of the human rights group Yesh–Gvul as part of a concerted civil-society action demanding the banning of white phosphorus munitions. The case demanded a reconstruction of the general features of this form of munitions. We studied many videos of white phosphorus blasts over Gaza, as well as over Fallujah in Iraq, where US forces used it in 2004. The data were integrated into a parametric model that simulated the burst of such projectiles over urban environments. Our analysis showed that the shell explodes at the height of 50 to 120 meters over the surface, where it releases 160 felt wedges soaked in white phosphorus, which starts burning upon contact with oxygen, producing tentacles of thick white smoke. The smoke cloud descends onto the ground in an elliptical form that covers up to 30,000 square meters. We concluded that in the 2008–2009 Gaza conflict, white phosphorous was likely used to harass and terrorize, rather than as a smoke screen.

We presented our report during the Annual Meeting of State Parties to the Convention on Certain Conventional Weapons (CCW) in the United Nations Office at Geneva on November 12, 2012. It was also presented to Israel’s High Court. The Israeli attorney general, who could not refute the findings, concentrated on issues of admissibility. "The respondents objected" to the report, the judges wrote in their verdict, because "the architectural expertise of the team preparing it was irrelevant to the question of the legality of munitions containing white phosphorus." On April 25, 2013, while the matter was being argued, the military issued a declaration stating that it would cease to use white phosphorus shells in populated areas—thereby yielding to the demand of the petition. A senior military commander explained that they had done so because white phosphorous "doesn’t photograph well." On March 5, 2013, the court dismissed the petition without ruling on the admissibility of our report. White phosphorous munitions have not been used in Gaza since. Other munitions have.

THE FORENSIC TURN

Forensic Architecture is part of a broader development that I’d like to refer to as the “forensic turn,” a turn of human rights to forensic methods practiced as counterforensics. Among the first practices that could be called counterforensic was undertaken by the “grave diggers” of Argentina, activists who exhumed and analyzed the bodily remains of the victims of political repression. In 1985, a group of Argentinean students established the Equipo Argentino de Antropología Forense (EAAF) to look for “the disappeared” (los desaparecidos), victims of the decade-long “dirty war” during which thousands of political activists, dissidents, and other opponents of the regime, as well as those merely imagined to be so, were kidnapped and murdered by Argentina’s security services. The logic behind the emergence of EAAF was simple: the former generals in the military government that overthrew the Perón government, amnestied in a process that they themselves instituted before the transition to civilian rule in 1983, persisted in denying that they had kidnapped and killed their victims and obviously did not reveal their fate. The students of EAAF set out to make the disappeared present by digging them out of unmarked graves and analyzing and identifying their remains, presenting this osteological evidence in the judicial processes against the former military leadership that had finally begun. Ultimately, they sought to bring closure to the families and to hand them over the remains for proper burial. With some notable exceptions, until the EAAF began its work, the mass graves of the victims of political violence were often the sites of religious or national ceremonies and were rarely seen as a historical resource for legal research and advocacy.

The group was trained by Clyde Snow, a celebrated forensic anthropologist known for many high-profile cases including—as Thomas Keenan and I wrote in a book dedicated to his work—the identification of the remains of fugitive Nazi Joseph Mengele in Brazil at roughly the same time. Snow’s work in South America helped develop procedures for identifying missing people. Mengele was only the most celebrated of tens of thousands of missing people in South America at the time. In a strange twist of historical irony, it was the forensic procedures developed for the identification of this arch perpetrator of Nazi atrocities that contributed to the effort to identify the missing victims of Argentina’s dictatorship.

While exhumations in the mid-1980s started in a spontaneous fashion by groups committed to the exposure of state violence, within less than a decade the demand for the practice increased, becoming professionalized and institutionalized as it started receiving considerable international funding. Exhumation teams grew and started to include a staggering array of practitioners: forensic archaeologists, anthropologists, pathologists, dental experts (odontologists), biopart technicians, DNA specialists, statisticians, ballistic experts, crime-scene photographers, and even experts able to identify mass graves by studying the type of insects that settle there. This international group of “grave diggers” moved from place to place: from Chile to the former Yugoslavia, Poland, Cambodia, Iraq, Kurdistan, Afghanistan, Sudan, Rwanda, Honduras, and Cyprus. The global proliferation of exhumation practices mirrored the universal experience of state violence in which the common grave has become the common ground.

Luis Moreno Ocampo, at the time, the deputy prosecutor of the Argentinean junta trials, who had made much of the legal use of osteological evidence, has recently provocatively suggested that as chief prosecutor at the ICC, he often dreamed of “a trial without witnesses” in which the judicial process is performed by matter and images alone. This nightmarish scenario is impossible, for the time being, at least, because material evidence requires an expert witness to present it to the court. Matter becomes evidence only when channeled through the language of the expert.

In societies recovering from dictatorialships, the exhumation and identification of victims of political violence is used in the context of transitional justice to reestablish social bonds; in other locations, they are tools for ongoing political struggles. In this context, most often, exhumations have to be undertaken in a clandestine fashion, in processes involving no or few laboratory protocols and sometimes by assuming personal risks.

Such is the case with the exhumation of Kurdish civilians and guerrillas killed in recent decades by the Turkish military. Many of these grave sites are ignored, built upon, planted over, or turned into dump yards. When such mass graves are known to exist, but are unacknowledged or officially denied, they operate as instruments of state terror.

Clandestine exhumations are taking place in eastern Turkey by groups looking to find the mass graves from the time of the Armenian genocide and in Russia in search of victims of Stalinist terror. In Spain, the first exhumations of the common graves of Republicans and other perceived enemies of the Franco regime started only a decade ago, sixty years after the end of the civil war and twenty-five years after the restoration of democracy as a civil-society initiative by groups of political activists committed to “historical memory.” Such exhumations continually
encounter controversy and disruptions on institutional and societal levels and have been stopped countless times in response to legal and political challenges. Civil-society forensic groups also emerged in Mexico in search of the disappearances related to the narcoars and migration. Relatives of the victims founded action groups that have identified dozens of common graves without support from Mexican authorities and often against their explicit prohibitions.

THE ERA OF THE WITNESS

While in juridical history, physical evidence and witness testimony were always intertwined in different ways, the human rights movement has reserved a special place for the testimony of survivors. Testimony has been seen as charged not only with an epistemic value with which to reconstruct histories of violence, but also with an affective ethical and political force. It is thus not treated as a simple matter of positive truth. It is not only what the victims say that is important in reconstructing histories of violence, but also all the things that interrupt their testimony—the confusion, error, and contradictions—that are understood to be ethically and politically significant and also laden with information.

It is interesting that in a way similar to the forensic turn’s origins in the search for Mengele—the identification of his bones and the media attention around it resulted in an increased public recognition of the work of forensic specialists—the emergent cultural sensitivity to victims’ testimony was linked to the discovery of another notorious Nazi escapee in Argentina, Adolf Eichmann. It was in the context of the Eichmann trial in Jerusalem that victims first gained their place as legal witnesses, playing a central role in the context of an international process involving crimes against humanity—in Nuremberg, the US prosecutor, Robert H. Jackson, was wary of letting survivors speak—but the 1961 Jerusalem trial was credited with the inauguration of the “era of the witness.” Indeed, the decades that followed the trial in Jerusalem have seen the foregrounding of the narratives of victims in human rights, arts, and the media. Testimony also reshaped sensibilities throughout Western culture, exercising a decisive cultural, aesthetic, and political influence on the visual and conceptual arts and documentary practices.

The value given to testimony was central to the advent of human rights groups such as Amnesty and Human Rights Watch in the 1960s and 1970s, respectively. Testimony fulfilled a historical role in relation to two general contradictions that shaped that period, as Michel Feher explained in relation to this project. The first was the political versus the humanitarian. In the post-1968 period, a creeping despair of the European Left about the Soviet Bloc was compensated for by the surge in humanitarian activism as exemplified by the formation of groups such as Médecins Sans Frontières (MSF) in the early 1970s. These doctors thought that it was delusory and dangerous to support any of the ideological systems clashing during the Cold War. The only thing left to do was to alleviate the suffering of victims and in the process become witnesses to it. Instead of working for political change, the emergent sensibility of the “era of the witness” asked the public to express empathy with victims, resulting in individualizing and thus depoliticizing complex collective histories.

Memory emerged as an important cultural force in the 1970s as a means to challenge official written history and open up the historical record to voices heretofore excluded from it. This suited the aims of human rights organizations, committed as they were to the plight of individuals against the arbitrary violence of repressive states. Testimony is tasked with more than revealing and authenticating claims of historical injustice. The validity of testimony in the context of war crimes stems from the capacity to speak in the face of the horrors of totalitarianism. Ethical, rather than only epistemic, the function of testimony in such situations is primarily in its delivery.
The “forensic turn” — the emergent cultural and juridical sensibility of the probative value of physical evidence, primarily bones, but also other classes of material evidence — has started to challenge the existing epistemologies and ethical positions of the human rights movement, especially with regard to witness testimonies. However, forensic methods were complementary to human testimony, not antithetical to it. Architecture, for example, can provide more than just investigative tools for the production of measured evidence. It can also be used as a mnemonic device for enhancing memories obscured, hidden, or distorted by the experience of extreme violence and trauma. The memory of horrifying experiences can sometimes remain inaccessible; at other times, they can not be kept out of consciousness, with much more mundane events interpreted as their constant repetition. Testimony after the “forensic turn” had returned as a material, sometimes architectural practice.

The “forensic turn” was not a decisive break from the melancholia of the “era of the witness.” Rather, the turn to the material object that emerged with the opening of human rights trials in Argentina and later in relation to the former Yugoslavia and Rwanda did not provide a simplified alternative to the complexities, uncertainties, and ambiguities of the human subject and that of language. The construction, presentation, and contestation of material and image evidence, like all findings in the natural sciences, are qualified by indeterminacies, contradictions, margins of error, and probability calculations. Expert forensic testimony, like any other human testimony, is prone to errors. Presenting evidence in these contexts is not what we understand, with much justifiable suspicion, as “positivism” — the desire to overcome language through materiality and to hold reality to be knowable without any intermediaries — but the art of making claims using matter and media, code and calculation, narrative and performance.

The forensic turn’s sensibility to matter and digital codes is not evident in police and military work alone, but has also permeated general culture, high and low. From philosophical movements such as object-oriented ontologies to the forensic crime series on television, attention has shifted from the physiological intricacies of the subject position to narratives led by things, traces, objects, and algorithms.

Bones are a special order of things, still haunted by the subject, and they thus provide the link between subject and object testimony and evidence. The forensic presentation of osteological evidence inherited much of the sensibility associated with victim testimony and has tended to mimic witness positions by adopting its ethical overdetermination. Snow’s most famous statement, “bones make great witnesses,” and similar statements by other grave diggers such as William Haglund blur the border between the living and the dead, between objects and subjects, image and materiality, people and things. Snow has referred to the method by which missing people are identified as “osteobiography” — the biography of bones.

Animating objects such as bones exemplifies the life-giving metaphor of forensics. Rather than concentrating on the moment of death and the method of killing, osteobiography is concerned with establishing the identity of missing persons by comparing the events of their life to material traits such as the form and texture of bones and fractures in them. Bones are under a continuous process of exposure to various life conditions: habit, labor, health, accidents, location, violence, nutrition, and ancestry, as well as to distinct environmental conditions typical of different geographies, such as temperature and humidity. These influences are inscribed on a surface that is not neutral or passive, but rather one that is mutating, growing, and contracting. Bones can heal and repair, erasing and retaining traces in the process.

As a technique for identifying human remains in mass graves, however, osteobiography was short lived. The physical examination of bones was phased out in the 1990s, when handling large numbers of DNA tests became
possible. Identifying the exhumed victims of the two distinct genocides of the 1990s—Rwanda and Yugoslavia—employed genetic databases to deal with much larger numbers of bodies than had been dealt with in Argentina and sometimes more complex sets of technical problems. For example, after the exposure of mass graves in Srebrenica in late 1995, the Serbian forces that perpetrated the killing employed bulldozers to exhumate these graves and hastily reburied hundreds of bodies in several secondary graves. These graves were in turn also exhumed, and the remains were reburied in several tertiary graves. Remains of some individual bodies needed to be reassembled from several grave sites—in one case, remains of a single body were found in seven separate locations—spread over an extended geographical area.35

Though made redundant in the context of mass exhumations, some of the principles of osteobiography nevertheless came to inform the conception of forensic architecture, which was similarly tuned to the materiality and texture of a building as a surface upon which events get imprinted and upon which process becomes form.

In April 2016, I traveled to Dublin to interview Clyde Snow. He was there on a short holiday. I wanted to ask him about his Menegale investigation in preparation for Thomas Keenan's and my book on the subject. Snow was surprised by my curiosity. After granting a generous interview, he wondered why an architect should take interest in a case long closed. I told him about Forensic Architecture, which had then just been established. "Then you must go to Guatemala!" he said, where he suggested our time would be better spent helping the forensic teams of the Fundación de Antropología Forense de Guatemala (FAPF), which he helped establish, locate and analyze the remnants of indigenous homes destroyed during the genocidal campaign of the early 1980s in the west Guatemalan highlands. We went there and joined the investigation. (See pp. 121–24.) Some of the rural villages of the Ixil Maya had disappeared completely; the organic materials that composed their buildings were consumed by the cloud forest. Only the plants were left, to be read as traces of built form and formerly inhabited areas. Exhumations and archaeological investigations were undertaken then in preparation for the prosecution of military dictator General Efraín Ríos Montt, whose military rule brought unprecedented violence and terror to rural Guatemala in 1982–83. "When you are trying to tell a story, the architectural evidence is as essential as the osteological one," Snow said.36

SAYNAYA: INSIDE A SYRIAN TORTURE PRISON

In 2016, Forensic Architecture was commissioned by Amnesty international to help reconstruct the architecture of Saynaya, a secret Syrian detention center, from the memory of several of its survivors, now refugees in Turkey.37

Since the beginning of the Syrian crisis in 2011, tens of thousands of Syrians, including protesters, students, bloggers, university professors, lawyers, doctors, journalists, and others suspected of opposing the Assad government have disappeared into a secret network of prisons and detention centers. Amnesty International researchers estimated that 17,723 people have died in custody in Syria since the crisis began in March 2011.38 Saynaya, located some twenty-five kilometers north of Damascus in an East German–designed building dating from the 1970s, is one of the most notoriously brutal of these places.

Since 2011, Saynaya has become the final destination for many prisoners who have already passed through a series of other interrogation and detention centers. In it, prisoners no longer face interrogations. Torture is widely and brutally used not to obtain information, but in order to terrorize and often kill detainees.

The Syrian government does not provide information about prisoners’ whereabouts and often denies that detainees have ever been arrested. People are simply "disappeared"—killed or dying in secret. In recent years, no visits from independent

Salam Osman, one of the witnesses, reconstructs the architecture of the Saynaya Prison. (FORENSIC ARCHITECTURE)
journalists or monitoring groups that report publically have been permitted to the prison. As there are no recent photographs of its interior spaces, the memories of Saydnaya survivors are the only resource with which to recreate the spaces, conditions of incarceration, and incidents that take place inside.

In April 2016, a team of Amnesty International and Forensic Architecture researchers traveled to Turkey to meet a group of survivors who have come forward because they wanted to let the world know about Saydnaya. Our aim was to help them reconstruct and model the spaces of the prison and some of the events and incidents that took place there. Every witness left with us several deposits of memory that they wanted recorded in detail. However, the process of recollection and reconstruction was not straightforward. In Saydnaya, witnesses were kept in a state of constant disorienting sensory deprivation. Their experience of the prison was at the threshold of both vision and sound: prisoners were blindfolded or forced to press their hands against their eyes while being led into the dark cells. They were forbidden to utter any sound, to whisper, speak, or scream. Because both vision and sound were at liminal states, prisoners’ spatial perception was undertaken through detection of differences in temperature, moisture, light, vibrations, and echoes. The modeling process sought to interrogate these sensory thresholds when all memories are conditioned by a state of extreme deprivation.

During the process, the relation between architectural modeling and memory was twofold. On the one hand, the model was a product of memory, a representation of the spaces of the prison as witnesses remembered and described them to us. This model and the description of events within it can potentially become a piece of evidence in a subsequent trial if one ever takes place. On the other hand, the model-building process helped induce further recollections. As they measured rooms, located windows, doors, and objects in their places; experienced the virtual environment of their cells at eye level; and reconstructed the acoustic properties of the building, witnesses had some recollection of events otherwise obscured by violence and trauma. Architectural modeling thus bridged the otherwise separate and distinct functions of testimony and evidence and captured the space between sound and vision.

Memories of violence are rarely straightforward records or internalized representations that are stored in an orderly manner and easily retrieved. Memory, like matter, is plastic, continuously morphing, and affected by violence. Recall could be inaccurate,
prone to distortions, and vulnerable to memory contamination. Our colleagues in the Forensic Psychology Unit at Goldsmiths, University of London, advised us that recollections of horrifying experiences might emerge as a result of an indeterminate cognitive process that is triggered by momentary, unpredictable relations—a distributed process that includes bodies, spaces, sounds, and objects. The model as we have conceived it, based on this advice, created the possibility for some of these relations and for recall to occur in a virtual space.

The model-building process also turned the witnesses into active participants in the project. They described in minute detail the cells and other areas of the prison, including stairwells, corridors, gates, doors, windows, bars, and hatches, to an Arabic-speaking architect on our team—Hania Jamal—who constructed computer models of these spaces and elements while they described them to her. They also reviewed and corrected their own and their peers’ models. Witnesses then further located and put into relation different elements and characters, such as guards and fellow prisoners, and objects, such as floor tiles, blankets, food bowls, bars, and torture instruments, inside the model as they recreated specific incidents. As the model became increasingly detailed, it was rendered to give an eye-level impression of the spaces, and witnesses could locate themselves virtually within it; experiencing spaces and zooming into elements in them induced further recollections.

As I mentioned, vision was extremely restricted. There was little natural light, and prisoners were made to cover their eyes whenever a guard entered their cell. Most of their movement through the prison was undertaken while blindfolded. Some detainees saw only the floor tiles through a thin sliver under sacks pulled over their heads or noticed only the contrast between darkness and light as they were moved past windows. Furthermore, sound was also restricted: speaking was prohibited, including inside the cells, and prisoners were even forbidden to shout in pain when being beaten and tortured. Detainees in Saydnaya thus developed an acute sensitivity to minute variations and nuances in vision and sound.

To capture their auditory memories, we solicited “ear-witness testimony” and reconstructed elements of the prison’s architecture through sound. Lawrence Abu Hamdan, a sound artist and audio investigator on our team, reconstructed ambient and contextual background sounds as another gateway to recollection. Echo and reverberation modeling helped confirm the size of spaces such as cells, stairwells, and corridors, as well as to reconstruct some incidents within them. Abu Hamdan explained that just like a sonar, “the sounds of the beatings illuminated the spaces around them.” Witnesses described the way water pipes and air vents amplified and transported sound across the building and said that the guards sometimes tortured people next to these infrastructural systems for the sound of the beatings to flow throughout the building without anyone knowing where it came from. Sound was the
MEMORY OBJECT 1: THE HATCH

After their arrival, prisoners spent the first period of their incarceration — between a week and five months — in small cells 2.35 meters by 1.65 meters — about 7.5 by 5.5 feet. These cells were built for solitary confinement, but are used to hold up to fifteen people at one time. Prisoners had to take turns sitting; there was no space to lie down. While modeling the solitary-confinement cell according to the descriptions of Samer Al-Ahmed, Hania Jamal asked about the door. Al-Ahmed told her that there was a small hatch in the bottom of it. She asked him for dimensions. He said that it was "a bit longer than my face... and thirty centimeters [eight inches] up from the ground." The attempt to model the location and dimension of the hatch triggered a description of an incident: one day, a guard patrolling outside asked him to push his head out through the hatch. It was too narrow, but Al-Ahmed finally managed to squeeze his head through by turning it sideways and pushing through. The guard then turned and straightened his head, putting his throat against the edge, and started kicking it repeatedly.

MEMORY OBJECT 2: THE HALL

Another of the detainees, Anas Hamado, has never seen the outside of his cell; when he was taken there, he was forced to press his hands firmly against his eyes. On one occasion, he was taken to the corridor outside his cell to be beaten. He had to keep his hands against his eyes and was not allowed to scream, even when the strikes landed. However, a strike aiming at his face caused his hands to slip away for a brief moment. In a flash, he caught a glimpse of the spaces he hadn't previously seen: "I caught a glimpse of a circle, a circular hall with lots of cells... a huge circle, like a cylinder." The instantaneous sight he gained was a momentary leak of vision into a spatial perception otherwise fully defined by sound.

We know from other witnesses and from our own analysis of the architecture of Saydnaya that the corridor outside his cell was straight. Rather than a precise architectural description, Hamado's description of a circular corridor is possibly the result of the beating and a sense of total incarceration. This lapse might thus testify to the violence of Saydnaya more precisely than any faithful architectural description.
FORENSIC AESTHETICS

Photographers, filmmakers, and artists have collaborated with human rights organizations since the birth of the human rights movement in the mid-1970s. Human rights groups made good use of the affective power of the arts in helping stir public compassion. And the emergence and development of a human rights sensibility and its attention to victims opened a new pathway for artists to engage with political issues. The compassionate sensibility that developed was different from the revolutionary aesthetics of the political art of the early twentieth century. It sometimes bypassed the desire for overarching historical and political narratives in favor of accounts of personal tragedies. Registering this entangled development and the emergent sensibility that ensued, the office lobbies of human rights organizations were often dedicated to art and photography exhibitions of this kind. However, with several important exceptions, artists' work was kept external to, and merely illustrative of, the actual investigative work.

Forensic architecture seeks to shift away from this use of the arts and to employ aesthetic sensibilities as investigation resources. Forensics is an aesthetic practice because it depends on both the modes and the means by which reality is sensed and presented publicly. Investigative aesthetics slows down time and intensifies sensitivity to space, matter, and image. It also seeks to devise new modes of narration and the articulation of truth claims.

"Forensic aesthetics" is a term that Thomas Keenan and I proposed in our book Mengel’s Skull. We used it to describe the way in which an affective image—a superimposition of Mengel’s face and his skull produced as part of the scientific process—had acquired the potential of conviction (in both the sense of a legal verdict and that of the subjective sensation of confirmed belief—being convinced and getting convicted) that was in excess of the protocols of both science and the law.

The use of aesthetics traverses the three sites of forensic operation, the field, the lab/studio and the forum, and refers to different things in each. Its first and basic level is that of “material aesthetics”: the modes and means by which material objects—bones, ruins, or landscapes—function as sensors and register changes in their environment. Matter can be regarded as an aesthetic sensorium inasmuch as its mutations register minute transformations and differences within the force fields around it. Material aesthetics is both prior and primary to human perception, apprehension, and judgment. Aesthetics in this context is close to the ancient Greek meaning of the term, in which to sense is to be aestheticized, just as, inversely, to be unaestheticized is to make oneself numb to perception. For Bruno Latour, aesthetics designates the ability to perceive and to be concerned, “to render oneself sensitive, a capacity that precedes any distinction between the instruments of science, of art and of politics.” While aesthetics is generally understood as what pertains to human senses and perception, “material aesthetics” instead captures the way in which matter absorbs or prehends (rather than apprehends or comprehends) its environment. Such “non-sensuous perception,” proposed by the early twentieth-century English mathematician and philosopher Alfred North Whitehead, can help form the link between human sensing and material sensors. Matter prehends by absorbing environmental forces into its material organization. Aesthetics, conceived in this way, is the mode and means by which material things relate to and affect each other.

Such an aesthetics of sentient materiality is familiar to the forensic anthropologist, who sees in the texture of bones a medium in which extended processes of life—habits, labor, nutrition patterns, as well as abrupt incidents—become texture and form. It is also a familiar concept to the building surveyor, who seeks to identify the processes that led to a structural crack. Bones and buildings could be said to be “aestheticized” because their deformations register variations and differences in the environment that surrounds them. Inversely, these formal mutations image (a verb) the
environment. Not everything gets registered in a similar fashion—from things get recorded, and others don’t.

While in the nineteenth century, celluloid soaked in gelatin and silver salt particles was the means—through photography—to record its relation to other objects and the environment around it, today, some digital instruments are sensitive enough to help us read the way different surfaces that have not been designated as sensors may function as such. A table, for example, senses the room in which it is located, objects, hot or cold placed on top of it, as well as the heat and radiation of living matter in various degrees of proximity to it. Material aesthetics is the quality of relations between things—the being of matter in the world, its ability to absorb and the degree to which it might. This extends the principles of photography to the rest of the material world, breaking film’s and digital photography’s monopoly over visual representation. The inverse must also be true: as objects become images, images should be studied as things, parts of the material world. Still, to be read as sensors, the transformations of material objects must be captured by other sensors, such as photographs, analog or digital, remote or proximate, single or hyperspectral, that translate the sensorial capacity of matter into data and help make sense of them.

On the next level, in the forum, the term “forensic aesthetics” refers to the mode by which things appear. It involves different techniques and technologies of demonstration, rhetoric, and performance—gestures, narrative and dramatization, image enhancement and projection. All this takes place in the media environment. International criminal courts and tribunals depend on video cameras to broadcast their proceedings to the public. Each participant in the trials of the ICC or ICTY sits in front of a screen. The legal teams watch these screens for the images, documents, or videos presented to all sides simultaneously in evidence. Face-to-face interaction has been superseded by face-to-screen or screen-to-screen communication, as Susan Schuppli and others have demonstrated. This is very different from traditional courts, which are still largely allergic to the presence of media. But it has a precedent: in the Nuremberg trials, a screen was set at the apex of the courtroom’s perspective, otherwise reserved for the judges. Now the space of international tribunals resembles more a film set or a live-broadcast studio, recording and archiving the processes that unfold in front of multiple cameras and screens. It is for this reason, perhaps, that the ICTY could be established in the anonymity of the rested floors of a former insurance building and the ICC could fit comfortably within the former headquarters of a mobile phone company.

**Image Space**

Contemporary conflicts include different optical regimes. Image-making capabilities are spread among all its participants. Militaries employ satellite and drone-mounted sensors, helmet-mounted cameras, as well as optical heads on guided munitions—kamikaze witnesses that crash into their subjects. Beyond their use as "operational images"—automatically produced by machines for machines transferable as data without ever being converted into anything recognizable by humans as a representation of the visual field—footage from optical heads on projectiles can also be used for propaganda purposes, when, for example, bits of warhead footage get publicly circulated.

Guided missiles make for the most immediate physical relation between cameras and subject—they hit it. The satellites on which their guidance depends are the farthest removed. Since the beginning of the new millennium, satellite imagery has become publically accessible and commercially available at ever-increasing resolutions. These images are shot from beyond the vertical extent of the state’s sovereignty—national airspace is cupped by the lowest possible orbit along which a satellite can travel, an altitude that remains unspecified because the lowest orbit—that of spy satellites—is kept secret. When human rights organizations use satellite imagery to monitor violations of human rights, they continue a well-honed Cold War practice: information gathering about foreign states from beyond their national borders. This often accounts for their designation as spies. They also literally demonstrate the universal aspirations of the movement—human rights principals perceive themselves to be above state sovereignty.

Before the 2000s, satellite imagery was exclusively a resource of governments, but in the late 1990s, the market was privatized, enabling non-governmental organizations to obtain satellite imagery from commercial providers. When a crisis occurs, commercial image satellite operators align the orbits of their satellites to cover "regions of interest," hoping to sell their images, as other photographic agencies would. The satellite continuously scans the globe into a digital archive. Only the metadata—where and when the satellite passed—is available upon first search. No one watches the images, indeed they are not images, before an analyst orders them from the archive. It is only at that point that data becomes an image. While the cost of a single satellite photograph, for just over a thousand US dollars, is generally affordable for most human rights groups, "tasking" a satellite, that is, paying for it to change orbit and pass over specific sites at specific
times costs several tens of thousands of dollars and is affordable only by states and large corporations.

As previously noted, the photographic resolution at which satellite images are made publicly available is degraded. For both privacy and secrecy reasons, to a level that masks the human figure within the square of a single pixel. State agencies have access to the full optical resolution of these photographs, as well as to data from other sensors in them. They can also limit the public availability of certain satellite images by purchasing them and “taking them off the shelf” for a specified amount of time.31

Image satellites take an average of ninety minutes to complete a full orbit around the earth. These satellites can potentially be over the same site only after twenty-four hours because by the time they have completed a full circle the earth has already rotated. Satellite photography is thus distinguished by two of its most pronounced limitations: it can capture neither people (because of the resolution) nor incidents (because of orbit time). They are thus the very opposite of the focused, time-bound incidents of spectacular violence scaled to the human body, the central trope of photojournalism. They are photographs in which the human event is replaced by the event of architecture — the changes and variations across the surface of the earth that become visible in a “before” and an “after” photograph.32 Juxtapositions of buildings with ruins, icebergs with water, and tropical forests with monocrop fields present history as a series of radical breaks and catastrophes. Before-and-after photographs are thus the very embodiment of forensic time. The “before,” often retrieved from the image archives of satellite companies, establishes the baseline, the supposedly normal state, against which the “after,” often “tasked” to capture the same site, is studied for differences and deviations. Satellite image archives are thus depositories of potential “befores” to devastating “afters” yet to come. The juxtaposition of this and other such pairings of before-and-after images produces the fundamental element of what Sergei Eisenstein called “dialectic montage” — a juxtaposition in which the meaning lies not in the images, but in the tension or discord between them.

The gaps between the before-and-after images are filled by continuous aerial observation platforms such as drones and by user-generated media on the ground. Indeed, one of the most important forms of documentation emerging from the battlefields of Palestine, Iraq, Syria, Ukraine, and elsewhere is produced by the people living there and made available on social networks almost instantly. For human rights researchers, citizen-produced images are the complementary technology to satellite imagery.

These kinds of videos include testimony, as well, because the people recording them often speak as they record. But unlike those testimonies collected by professional human rights researchers well after the fact, these recorded video testimonies are delivered in real time, as things happen, on the terms of those collecting and distributing them. Photographs and video files are sent out like messages in a bottle in the hope that somebody will see them and offer some help. Often, this is too hopeful.33 The Syrian citizens-witnesses of the early years of the revolution believed that the constant flow of videos that they risked their lives filming and uploading would shock the world’s conscience enough to lead to action against the regime. They were wrong, of course, and their hopes were drowned by rivers of blood. Other images of decapitated heads, immolations, and the spectacular bombing of archaeological sites replaced them. As years of conflict ensued, media activist groups in Syria were formed to document and log events.

The increase in the number of primary sources has expanded the visual field, but this expansion has not always added clarity. While it has helped corroborate truths and dispel some lies, it sometimes facilitates the creation of new lies and the spread of propaganda. Images often become embroiled
in a secondary conflict about authenticity, veracity, and interpretation. The proliferation of photographic and video testimonies makes necessary a complementary practice of trawling through blogs and social media sites, collecting images and watching carefully.

While debates in the fields of photography and visual culture over the past decades were concerned with the spectators' relation to single images and photojournalistic trophy shots, with questions regarding the image's ability to capture "the pain of others," today, the sheer number of images and videos generated around incidents means that to view images requires understanding the relation between them. We look at photographs not only for details captured in their details but as doorways to other photographs; that is to say, we look at images through images.

Most videos that end up being broadcast or becoming viral on the Internet contain, in a single image frame, both perpetrator and victim. This has been the case in most videos of police brutality since the video recording of Rodney King, the black motorist beaten by the Los Angeles Police Department in 1991. But for every shot that includes a beater and a beaten or a shooter and a victim, there are many more that include only one or the other, or just audio, or things that happened just before or after the incident. Their relation to other images and the main incident is not obvious. It is harder to view and understand incidents that slip between images. Images containing partial information are rarely broadcast and are often discarded as trash. Searching through this image flotsam, however, we can sometimes find, synchronize, and reassemble images to reenact incidents visually and virtually in space. Viewing in this context requires construction and composition — thus, architecture. Constructing virtual models from the spatial information harvested from images, we can locate cameras in time and space. What we refer to as the architectural image complex is a method of assembling image evidence in a spatial environment. The architectural image complex can function as an optical device that allows the viewer to see the scene of the crime as a set of relations between images in time and space. It can also be used as a navigational device to help move between images, exploring a space that is at once virtual and photographic. Essentially, it makes manifest the necessity for composing evidence that is simultaneously material, media-based, and testimonial. The architectural image complex thus replaces both the thematic classification system of archives and the linear transition between images in before-and-after montages. It is best demonstrated in relation to the two cases — the Nakba Day killing and Black Friday — presented in Part 2.
on the photographic plate. The "after" image shows the state of the street after the battle. The barricades are broken, and the windows that were closed in anticipation of battle are now open. One can make out soldiers and a few horses. The workers were defeated. The pair of images was printed, two months after the battle, in the reactionary (and, later, collaborationist) Parisian weekly L'Illustration, to convey a warning to the workers. This short sequence of two images prefigured the possibility of the moving image, a decade before it was invented.80

One hundred and fifty years after the invention of photography, the problem of capturing the human figure and incidents persisted in what had become the most common form of before-and-after images — satellite imagery. Satellites impose a different set of limitations on photography. The human figure is erased, as we can see in the pair of images from Darfur below, because the resolution of satellite imagery is designed to mask it. Traces of violence are captured by spatial transformations between two points in time.

Further scaling up the pairs captured in Before and After, in January 1973, less than five months after Landsat 1 went into orbit, the first photographic survey of Cambodia was undertaken from outer space. That year saw the culmination of an escalating campaign of "secret" bombing unleashed by the Nixon administration. The satellite image captured a landscape transformed by close to three million tons of bombs dropped on Cambodia between 1965 and 1973, ravaging villages, fields, and forests. The image became known, however, not so much for the damage it showed, but rather for providing the "before" image — the supposedly normal baseline — against which another crime would be registered: the atrocities perpetrated by the Khmer Rouge regime a few years later on this very terrain. A satellite survey undertaken in 1985, six years after the Khmer Rouge regime was eliminated, shows a huge orthogonal grid— a vast canal system dug by the Khmer Rouge along the one-square-kilometer gridlines on their maps. This irrigation system, whose construction was based on the slave labor of hundreds of thousands, was also the site of its killing fields. Of the two destructive periods in Cambodia's history, the US bombing is the less-represented episode, partially because although it was captured in the 1973 Landsat photograph, there was no "before" image to which it could be compared.81

The third major destruction to have befallen Cambodia in the last half century was the result of climate change. Although one of the countries contributing least to anthropogenic climate change, Cambodia is paying one of the highest prices for it in the increased frequency and severity of the monsoon floods. In 2011, the worst flood in Cambodia's recorded history saw three-quarters of its land area inundated and about 30 percent of the harvest destroyed. Climate change and its resultant ecocide now seems to have replaced genocide as the defining tragedy of our generation.
At different times throughout the Syrian conflict, Forensic Architecture was asked to locate air strikes based on images and clips posted on social media. Of all the strikes we worked on, I present here one likely undertaken by the US and one undertaken by the Russian and Syrian air force.

On March 8, 2015, three bombs were dropped on an area abutting the Turkish border, between the town of Atimah and a displaced-persons camp where more than thirty thousand civilians were sheltered. No military force has claimed responsibility for this attack, but it was likely a US strike on al-Qaeda militants who operated in the area.

Forensic Architecture was asked by the casualty-monitoring group Airwars to undertake an analysis that would confirm the exact strike location. People in the camp and in the town photographed the bomb clouds shortly after the strike and uploaded their images and videos on social media websites. We verified two sources to be of the same strike, taken from different perspectives—one from the town and the other from the displaced-persons camp. We reconstructed the cameras’ locations and their cone of vision by identifying recognizable elements in the images. We intersected these perspectives to locate the strike. Comparing the size of the smoke plumes with those of other known bombs in our archive, we estimated that these were one-ton bombs.

The strikes targeted the eastern edge of the town of Atimah, close to homes and a public building, possibly an improvised hospital. The blasts were less than a kilometer away from the densely inhabited refugee camp. Six civilians were reportedly killed.
On the morning of February 15, 2016, a hospital supported by Médecins Sans Frontières (MSF) in al-Hamidia, a small village located south of Maarat al-Numan, Idlib Province, Syria, was hit in two separate air strikes. This investigation was undertaken on behalf of MSF, as part of a project that seeks to investigate and publish information about every strike on their facilities. One strike completely destroyed the hospital. Twenty-five people died and eleven were wounded. Because the first attack occurred during the changeover from the night shift to the day shift, the patient count had not yet been carried out. This meant that in the early stages of the rescue operations, first responders could not know the extent of the number of people trapped or crushed under the rubble.

A second attack occurred roughly two hours later. The town of Maarat al-Numan and its outskirts were also attacked, with a strike later that day targeting the national hospital. Members of the opposition group, the Free Syrian Army’s Observatory who operate like plane spotters, posted that on the morning of the attack Russian warplanes were spotted leaving Hanaymen airport, a Russian military base. These planes likely committed the first set of strikes. Later that same day, MiG-23 fighter jets belonging to the Syrian military were spotted leaving Hama airport and most likely took part in the later bombing raid.\(^{83}\)
at the camera, then raising his gun. Reeb starts panning to the right while zooming out. While the camera moves across the fences, the sound of a shot is heard at the same time that the blurry streak appears in the aforementioned frame. Abu Rahma is seen falling to the ground. Looking at this sequence repeatedly, we started to suspect that the shot might have aimed at the very camera that recorded it. It was possible that the soldier aimed directly at Reeb’s camera, missed it by a few centimeters, and hit Abu Rahma, who stood right next to him. It was the same incident documented in Emad Burnat and Guy Davidi’s documentary _Five Broken Cameras_. The broken cameras in

BF”in demonstrated the degree to which the military perceives image making as a threat and also the risks involved in documenting soldiers in action.

The case still drags on in the military courts without resolution. Lieutenant Colonel XXXXX, the military expert, now agrees with our analysis that the canister was fired directly, but now, incredibly, he claims that the military police do not know who the soldiers seen in our video analysis are, nor have they interviewed them since, despite a killing having occurred. Seven years after the incident, no one has been arrested or even interrogated in this case.
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LEFT: A still frame from a video posted on JSRTV (the pro-opposition satellite channel Al-Jazir TV) shows a bomb cloud seconds after a blast destroyed the MSF-supported hospital of al-Hamidiah, in Ma’arat al-Numan, Syria, February 15, 2016. A still frame from a video found on Twitter shows the same bomb cloud from a slightly different angle, February 15, 2016.

IMAGE ANALYSIS BY FORENSIC ARCHITECTURE
ABU RAHMA: FROM VIDEO TO VIRTUAL MODELING

On Friday, April 17, 2009, near the West Bank village of Bil'in, an unarmed demonstrator, Bassem Abu Rahma, was shot and killed by a tear-gas canister fired across the fence of the separation barrier (wall) there. Four years previously, the military had declared this protest area one of its “closed military zones,” arresting and imprisoning nonviolent activists. In the context of such encounters, open-fire instructions allow soldiers to use only “nonlethal means,” such as, ostensibly, tear gas and rubber-coated steel bullets, unless their lives are in danger. But these can be used to kill and have killed on dozens of occasions. It was the military’s way to make such nonviolent protests harder and to force events to escalate into armed encounters in which it has the advantage. Where there were no activists’ cameras around to record the incidents, no police or military investigations were conducted. This was one of the reasons why protesters started using cameras extensively.

Tear gas is considered a nonlethal munition, but it can kill when the hard aluminum canister, fired through a special gun, hits a human body directly. Soldiers are supposed to shoot these munitions only upward, in a ballistic trajectory of 60 degrees.

The killing of Abu Rahma was recorded not by one, but by three video cameras from different angles. However, the military had persisted in denying responsibility, claiming that the soldiers did not fire the canister directly at Abu Rahma and that he might have been hit by a deflection, and they closed the investigation. After the closing of the file, Forensic Architecture was commissioned to undertake a scene reconstruction at the request of Michael Sfard, who was acting for Abu Rahma’s parents and the Israeli human rights organization B’Tselem. The legal team appealed to the High Court to force the military to investigate the killing.

One of the three people filming that day was David Reeb, an Israeli artist/activist who was standing right next to Abu Rahma when he was shot. His footage showed a group of Israeli soldiers on the opposite side of the fencing system of the separation barrier. A few seconds later, a single still frame captured a faint and blurry streak. This was the projectile moving horizontally in midflight. Three frames later, the canister impacts. Abu Rahma is heard calling out in pain. Reeb quickly turns the camera toward him.

Our report located the videos and the participants in a 3D model and demonstrated that the lethal strike was shot in direct aim, intentionally tokill or maim. The report was signed February 22, 2010, and presented to the Israeli High Court on March 28, 2010, in a petition against the military’s decision to close the case. The ruling forced the Military Advocate General (MAG) to reopen the criminal investigation. The military thus had to engage our evidence and confront our analysis. On April 3, 2014, we received the military’s “counter expert report,” signed by Lieutenant Colonel Naftali XXXX (his surname was crossed out), presented as the “Senior Deciphering Officer of the IDF Intelligence Corps.” His report claimed that the streak we identified in the video “has not directly hit Abu Rahma” and provided drawings that attempted to explain his determination.

Our response was submitted on July 25, 2014: it was impossible to analyze the movement of a projectile in space based on two-dimensional images only. Photographs or video stills need to be located within three-dimensional models to determine relations between elements such as characters, objects, points of origin, and trajectories, otherwise flattened on a two-dimensional surface. We provided a set of models that constructed the scene in 3D and located the projectile in space. Our 3D model showed that it had to have passed only a few centimeters from the lens of the camera and that it could not have been captured as a streak.

A wide panoramic collage of the still frames from Reeb’s footage helped reconstruct more elements of the sequence of events in the incident: Reeb’s camera is zooming in on the soldiers and holding on them for a few seconds; a soldier is seen looking directly
Lieutenant Colonel Naftali XXXXX's trajectory study in his counterforensic report on our first report. Abu Rahma is marked by the red circle. Reeb (Reev, in the report) is marked by the blue circle. The lines in yellow are Reeb's camera's cone of vision. The projectile trajectory, according to him, is marked by the dotted purple line. The Hebrew caption on the image reads: "Analysis of the Abu Rahma incident. April 9, 2009 (the incident took place on April 17). Photograph from [military] observation post Aladdin. The moment of impact. The position of Abu Rahma and near him Reeb, marking the trajectory of fire according to analysis of Reeb's footage. Main conclusion: the photograph of the trajectory in Reeb's frame, assuming it is the impacting measure—was not aimed directly at Abu Rahma, but was deflected." - IDF INTELLIGENCE CORPS

Left: A top view of a 3D model showing the location of Abu Rahma and Reeb in relation to the soldiers on the other side of the fence. J represents the trajectory of the canister as it would travel from the "Jeep Position" to strike Abu Rahma. W represents the trajectory that the military counterforensic expert proposed. It does not strike Abu Rahma. It is an impossible trajectory, according to our 3D model. W1 represents the trajectory of the canister as it would travel from the "wall" position to strike Abu Rahma, passing close to the camera. It is more likely the trajectory that was recorded as the streak. X1: A model showing the trajectory of the projectile (the streak) in three dimensions. It passes very close to the camera lens, missing it by a few centimeters before striking Abu Rahma (AR). Positions A and B indicate the same endpoints of the trajectory that appear on the two-dimensional photographic plane in Reeb's footage. FORENSIC ARCHITECTURE AND SITE RESEARCH
Patterns

Violence unfolds on different scales, over different durations, and at different speeds: it manifests itself in the instantaneous, eruptive force of the incident, evolves in patterns and repetitions across built-up areas, and then manifests itself in the slower, incremental degradation of large territories along extended timescales. The different scales and speeds of violence are interrelated and convertible to one another. Incremental processes of environmental degradation build up tension that can then erupt with the kinetic force of armed conflict. But although the different scales, durations, and speeds of violence are entangled and codependent, seldom are they studied and presented together. Each becomes perceptible by different optics, is often engaged by different organizations, and relates to different juridical and political frameworks. The problem is similar to that of the figure-ground gestalt. An observer, at a given moment, can see either a figure or the ground.

At other times, such scalar arrangements can be wrongly interpreted as the structure of causality, but the large-scale political, strategic, or territorial conditions cannot be understood as a root cause of all local incidents. The connections between what historian Marc Bloch called "micro- and macro-history, between close-ups and extreme long shots," run along multiple threads and feedback loops in which local, sudden, unforeseen, eruptive incidents or accidents, the result of chance or of miscalculations, can reorient development in unexpected directions and trigger large-scale transformations. Our investigations adopted a cross-scalar approach in which we might start with a shooting incident, then zoom out to map repeated patterns of such incidents in time and space, then open up further to study the area's long-term history and politics, and the transformation of its environment over time.

The individual is the molecular level of human rights analysis and the vanishing point of its optics. Small-incident analysis, whether evidenced in testimony of image/video material, seeks to connect individual perpetrators to individual victims. It could thus be tried in a criminal context, whether local or international. Foregrounding individual perpetrators might be legally effective, but such individuations can also mask the political reality and historical context. Although they are generally reluctant to do so, when put under pressure, states and militaries might single out and even indict individual soldiers who perpetrated violence and insist that it was in excess of orders and aberrations of standard operating procedures. Labeling such cases "abnormal" creates a threshold that helps present the rest as legitimate. If evidence is to exceed the individual soldier's criminal liability and implicate the higher military and political levels, it is essential to demonstrate that an incident is part of a repetitive pattern of similar violations, that takes place in different parts of the battlefield by different units. Patterns allow lawyers to attribute violations to the military's mode of operation, rather than to individual decisions. Mapping such patterns can help establish what international lawyers call the "widespread and systematic" nature of the violations, which, alongside their "gravity," is an important condition for a war crime conviction.

The larger the data set, the more reliable and coherent the time/space patterns that might emerge. Different algorithms can establish correlations, clusters, and associations between incidents that otherwise would have remained invisible.

Pattern analysis originated in the development of technologies of risk management by financial or security companies, and as previously noted, had been weaponized by the CIA in the preemptive drone strikes. But like countermapping and counterforensics, pattern analysis can also be repurposed to be employed while investigating state violence.

In recent decades, human rights research was limited by the scarcity of sources and evidence; at present, there is such a large quantity of information that the problem becomes instead how to manage and generate insights from an overabundance of data. As the stack of hay is getting higher, human rights analysis must simultaneously both be looking for the needles (the incidents) and at the disposition of the stack (their patterns).

Employed in the analysis of state violence, patterns can reveal the modes and frequencies of attacks on specific target types, the modes of their destruction, casualties, and more. They can reveal trends, origins, and phase transitions. A shift in strike policy might be traced back to a preconceived plan, to an operational order, to a change in standard operating procedures, or to tacit political approval of certain violations. Patterns can reveal how peaks of violence and rapid escalation emerge in retaliation for military setbacks, for example. It can also capture more elusive processes of "cumulative radicalization," in which different military units of the same force might mimic or compete to outdo each other. Other types of pattern analysis can look at situations in which a particular type of information is being repeatedly withdrawn, erased, obfuscated, denied, or censored by military or other state agencies. Such patterns in the withdrawal of evidence can become evidence in their own right.
Starring in 2014, Forensic Architecture (in a project coordinated by Francesco Seiberg and others) developed an open-source software called PATTRN, designed as a crowdsourcing device that allows activists to upload information and then map relations between discrete events, identifying patterns and trends in time and space. PATTRN was conceived to enable citizen-driven participatory mapping. Our aim was to support the sharing and collation of first-hand reports of events on the ground by the very people who are subjected to violence, to assemble reports and produce analysis, and eventually to bypass the need for professional investigators. Crowd-sourcing needs to be able to safeguard the anonymity of users. Data protection is key, and the anonymization technologies that we employ are the basic condition of participation in situations where identification of researchers could be risky. Verification can be undertaken not by tracing the provenance of evidence back to the identity of users (which could be dangerous for them and would render the tool vulnerable in court), but by peer-to-peer correction with minimal editorial oversight.\(^{10}\)

PATTRN is employed by several organizations. Some require pattern analysis for identifying trends in past data. The ICC in The Hague, which is considering opening proceedings against Israel for the 2014 Gaza war, needed to undertake pattern analysis to determine if violations were “widespread and systematic” and has been studying the database of Israeli attacks during this war processed by Forensic Architecture’s software.

But pattern analysis also can be used to provide general predictions and indications of where and when vulnerabilities might be expected. Organizations working on risks to migrants in the Mediterranean used PATTRN to identify the convergence of categories that would help identify such emergent risks or where people might most likely be intercepted or left to die. The accuracy of prediction is based on the quality and quantity of data. Any result needs to be treated with caution, merely as an indicator of possibility. But pattern analysis in the human rights context might open the way for forensic techniques to be used not only for studying the past, but also, tactically, in predictive manner, oriented toward the future.
FIELD CAUSALITY

The environment, whether built, natural, or the entanglement of the two, is not a neutral background against which violence unfolds. Its destruction is also not always the unintended “collateral damage” of attacks aimed at other things. Rather, environmental destruction or degradation over an extended timescale can be the means by which belligerents pursue their aims. The targeting of life-sustaining resources such as fields, forests, and water sources or infrastructural systems such as roads and electricity networks can erode the conditions that sustain life. This is a form of environmental destruction that can be undertaken as a means of population control and ethnic cleansing. And the effects of environmental degradation can linger for years after the actual fighting has ceased. It can also become a contributing cause to the eruption of further conflicts or to the aggravation of existing ones. The environment thus belongs within the histories of violence, and to include it, we must engage the historical perspective of the longue durée, that is, to be both geographically broad and historically deep.99

Some forms of environmental violence99 are largely invisible. “Slow violence,” literary critic Rob Nixon has pointed out, “occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all.”99 His examples include the aftereffects of the use of the defoliant Agent Orange in Cambodia and Vietnam and the toxic drift of oil spills. The slow violence of environmental degradation is lethal, and not only because it causes or aggravates armed conflict. Slow violence exacts its own victims who, in many cases, outnumber the direct casualties of war.99 Mortality rates increase when water sources get contaminated or depleted, when fields or a forest on which a community depends are burned down, cut, or poisoned. While direct mortality—from trauma, bullets, or explosives—is visible and mappable, figures of indirect mortality, resulting from the destruction of life-sustaining environments or infrastructure, are more difficult to establish. This kind of environmental violence is slow, often formless, diffused, and continuous and thus largely imperceptible, unimagetable, and unimaginable.98 It is often not considered violence at all, thus demanding that we expand our definition of what might constitute violence, what might count as killing, and also what amounts to evidence. Indeed, evidence of this kind of violence is hard to establish because the consequences are spread across extended periods of time and large territories, and its perpetration involves the interaction of various agents and phenomena. When used as a weapon of war, environmental violence can become a subtle way of killing that masks perpetrators by distancing them from the victim. It also accounts for slow and painful ways of dying.

In generating evidence, we should look at the environment as a medium of inscription. Plants are useful sensors. The long-term biomonitoring of plants across extended territories and time spans is one of the ways in which the facts of environmental violence and other forms of environmental change can be established. Whether in agricultural environments, savannahs, or forests, plants are sentient, sensing bodies. Shifts in their year-to-year patterns of vigor and decay record long-term transformations in the environment—changes in the climate, but also political transformations, the result of conflicts, as well as combinations of all the above. An archive of plant transformations over extended regions and decades exists in the remote sensing data of earth-observation satellites such as Landsat, which go back to the start of the program in the early 1970s.

Using environmental data as evidence for armed conflict poses challenges that are not only scientific, but also represents legal, and political. While criminal law seeks to establish a linear string of causal relations between intentions, actions, and victims or between, so to speak, the two ends of a smoking gun, the representation of the causes of environmental violence demands the establishment of more complex and diffused causal structures. I propose the term “field causality” to refer to indirect forms of causality, multidirectional and distributed over extended spaces and time durations. It is an inherently spatial form of causality whose employment seeks to reconnect the multiple threads that linear juridical protocols have torn apart.

Inversely, when presented in isolation, particularly in legal settings, field causality can also end up becoming the bastard’s best line of defense. Often, perpetrators will attempt to use such explanatory structures to deflect accusations of their direct responsibility. It is indeed currently more common as a form of deflection than as an operative form of forensic analytics. Against a persistent defense in the context of a criminal trial, it is hard enough, chief forensic scientist of the ICC Eric Baccard sarcastically informed a group of us in a work meeting, to establish that a hole in a skull measuring 5.56 millimeters is the result of a 5.56-millimeter bullet, let alone suggest complex and diffused field causalties.98 Extending causal ecologies and pulling more actors and agents into them might result, in the eyes of the legal professionals, in the production of “dirty evidence.” That is, an excess of information that lawyers often feel compelled to distill into a
linear chain of distinct cascading actions—according to the mechanical or "billiard ball" model of criminal causality which finds it necessary to draw straight lines between perpetrators and victims. But whatever evidence is excessive in relation to the protocols and institutional needs of one forum might become important in another. And the "dirt" in one context might be exactly the operative element in another.

The necessary forums for dealing with field causalities are currently not juridical, but political. To establish field causalities for environmental violence is to articulate the material basis for the imperative to reconfigure the political field fundamentally, as opposed to the tendency of international justice to isolate and punish a few individuals and leave the social and economic structure intact.

GUATEMALA: ENVIRONMENTAL VIOLENCE

The violence inflicted by Guatemalan security forces — both the military and military-organized civil militias — on the Ixil Maya people in the El Quiché region of West Guatemala between 1978 and 1996 amounted, according to Guatemala’s 1999 Comisión para el Esclarecimiento Histórico (CEH), to "acts of genocide.‖ Indigenous Maya, 60 percent of the population of Guatemala, accounted for some 83 percent of the victims of the civil war. Thousands of people were massacred and ninety villages were destroyed, along with large-scale deforestation, the latter purportedly to expose guerrilla hideouts, but in fact meant to render the area uninhabitable, which it did.

American historian Greg Grandin called these events "the last colonial massacre" and the culmination of a five-century-long process of colonization, land grabs, and massacres suffered by the indigenous people of Central America. However, the CEH considered the events of the civil war to be an isolated historical incident, an aberration from the evident social order thereby ignoring the terror of the area's colonial history. This problem was nested in another: as substantive as the final report of Guatemala's CEH was, it was largely textual and was not furnished with extensive maps. Statistics about destruction and mortality were provided, along with the testimonies of survivors, but the civil war remained little understood as a process of physical transformations continuous with Guatemala's colonial history.
Forensic Architecture was commissioned to undertake spatial research in support of action promoted by an NGO, the Centro para la Acción Legal en Derechos Humanos (CALDH), which attempted to foreground such colonial continuities. The research, undertaken with Paulo Tavares, was conducted on two distinct scales. On the architectural scale, we aimed to help locate remnants of destroyed buildings, mainly in and around the villages of Peña Grande and Xolotún, to help estimate their size and population. On the larger scale, we studied environmental transformations between 1978 and 1981, at the height of the repression, in the larger Quiché region of West Guatemala, where these villages were located. Besides CALDH, the research was also undertaken on behalf of the Oficina de Derechos Humanos del Archivo de Guatemala (ODHAG), and the exhumation teams of the Fundación de Antropología Forense de Guatemala (FAFG), introduced to us by Clyde Snow. The context included several legal processes. In 2012–2013, the trial of Efraín Ríos Montt, former military dictator of Guatemala between March 1982 and August 1983, took place in the National Court of Guatemala. After Montt’s genocide conviction was overturned by the Guatemala Constitutional Court in 2013, our research was presented as part of a legal process pursued in the Inter-American Court of Human Rights, where the IIL Community took its demands for justice. The second trial concerned the period of General Lucas Romeo García, who ruled before Montt, between July 1978 and March 1982.

We examined vegetation change between a satellite image taken by NASA Landsat 3 in February 1979 and one taken by Landsat 5 in March 1986, the images most closely bracketing the period of the genocide. The resolution of these images—in the two images, a pixel is 30 by 30 meters square, respectively—is not sharp enough to capture individual villages, but sufficient to record territorial-scale vegetation change. Normalized difference vegetation index (NDVI) analysis visualized the vigor of the earth’s vegetation cover. Green indicates vegetation gain, while red/pink shows vegetation loss during the period of the military campaign in the mountains. Forensic Architecture with the collaboration of IILT Research.

The natural environment registered this process in two distinct ways. In the south, where villages were destroyed and “zones of development” were erected, large parts of the forest were burnt down. This is registered as vegetation loss in the southern areas. In the northern areas of this image, abandoned villages were taken over by the forest—shrubs and trees are more robust and durable than cultivated plants—and registered as a rebound in vegetation biomass. What otherwise could have been interpreted as a return to wilderness, as nature repairing itself, is in fact evidence for a process of ethnic cleansing. Forensic Architecture with the collaboration of IILT Research.

Our work was based on three periods of fieldwork in Guatemala, undertaken in December 2013, November 2012, and March 2010. Because the buildings of the IIL were constructed of wood and adobe, once they were destroyed, the organic remains were quickly consumed by the cloud forest. To identify building remains, we learned to follow the plants. Fruit trees such as avocados, papayas, or peaches signal the possible former presence of house and village sites. Only the foundations were made of stone, but more than thirty years of overgrowth made it necessary to probe the ground with sticks to find their harder surfaces, then clear the shrubs with a machete to measure the extent of the ruin.

Like other Maya peoples across the mountains of Guatemala, the IIL inhabited this area with dispersed homesteads surrounded by small subsistence gardens of beans and maize set in clearings within the otherwise dense cloud forest. The forest was considered a commons and was to some extent man-made, with cultural afforestation of medicinal plants and fruit trees existing in higher densities around inhabited areas.

The IIL Maya were refugees from the centuries-long process of colonization, gradually pushed from the fertile valleys and coastal plains up toward the harsher highlands and mountaintops. The military’s repressions in the area that it referred to as the “IIL Triangle” escalated between 1978 to 1983. The entire territory was occupied by the military, which considered the IIL Maya people to be “subversives” and their villages to be
the material base of an insurgency. Despite the insurgency being responsible for only some 3 percent of the acts of violence conducted during the conflict, according to the CEH (the rest was undertaken by government forces), it was characterized, in the con-
temporary language of the Cold War, as “infilitrating Communist cells” operating
deep within the forests, an environment that, from Cuba through Peru to Colombia,
eluded the US military and its proxies.

It was in fact the autonomy that the ikil enjoyed in the high mountain areas — they were not citizens of the state and did not participate in the national economy — that was in itself perceived as a threat to national sovereignty. The campaign was about more than putting down an insurgency — it was about the “domestication” of these unruly areas and bringing them into the fold of the state. The logic was both strategic and political: the destruction of the environmental conditions upon which the ways of life of the ikil Maya depended was meant to bring them under state control.

The Guatemalan military command marked many of the landlocked highlands as “red zones.” In them, they explained the logic of the operation as “draining the water to kill the fish,” an inversion of one of Mao’s famous dictums, “the guerrilla must move among the people as a fish swims in the sea.” This involved acts of both con-
struction and destruction. About 80 percent of the ikil villages were razed, and thou-
sands of civilians were killed. Fields and forests were burned down. Alongside all this destruction, a major project of construction and territorial reorganization also took place. Survivors were resettled in “pole development” — concentration towns surrounded by “model villages” — where they were educated in modern agricultural techniques and monocrop cultivation of modern seeds, a strategy similar to the meth-
ods of “territorial reduction” — the concentration of dispersed indigenous people to free the land for development — used by Spanish colonizers.

THE LANDSCAPE AGAINST THE STATE

The case of the village of Beit Surik, north of Jerusalem, was the first petition brought against the separation barrier known as “the Wall” in the Israeli High Court, but typ-
ical of the rest to come. When a topographical model showing the path of the Wall
was brought to court, at the request of the judges, the parties had to go to the
their designated places and assemble around it. The physical properties of the model inter-
rupted the court’s protocol and its formalities and the legal process came to resemble
a design session, with different proposals for the “best of all possible walls” debated
by the parties. The result was a new route that was a little less invasive, but that also justified the presence of the Wall. Forensic Architecture participated in another case
which attempted a different approach.

The Palestinian village of Batir is located south of Jerusalem, close to the 1949
Green Line that established the original borders of the state of Israel. Its farmers
have long cultivated an ancient terraced landscape using a unique network of open
irrigation channels dating to the Roman era. It is a small and jewel-like landscape,
only a kilometer-and-a-half long, a fragile garden surrounded by an otherwise torn
landscape. In June 2014, UNESCO, the first UN body to have recognized Palestine as a member state, placed this landscape on its list of World Heritage Sites. The decision was implemented in an emergency process, after UNESCO found that “the landscape had become vulnerable under the impact of socio-cultural and geo-political transformations.” UNESCO was referring to Israeli plans to erect the Wall on this very site.

Forensic Architecture was approached by Michael Sfarid, who in 2012 brought a petition against the construction of the Wall in Battir to the Israeli High Court on behalf of the Friends of the Earth Middle East. He commissioned us to undertake a survey of the area and to model the impact the Wall would have on the landscape.

The case provided a number of important lessons. It was the first petition against the Wall that was not pursued on the basis of human rights, which previously had resulted in negotiations between human rights lawyers and the military over the “least invasive” route of the Wall under the principle of proportionality, but rather on the basis of environmental rights. The claim we made for Battir was on behalf of the landscape, archaeology, and nature. Animated by the law, elements of this landscape assumed something of a nonhuman “legal personhood” in the same way that corporations receive the rights of persons in US law or ecosystems in the Ecuadorian or Bolivian constitutions. The case might thus be aptly named The Landscape of Battir v. the Government of Israel, or simply, the landscape against the state.

This legal strategy allowed the formation of an odd coalition composed of Palestinian villagers, environmental NGOs, archaeologists, and even some Jewish settlers who supported UNESCO’s determination regarding the site’s heritage value and who objected to the Wall on the basis of this landscape being “biblical” — likely due to the nearby presence of an ancient ruin, Khirbet el-Yahud (the Jewish Ruin), the presumed site of Beitar, where a celebrated and partially successful Jewish revolt against the Roman Empire was believed to have taken place. The paradox of this case was that bypassing the frame of human rights and claiming the rights of the environment best served the human rights of the villagers and their political struggle against the Wall. On January 4, 2015, after a three-year battle, the high court ruled against the government, rejecting the plan to build the Wall anywhere within this landscape. Whereas all previous cases achieved mere improvements in the path of the Wall, this case achieved its cancellation entirely within the limited area of the petition. There will be a permanent gap in the Wall there. In legal terms, it was a small, but rather satisfying victory. Disrupting the politics of partition in one place might also help challenge it in other places. More generally, we used it to challenge the very principle of separation. If it is possible to avoid building the Wall on this site, why not everywhere? Is Palestine not in its entirety an environment endowed with cultural heritage and delicate fragile beauty? This case taught us that the common environment might be a good place to start building a politics of sharing.189
We cannot know the past as a conclusive, transparent fact mechanically etched into matter or memory or perfectly captured in an image. Histories of violence will always have their lacunae and discontinuities. They are inherent in violence and trauma and to a certain extent evidence of them. When undertaking our investigations, we must take into account the difficulties and complexities of memory, just as we do with photography and other forms of material investigation. No evidence ever speaks for itself. It must always be presented and face cross-interrogation—nothing is guaranteed. In trying to interpret and present the evidence before us, we must continually try to steer between the two opposing tendencies into which all discussions of truth gravitate—a totalizing view of a single, privileged position, and a relativist, anti-universalist perspective that regards all truths as multiple, relative, or nonexistent. Access to truth can be obtained by local communities and groups rather than only by institutional science and law, but this "positional" truth has to be fought for.

The starting point for each of our investigations is the inherent contradiction in all accounts—not only between the claims of the state and its military and the accounts of its civilian victims, but also within each of these groups and sometimes within a single testimony or a single bit of material or media evidence. Sometimes from that great, messy flood of testimonies and pixels, from the contradictions and unknowables, it is possible to assemble, with some effort, a more or less coherent narrative (or a counter-narrative) that is cognizant of the problem of truth-telling, and claim, "This is what happened here." But even in such cases, we record the situated perspectives and divergences and regard them not as falsehoods, but as information in their own right.

We do not have at our disposal the same access to technologies and information that rich states, corporations, and their militaries might be able to muster. We sometimes have only weak signals at the threshold of detectability with which to disrupt the flood of obfuscating messages and attempts at denial—a faint and blurry streak, identified in a single frame of a video shot by a videographer-activist, a few pixels, lighter than their surroundings, that indicate, in the absence of other photographic documentation, the likely place of impact of a drone-fired missile, changes in the vigor of vegetation that demonstrate the loss of biomass in the cloud forest and thus the displacement of the indigenous peoples who lived there.

It is precisely because of the potentially fragile nature of such evidence that political mobilization is necessary. Unlike law, politics does not seek to render judgment on past events from the vantage point of the present and its institutions. Rather, it is driven by a desire to change the way things are.

One of the most important insights from time spent in forensic work together with activist and human rights groups is that rather than numbing our perceptions of the pain of others, work on sensing, detecting, calculating, processing, and presenting the facts of violence and destruction has, in fact, further sensitized us to the world around us.

In achieving a heightened state of sensitivity to the actuality and material consequences of politics, we realized that we had grown to have something in common with the objects of our investigation. No matter if you are a building, a territory, a photograph, a pixel, or a person, to sense is to be imprinted by the world around you, to internalize its force fields, and to transform. And to transform is to feel pain.