



Chefie housing estate at the eastern periphery of Addis Ababa, Ethiopia. Part of one of the largest ongoing social housing initiatives on the African continent. Courtesy C. Marcinkoski.

Significant loss of arable land is already occurring in rapidly urbanizing contexts like Kenya. As a recent *New York Times* feature notes: “Population swells, climate change, soil degradation, erosion, poaching, global food prices, and even the benefits of affluence are exerting incredible pressure on African land.”¹⁸ Given that the continent is the new epicenter of global speculative urbanization practices, we can only assume that this remaining arable land—and its corresponding ecosystem service capacity—is under extreme duress.

Landscape architect Richard Weller has illustrated the emerging conflict between rapidly expanding urban form in the Global South and the remnants of the earth’s most important pockets of biodiversity in his *Atlas for the End of the World* (2017). Weller identifies no fewer than 70 cities whose projected growth will consume and permanently destroy significant portions of the African continent’s nine biodiversity hotspots.¹⁹ Yet these “hotspots” represent only a tiny fraction of the continent’s overall ecosystem service capacity that is under threat due to, among others, intensifying speculative urbanization practices.

Conclusion

All this brings us to the essential question at the root of this ongoing research into the phenomenon of speculative urbanization: how do we, the urban design disciplines, plan and design for future urban conditions fundamentally characterized by the risk of failure or incompleteness, that are moreover profoundly at odds with the ecosystem service capacity of the sites in question? The answer is not a matter of better, or smarter, or more bottom-up; but rather an essential reorientation of disciplinary priorities.

18 Jeffrey Gettleman, “Loss of Fertile Land Fuels ‘Looming Crisis’ Across Africa,” *New York Times*, July 30, 2017, <https://www.nytimes.com/2017/07/29/world/africa-climate-change-kenya-land-disputes.html>.

19 Richard Weller, Claire Hoch, and Chieh Huang, “Hotspots,” *Atlas for the End of the World* (2017), http://atlas-for-the-end-of-the-world.com/hotspots_main.html.

Without a doubt, design and planning rely on the notion of optimism bias discussed above. Disciplinary work is rooted in expressing the ambitions and aspirations of a potential future. But to disregard the inherent volatility and risk associated with design and planning at the global scale discussed herein is both irresponsible and unethical. As such, acknowledging the reality of this volatility indicates the need to retool contemporary urban design and planning praxis so as not to adversely contribute to, or further exacerbate, the consequences of more and more common 21st-century speculative urbanization practices.

Incidentally, one of Flyvbjerg’s conclusions regarding the proliferation of megaprojects should be a fundamental conceit of contemporary urban design praxis: risk cannot be designed out of speculative urbanization, or urbanization in general.²⁰ Actively planning and designing for uncertainty and failure instead creates systemic frameworks that allow an urbanization project to be reliably recalibrated and readjusted over the extended timescale of its implementation and—hopefully—occupation.

Rather than focus on the preferred outcome of a proposal for new settlement—as most of such contemporary planning tends to do—a retooled urban design praxis would elaborate strategies to exploit the transactional motivation behind these speculative proposals in support of alternative urbanization logics. Near-term protocols could be redirected to examine the efficacy and value creation of planning and design strategies that manage and cultivate speculative urbanization practices over time. This would require approaches to the planning of settlement rooted in contingency, disposability, and synthesis—not outcome.

In many ways, the interim state of the urbanization process—after initiation, before occupation—can be understood as a kind of fallow state. Treating it as such, however, necessitates fundamentally reconsidering both how a project begins, and the unpredictability of its future. Until urban design praxis engages this uncertainty, it maintains complicity in the potentially catastrophic consequences of 21st-century speculative urbanization.

Concrete Abstractness

A Conversation with PETER GALISON

New Geographies

One main aspect of “fallow,” as conceived in this volume, concerns the periodicity of the de- and revalorization of the built (and unbuilt) environment. Often these cycles follow easily graspable timeframes; from years in terms of agriculture to perhaps decades in land speculation and the built environment. Your work on nuclear waste storage and disaster sites renders a much more difficult proposition. Rather than a single human lifespan, in this case the period of dormancy or inactivity is on the order of tens to hundreds to thousands of years. To begin: how might we critically examine the sites, strategies, scales, and imaginaries of the unused, the devalued, and the dormant across such vast temporal distances?

Peter Galison

For thousands of years, farmers rotated their crops—Leviticus commands a “Sabbath of the land” during which soil should be left alone. We know that over-intensive farming with a single crop can be disastrous—rotation is crucial for nutrients in the soil, and for stability to prevent erosion. But there are other reasons why people might want to leave land fallow, in a more metaphorical sense. For instance, think about the real estate investors who bought up land near the port in Boston. They might put up a temporary structure or parking lot and say, “we are leaving it fallow,” while waiting for property prices to rise: speculative fallowness. There are also particular timescales for land infused with toxic substances. If you have a bacteria that survives only a certain number of hours or days, or a chemical that decays in the sunlight over 1, 5, or 10–15 years, regulators want that property left alone for that span, until it can be recovered for use.

For nuclear waste the scale of decay is highly variable, measured by the time (half-life) during which radioactivity is cut in half. Typically, one looks at a period of 10 half-lives, or the time during which a substance becomes about 1/1000th as radioactive as it was initially. Some nuclear half-lives are short: days, hours, or even seconds. One isotope of iodine that carried a large fraction of the radioactive load at Chernobyl (iodine-131) has a half-life of eight days, so 10 half-lives is less than three months. Cesium-137 and strontium-90 carry half-lives of 30 years. For plutonium and some other isotopes above uranium on the periodic chart, it can be very long: plutonium-139 has a half-life of 24,000 years, so 10 half-lives means 240,000 years. Adding insult to injury, as plutonium-239 decays, it forms uranium-235 which has an even longer half-life.

Depending on your classification system, Homo sapiens is only 250,000 or 500,000 years old, so plutonium waste drives us to imagine a timescale about as long as the age of our species. Indeed, when the US Congress, through the Environmental Protection Agency (EPA), attempted to calculate how long to keep such nuclear waste isolated from the human biosphere, they warned people away for a period of no fewer than 10,000 years, or twice that of recorded human history! They thought 10,000 years would at least get things started at the waste burial site in New Mexico. Then our great- (x 400) grandchildren could carry the nuclear baton further into their future.

In the case of Yucca Mountain, nuclear physicists predict that the peak radiation dose absorbed by someone living near the disposal site has not yet reached its maximum. The maximum danger there will occur some 250,000 or more years in the future. Because that nuclear waste high-water mark is so much longer than 10,000 years, the National Academy of Sciences (NAS) recommended—and the courts approved—a regulatory period of one million years. By just about any count, that period is in excess of any likely historical existence of Homo sapiens. When seeking to warn those a million years in the future, we may not be talking to “our” descendants at all.

NG Your newest film, *Containment* (with Robb Moss, 2015), grapples with the problem of communicating deep into the future, raising important questions for design in relation to managing the legacy of industrial landscapes.¹ How can designers engage with what seems an “impossible challenge” to advise 400 or more generations ahead?

PG In my work, I like queries that resemble those of Immanuel Kant, the great 18th-century philosopher. At the beginning of his masterpiece, *Critique of Pure Reason*,² he suggests that some questions we are neither capable of answering nor able to avoid. Such questions are completely fascinating. They are very difficult, and we do not even have to ask them: “How are we going to get to Mars?” We could address that, but do we need to?

Yet nuclear waste exists. We do not have a choice about that and there is no way to make it go away. You cannot destroy the waste. You cannot launch it into space (because rockets do blow up on the way out of the atmosphere and you do not want to scatter radioactive debris over half the globe). You cannot dump it in the ocean—that would violate international law. You can only try to figure out how best to contain it.

In that sense, what happens to nuclear waste is a question that we must ask. There are many debates you can have about the optimal disposal of nuclear waste, but it is pretty clear that what we are doing now—putting it in big pools of water for the long term—is the worst solution. There are plenty of weird science-fiction questions that we could, in principle, ask about almost anything in the possible future. But we must ask this question about nuclear waste. So what did the people tasked with trying to warn the future do back in 1989? First, they hired a team of futurists to imagine possible futures, scenarios that would draw attention to ways that people in the far future might inadvertently enter the waste. Then architects, including Michael Brill, used those disaster scenarios to design warning mechanisms to help avoid those cataclysmic futures. For instance, Brill designed the stunning spike fields that show up in *Containment*. Robb Moss and I introduced them with black and white 3-D animations.

There were competing ideas—people did not like monuments like Brill’s. They said it was too simplistic, that we should make something ruder and cruder: bury tablets in the thousands with cautionary messages; construct large, Rosetta Stone–like guides with a variety of languages. Or enlist designers to make the Waste Isolation Plant (WIPP) site a totally uninteresting place to go. Some people worried about using valuable materials—because they might be scavenged. For example, the pyramids used to have a marble surface, which is not there anymore because marble was valuable at the time and so people carted it away pretty quickly. The pyramids themselves remain because limestone is much less precious, each stone is 2.5 tons, and the Cheops Pyramid alone weighs some six million tons. It is hard to move.

They thought about these things in 1989. They were smart people—and they were right to address this problem. Leaving the land unmarked would have been a moral hazard, because otherwise people



Yucca Mountain Nuclear Waste Repository, Nevada. Courtesy US Department of Energy.



Landscape of Thorns, a design by architect Michael Brill for the US Department of Energy.

The permanent marker is intended to communicate the danger of radioactivity 10,000 years into the future. Courtesy Peter Galison and Robb Moss.

would dig there. How do we know? Because the Permian Basin may well contain the most promising oil reserves in the world. Big oil companies are bidding billions of dollars to dig around there, in the Permian layer. In the trade they call it “permania” because they are so excited! They are prospecting all around the WIPP Site. There is no doubt at all that if the site were unmarked and unprotected, someone would dig straight into it.

- NG Another issue of core importance to this volume is value. For example, while in agriculture fallowing is understood as a process of restoring latent ecological value through inactivity, in urban discourse a lack of productivity is often described negatively as abandoned or marginal, an effect produced through industrial exploitation—in other words, a valueless “wasteland.” We are most interested here in two dimensions that we would like you to comment on:
- a. How can we understand the historical construction of wilderness and wasteland as “zones of exclusion” that position humans and nature across an ontological abyss?
 - b. As environmental historian William Cronon does in his essay “The Trouble with Wilderness; or, Getting Back to the Wrong Nature,” you too advocate for something of a constructed rather than primeval or unspoiled nature, where humans are enmeshed in, rather than separate from, the world around them.³ How can a more complex understanding of our relationship to nature provide a source for alternative ecological, social, or cultural value creation?

PG Traditionally we have seen the wasteland and the wilderness as opposite ends of a one-parameter family, as from ultraviolet to infrared, or from smaller scale to larger scale. But I think a different topology is emerging where instead of a single linear scale, with two ends maximally apart, there are actually ways in which the wasteland and the wilderness have begun to touch one another, forming what I refer to as “waste-wilderness.”

These arenas function in some ways like a traditional wasteland and in some ways like a traditional wilderness. For example, one might naively picture the lands surrounding the destroyed power plants at Chernobyl and Fukushima as ruined territories, like the burnt out husks of bombed cities. But in fact the land does not look that way at all. What people are often struck by when they visit Chernobyl or Fukushima, or the nuclear weapons plant in South Carolina (the 315-sqm Savannah River Site), is that they are stunningly verdant. Some species have returned to these areas that have been missing for a long time. There are famously large-scale fauna, like the wolves of Chernobyl, or the boars of Fukushima, as well as the myriad water insects that make the Savannah River Site one of the most biodiverse of the 48 continental US states.

So, what are these places and how do we understand them? The Savannah River Site is so green you can see its boundaries from outer space, from Google Earth. That territory looks very different from the adjacent land that is either under continuous agricultural cultivation or exploited for suburban development. So by virtue of biodiversity, lack of through-traffic, and large fauna, they qualify as wilderness. On the other hand, to call them wilderness in a 19th-century sense would neglect the fact that each site contains a vast deposit of radioactive detritus.

So we need to question these categories. Nuclear contamination keeps people out and therefore allows biodiversity and the species recovery of American alligators, wolves, water insects, and all sorts of plants and snakes. That is the overall frame of my interest in your question. And it connects with some of your broader questions about value, disuse, non-use, and set-asides. What most clearly aligns these various themes is the changing relationship that we humans have to this technical land. What are we with respect to the earth, to nature, to the world around us?

William Cronon’s “The Trouble with Wilderness,” which I very much admire, addresses the very real dangers of treating wilderness as primeval-pure. Cronon has always been attentive to the fact that the land is always already affected by us. It’s not entirely true that the colonists lived in harmony—they fenced off their holdings to mark property and contain domestic animals, and by doing so changed the migratory pattern of many species. And if we go still further back in time, to the primeval wilderness of the Native Americans? No, Cronon says. The Native Americans living in New England were burning the shrublands so they could hunt better.

For Cronon, the land has never been primevally pure. That is important. But I disagree when he and several colleagues write about the irony of sites that are both industrial/toxic and nature preservers. I see such areas as increasingly common, as waste-wilderness. Now we have many millions of acres in the world with this status. It is not a bizarre twist of fate. It is legally, theologically, and practically structured that way. Contaminated areas can be controlled through a nature park designation—a means to remove

them from certain uses (tourism, agriculture, development) that borrows from the isolation of both wilderness and wasteland.

In the US we have “withdrawn lands,” which have been removed from the administration of one agency and put under special rules and regulations that dictate who can go there and for how long. They also restrict the construction of long-term habitation, laying down roads, and installing industrial infrastructure. Withdrawals are used for both wasteland and wilderness areas—there are all sorts of ways in which these lands become connected. That is what I have been writing about.

NG How can we think about the nuclear tourism emerging at some of these disaster sites, and does this lack of inhibition suggest a transformed relationship to the land?

PG Since modern tourism emerged in the late 18th to early 19th century, there has always been an element of danger; whether in seeing a half-sunk ship off the coast, a train wreck, or some other disaster. There is a long history of dark tourism.

Another feature that seems to be important about places like Chernobyl, Fukushima, and the former Nevada Test Site is that although people go there, they can only do so in a very temporary way. The reasons for this are health related. Nobody wants the tourists—no matter the potential financial gain for the local economy—to get such a big dose of radiation.

A similar position on human visitors who do not remain is written into the Wilderness Act of 1964.⁴ In both cases we have a touristic relationship that allows us to visit, although we do not own the territory. So we are not permanent servants, in a romantic sense.

By talking about nuclear tourism in the context of waste-wilderness, I want to emphasize that neither alternative, “wasteland” or “wilderness” as they are traditionally understood, are alone sufficient for our day. We are not biblical masters who transform the primordial wilderness into cultivated land, despite the apocalyptic visions of those like US Secretary of the Interior James Watt. Back in the 1980s he used to say: “It is our theological obligation to use up the land”—as if anticipating some state of rapture or end of days. Nor can we quite see ourselves these days as romantic servants of a pure, untrammelled, primeval nature. In the waste-wilderness of these nuclear zones, we are visitors to nature in an existential sense. We want, or are allowed, to go to these radiological territories but they do not belong to us and we do not belong to them—lands that host both biodiversity and radioactivity.

NG The ability to own land or appropriate it for private use is the bedrock of US mythology; it is radically challenged by the idea that the land doesn’t belong to us and that we do not belong to it.

PG The history of land acquisition in the US is incredibly important and we see its manifestations even now. The Louisiana Purchase of 1803—the largest territorial gain through conquest or purchase—brought a staggering amount of land under US government control that was then given away to the railroads, to homesteading, to the creation of national parks and public universities, and later to wilderness areas administered by the Bureau of Land Management. We can still see the instability in some of those relationships in the protests by cattle farmers in the Pacific Northwest, for instance, who think that environmentally set-aside land is a violation of their God-given right to use it for grazing.

NG Considering your long-standing interest in Foucault, particularly in relation to the material conditions under which scientific knowledge is produced, can his thinking also be applied to the spatialization of fallow scenarios?

PG There are two points to make here; one that is general and the other more specific. Generally, Foucault often spoke of the positivism in his approach. That is to say, he wanted to talk about things that we could observe. People—historians in particular—would accuse him of being too philosophical or meta-physical because he discussed sudden jumps and breaks in history when “everyone” knows that history is continuous and causal. Foucault argued that, on the contrary, we have never seen continuous, causally complete processes in history. He insisted that he was focusing above all on that which actually survives in the archives, what we can see. A historical narrative is after all constructed from those archives; you find a series of statements and try your best to piece them together into a series of events. But these archival bits are finite, discontinuous, and fragmentary; they do not ever amount to a complete, philosophically sound, continuous set of historical unfoldings. By ignoring the lacunae that actually correspond to gaps in the archive, Foucault contends that it is the historians who impose their own metaphysics of history on what we are supposed to see and know. For Foucault, it is not the philosopher but the historian who sees the world through an unjustified assumption of continuity and causal plenitude.

Through considerations like these, Foucault draws out the specificity in me. When people discuss abstraction, I want to ask, “Upon what concrete circumstance is that abstraction built?” If someone talks to me about nuclear waste, I want to know: where is the nuclear waste? What consistency does it have? How much of it is there? How is it handled? How does it move? What does it look like? Where does it go? That concreteness appeals to me aesthetically—I think it is interesting to see abstractions cashed out in very specific circumstances.

Pedagogically, if you want to convey what nuclear waste is, you need to remove it from the realm of a frightening, cloudy picture. People need to know where it is, what it is like, what it consists of, how much of it there is.

Politically, we want people to be able to act and make decisions in their lives. You cannot just say, oh well, that is computer privacy, or bio privacy, or that is nuclear waste. When one can see things concretely, one can act. A solution does not come without first understanding the problem.

Aesthetically, I am drawn to the sudden confrontation of ethereal ideas and their all-too-terrestrial bases. That science fiction could tie in so closely to the regulatory planning of the nuclear state, as it does in nuclear containment, is astonishing.

NG This conversation about the concrete allows us to address the complexity we are dealing with through the concept of fallowness. When you get to concrete circumstances it is very difficult to avoid thinking through the social, ecological, and political entanglements that really constitute life. Being abstract allows you to disentangle complex relationships, leaving you with a two-dimensional understanding.

PG That is absolutely right. If someone says, “I am a land speculator” or “I am making an investment in the land,” then you think that is just like buying 23 shares of AT&T. It is just an investment, but to actually see what that does—what does it mean when someone invests in urban land and does not want to develop it? To allow its value to increase in time, perhaps. What are the regulations? What laws govern it? How does it affect the use of that area? What effect does it have on adjacent parts of the city and on movement in the city? These are important questions, the kind I like to ask.

Very often our abstractions hide something specific that lies at the seat of the abstraction. And to understand and intervene in our world, we need to get to that concreteness behind the abstraction. You can call it abstract concreteness or concrete abstractness, but that combination of things interests me.

NG Does this notion relate to your motivation for making film? How does the medium of film help you explore this terrain differently?

PG For me, film complements many of the questions I tackle in print, where I try to use concrete circumstances to get at things that otherwise remain fully abstract. For example, what are secrets? How are secrets created and how do they circulate, how are they guarded, how are they de-classified, what do they do to us? These concerns underlie my writing and film work in “Secrecy in Three Acts” (2010), “Removing Knowledge” (2004), and *Secrecy* (2008).⁵ Similarly, surrounding our set-aside nuclear lands of waste-wilderness, there are many questions about our responsibility for vast swaths of territory on the planet today and into the far future. Those concerns take concrete form in *Containment*. Elsewhere I have tried to use railroad and cartographic technologies to examine the physics and philosophy of time. In *Objectivity* (2007), a book I did with historian Lorraine Daston, we examined those images considered to be “objective” that helped create and substantiate the notion of scientific objectivity from the 18th through the 21st centuries. How did objective depiction work? What were its procedures?

NG Inhabiting the tension in Kant’s impossible-to-answer yet unavoidable questions, your films seem to hold a mirror up to humanity that reveals something more profound than what may have been your initial focus.

PG It is the reciprocal part of seeking concrete circumstances below our abstract understanding of the world. There are concrete circumstances generating this metaphorical surround that are tremendously important in what we value.

1

Containment, directed by Peter Galison and Robb Moss (Boston, MA: Redacted Pictures, 2015).

2

Immanuel Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith, rev. 2nd ed. (Houndmills, Basingstoke; New York: Palgrave Macmillan, 2003).

3

William Cronon, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature," *Environmental History* 1.1 (1996): 7–28.

4

US Congress, House, Wilderness Act of 1964, Pub.L. 88–577, 88th Cong., 2nd sess., introduced in House June 22, 1956, <https://www.gpo.gov/fdsys/pkg/STATUTE-78/pdf/STATUTE-78-Pg890.pdf>.

5

Secrecy, directed by Peter Galison and Robb Moss (New York: Docurama, 2009), DVD.

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