



Architecture and Land  
in and out of the Americas

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The Temple Hoyne Buell Center for the Study of American Architecture was founded in 1982. Its mission is to advance the study of American architecture, urbanism, and landscape. Located within the Graduate School of Architecture, Planning, and Preservation at Columbia University, it sponsors programs and research projects focusing on issues of both scholarly and general interest. See <https://buellcenter.columbia.edu>.

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This booklet is published in conjunction with and as a component of an installation conceived and produced with the architects AD–WO, *100 Links: Architecture and Land in and out of the Americas*, at the Fifth Chicago Architecture Biennial, *This is a Rehearsal*. Some of the work in this booklet also forms part of ongoing historical research to be published in an upcoming edited volume.

The Temple Hoyne Buell Center  
for the Study of American Architecture

# Architecture and Land in and out of the Americas

Edited by Lucia Allais, Maur Dessauvage,  
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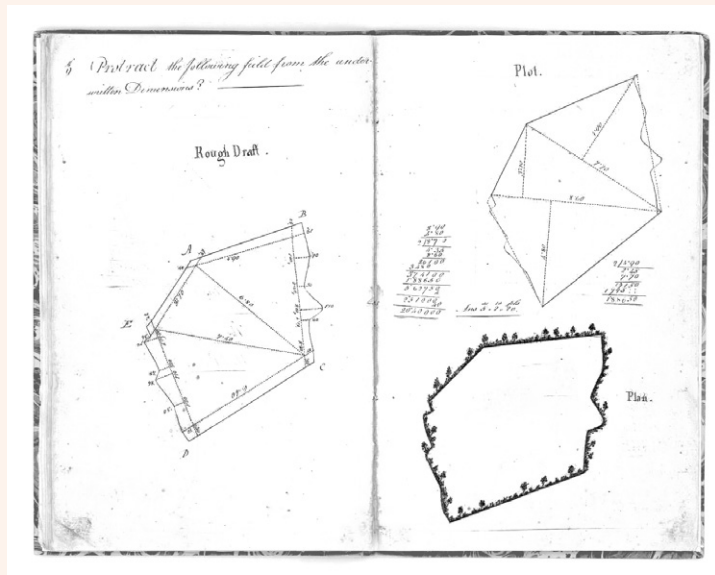
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This publication is produced by the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, as an extension of its ongoing conversation series—Architecture and Land in and out of the Americas—and of a research project that works to clarify architecture’s imbrications with land. The plural “Americas” helps decenter the Buell’s mission, the study of American architecture, in two ways: by connecting building practices across the Western Hemisphere, and by recognizing that there are several Americas within the United States.

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Manual for surveying by Gunter's chain, manuscript, nineteenth century. Library of Congress

Land precedes architecture: this is one of the basic assumptions underlying building culture today. But this assumption rests on a fictional vision of land as an available surface, “a piece” of which has to be secured before anything can be designed or built. This fiction plays a key role in the life of frontier nations. It is particularly essential to the history of architecture and settlement in the United States, for several reasons.

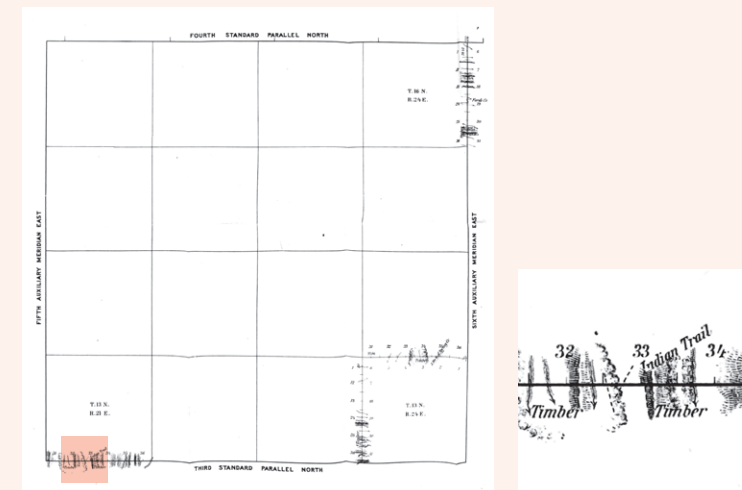
First, because the nation’s birth was entwined with political theories of liberalism that equated citizenship with personal freedom, and freedom with property—property being defined as the result of mixing one’s own labor with the soil. “In the beginning all the world was America,” wrote John Locke in his *Second Treatise on Government*, as he staged his theory of modern governance.<sup>1</sup> Since the earliest white colonists began settling the territory in the seventeenth century, freedom in the United States entailed improving land, including through building: fences and mounds, shacks and pens, homes and churches, and eventually banks and land offices. These early “improvements” were as much space-clearing acts as they were public statements, intended to communicate freedom-worthiness and to shape perceptions.<sup>2</sup> By far the largest portion of colonized land in New England circa 1750 was occupied by livestock, as William Cronon shows<sup>3</sup>; yet the true architectural expression of the colonial dream was thought to lie in the ostensibly humble cottage, which focused the eye on small plots where gardening sensibilities could be displayed. **IMPROVEMENT**→55 A logic of diminishing returns already characterizes this ideal: improving land

meant enclosing plots, but any enclosure reduced the horizon for additional improvements.<sup>4</sup> And so, every time land's ends appeared within reach, new tools had to be invented to declare land endless again. Then as now, capital feeds off of this contradiction. Many inventions in architectural history can be explained as motivating and motivated by the race to find new and ever-more-clever ways to extract value from a shrinking horizontal surface with dwindling fertility. Land was presented to white settlers as an endlessly renewable resource, against all evidence to the contrary.

The second reason why this fiction of land enabled settlement in the United States is that the territory itself was not blank at all. Settlers encountered whole stretches of earth inhabited and cared for by communities that lived otherwise and made competing claims to “territorial togetherness.”<sup>5</sup> Indigenous people, for whom land was not an object but a relationship, saw themselves as belonging to lands rather than the other way around.<sup>6</sup> Settlers also shared the land with enslaved people, who had been forcibly brought to the Americas but invented ways to make spaces outside the plantation economy and to claim personhood despite having been declared mere property. Unmentioned Black persons appear routinely in the illustrations of colonial architectural literature, underlining that they were materially essential to the transactions of settlement, and to the legitimacy of the sovereign white self.<sup>7</sup> **DISPOSSESSION**→<sup>39</sup> Yet the brutal dynamics of capitalization had no place for the alternate valuations of the ground posed by the enslaved or the indigenous. These communities were perceived as odious obstacles to landed freedom. So the story of architecture's relation to land is also a history of dispossession and disenfranchisement taking on built form. This form has ranged from treaties signed to encourage tribes to adopt more permanent modes of settlement, to

violence that directly destroyed such settlements when convenient, to buildings that perform elaborate forms of social control.<sup>8</sup> The political calculus of locating certain people in certain places is a precondition for the financial estimation of land's worth. Today's gerrymandering is a descendant of these displacements under a more covert form. **GERRYMANDERING**→<sup>45</sup>

In order to resolve the apparent contradiction between the promise of infinite land and the continual reminders of its spatial, material, and human finitude, statesmen-architects like Thomas Jefferson facilitated white settlement in the United States by proposing the use of the grid.<sup>9</sup> An act of preliminary geometric conquest giving settlers the coordinates to build anywhere, the grid was meant to replace one existing condition (the ground and the people who dwell upon it) with another (the land and its coordinates).



Surveying grid annotated with timber, creeks, and an Indian trail. General Land Office, *Instructions of the Commissioner of the General Land Office to the Surveyors Generals of the United States* (Washington, DC: GPO, 1881)

Instead, the grid gave new depth to the mirage of land's abstraction. As an overlay, it flattened existing patterns of life, thereby managing the market value of land and creating exceptional conditions for the accumulation of capital.

Today, manipulations of land are assumed to be out of the hands of architects. Agency over land has been made remote, both historically and professionally. At the scale of the nation, "the land" is mythologized as something that was settled once, a long time ago. In everyday parlance, land equals property, before building is even discussed. In fact, architecture is a big part of why property is always possible. All the while, the canon of "American architecture" is still romanticized as transforming a wild territory into a domesticated nation.

The research published in this booklet is aimed against this fiction of land as something that is endlessly available and that comes before building. Our hypothesis is rather that architecture participates in the establishment of expectations and the crystallization of social, economic, and environmental relations through which land comes into being as such—something that can be politically objectified and economically exploited and, at the same time, become a battleground for alternate polities.

This booklet was authored collectively by a team of scholars and researchers, hosted by the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, who have examined the relationship between capitalism and the built environment through the relation of architecture and land in the Americas. The plural "Americas" in the project's title expresses the need to complicate the Center's stated mission by acknowledging, first, that building culture in the United States exists in hemispheric and global relation to other states on Earth; and second, that there are several Americas within the United States. The booklet collects stories that



William Langland, *The Vision and Creed of Piers Ploughman* (London: Reeves and Turner, 1887)

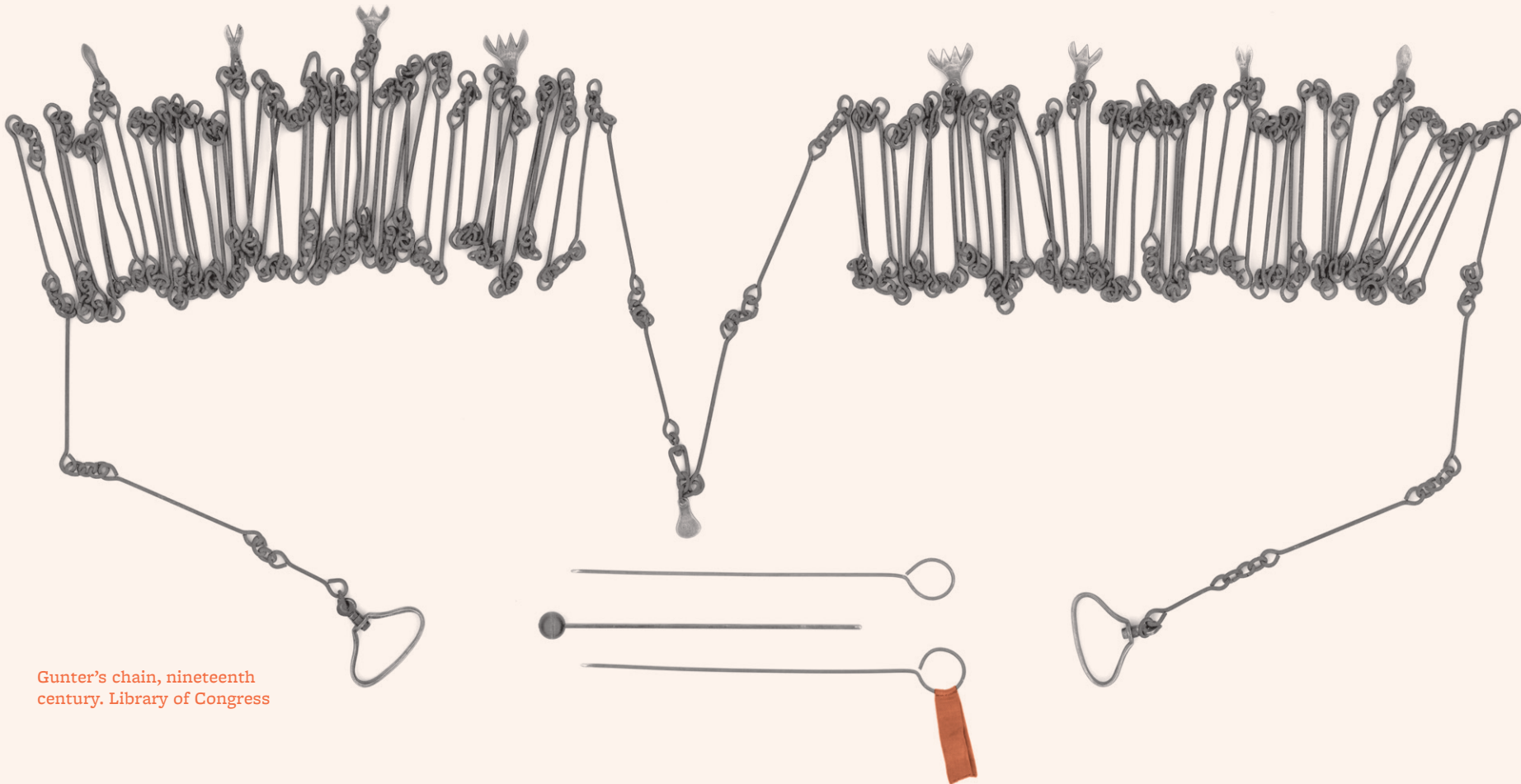
have the power to change the way the relationship between architecture and settlement is understood, in history and at present.

To detect how land is settled today is to pay attention to the continued legacies of earlier arrivals, encounters, and transformations, but also to seek out resonances across history, and geography, and to forge new solidarities capable of transforming land now. Settlement is not something that happened once, a long time ago. Rather, the events of colonization set in motion certain dynamics that continue today, and settlement keeps these dynamics in motion. Architecture sustains this process, and by "architecture" we mean not only fully fledged buildings but also a range of related phenomena, including surveying techniques, data visualizations, urban zoning, soil engineering, legal frameworks, and ecological footprints, to name just a few.

### *Chains and Mounds*

There is architecture in the simplest of tools. Take the Gunter's chain, a surveying instrument patented in England in 1620. A precursor to the measuring tape, the chain was deployed whenever new plots' boundaries were set. Sixty-six feet in length and made up of one hundred interlinked metal rods, it conveniently bridged

the decimal and English measuring systems; but its design was also calibrated to a specific mode of agricultural and animal life. Its total length measured one-tenth of a furlong (or furrow-long), the average distance an ox could plough continuously without resting. When unfurled in the Americas by English settlers in the seventeenth century, the Gunter's chain



Gunter's chain, nineteenth century. Library of Congress

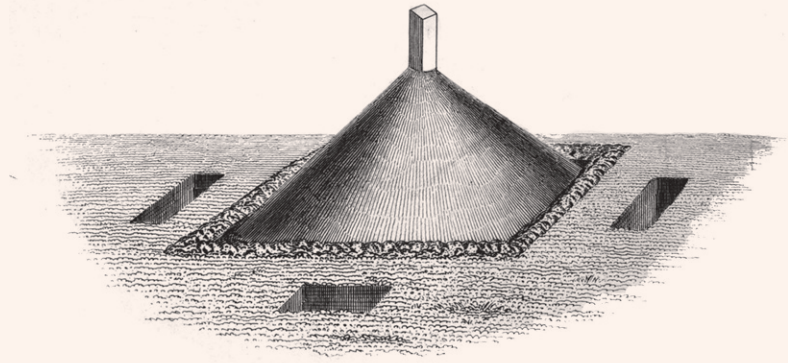


thus helped not only to record the ground but also to impose British manorial agricultural practices, such as the open-field system, on the so-called New World.

Although it was attached to this older mode of political sovereignty, the chain survived the American Revolution and became essential to laying the ground for nation-building in the late-eighteenth and nineteenth centuries. Initially used to measure and record small land-holdings, the chain was one of the primary tools deployed to inscribe the Jeffersonian grid across a vast territory that had yet to be charted. The American one-mile-square grid was therefore not merely a product of Enlightenment reason; it was also grounded in a specific technical apparatus.

The chain lent itself generously to the rationality of the grid, but it also brought its own habits based on customary practices imported from England. Both while accounting for existing plots and laying out new ones for sale, surveyors measured land link by link, pulling the Gunter's chain through a series of eleven pins that they would stick into the ground (marking twelve equal intervals). Through this gesture surveyors remained intricately connected to an older system of measurement. In fact, it was because most English-American settlers still adhered to the system's customs and habits that Jefferson's 1789 proposal to convert the measurement of U.S. lands to the decimal system was ultimately rejected.<sup>10</sup>

By the time the U.S. frontier reached what is now the Midwest, a new homegrown tool emerged to systematically transfer the public land survey to the ground. Initial methods employed by surveyors had included leaving blaze marks on trees located next to the grid lines, digging pits, marking rocks with an "x," and placing tablets in masonry blocks. Yet as bearing trees and objects became increasingly difficult to find, the General Land Office adopted a more systematic approach: the digging



Corner mound. General Land Office, *Instructions to the Surveyors General of Public Lands of the United States* (Washington, DC: GPO, 1855)



Granite survey pillars used to mark the boundary line between Idaho and Montana, 1897–98. *Bulletin of the United States Geological Survey* (1900)

and piling up of earth from four pits into a single pyramidal mound at the grid's intersection points. These "corner mounds," which measured 4 feet at the base and 2½ feet in height, were covered with sod to prevent erosion and promote grass regrowth. To increase its visibility, each mound was also anchored by a 4-foot-tall wooden pole, which would be subsequently replaced by a chiseled granite pier, or "monument."

Corner mounds existed between paper and soil. To surveyors they defined the boundaries of various subdivisions as represented on the official paperwork. But their significance extended beyond this immediate practical purpose; they also became monuments in the broader sense of public structures that could be easily located, identified, and pointed to as spatial facts in the nascent legal culture of a settled society, with its inevitable land disputes.

The chain and mound are two of many architectural technologies through which the earth became land as such—going from soil to property. When viewed in historical sequence, they offer an impression of progress and increasing permanence: at the beginning there was a portable chain brought from England; by 1900 there was a coordinate system that shaped the ground itself.

Rationality also marks the land, however, in places where architecture and geometry do not overlap so neatly. In this booklet, we have gathered some instances where architecture helps to materialize land by making lines visible, and others where data is collected through the most varied of architectural alibis, such as concrete floors laid with government help [DATA MINING→49](#), trees planted to offset carbon emissions [OFFSETTING→83](#), and computers prescribing the edges of voting districts.

### *Paths and Markers*

Some methods for shaping the natural environment produce land in more diffuse ways, through displacement, resistance, and difference. Their implicit architecture is often recruited in stories of nation-building. Consider trail marker trees: for more than a century, these have been deemed the "natural" counterparts to formal frontier architecture, although they are in fact also shaped by humans. After a tree has reached about seven feet in height, its growth is diverted into a bend by tying its trunk back on itself or to the ground. The tree is then left to correct its growth, producing a distinctive *l*-shape that appears to point in a certain direction. When several such trees line an itinerary, they signal passage and movement. If mounds and chains were used to settle and enclose the land, trail marker trees were used to orient and navigate the earth.

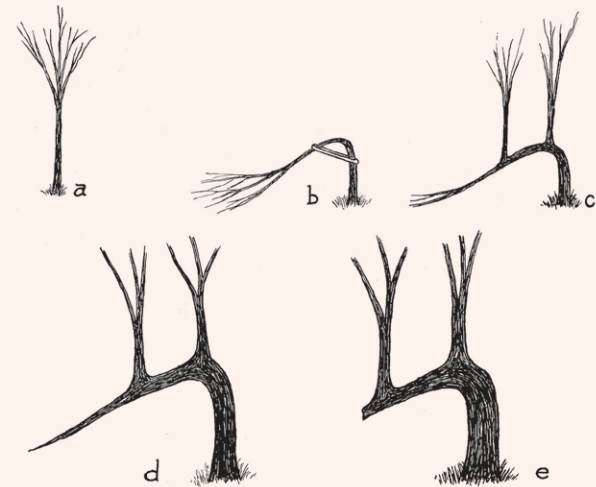
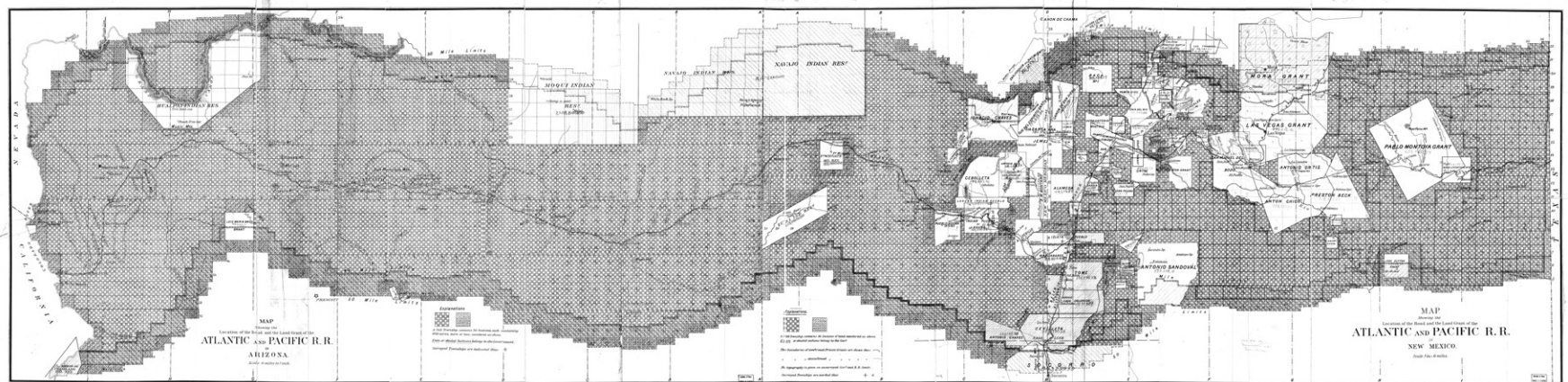


Illustration detail from Raymond Janssen, "Living Guide-Posts of the Past," *The Scientific Monthly* 53, no. 1 (1941)

As early as 1900, landscape architects became interested in protecting trail marker trees, recording their locations and naming them as artifacts of a transient indigenous life. Indeed, then as now, oral histories and colonial written records attest to the way Indigenous tribes performed a totally different kind of stewardship of land, relying on mobility over long distances and the seasonal retracing of certain paths. Take the land upon which the Buell Center’s office currently sits. Until about 1650 the Lenni-Lenape managed the forests, marshes, animals, winds, floods, and paths of the island of Manahatta by seasonally stopping in as they navigated the Hudson River.<sup>11</sup> They stayed in small encampments, growing food, perhaps also harvesting crops, hunting and fishing some animal species while conserving others, periodically setting fires to control growth, and generally maintaining a resource ecology that stretched all along the Atlantic Coast. Bent trees seem to fit well into this account, shaped in their growth in the same way as the Lenape shaped aspects of their lands’ ecosystem.

And yet the extent to which trail marker trees were exclusively used by Indigenous peoples is a matter of controversy. One of the only historical certainties is that their naming as “Indian” in the literature coincides with declarations of Indigenous peoples as “gone forever.”<sup>12</sup> Monumentalizing these trees as a species of architectural memorial also fits all too easily into efforts to incorporate native trails into a history of American settlement that is actually responsible for interrupting such ways of life, displacing Indigenous communities into bounded reservations. Native paths were strategically cut off when checkerboard development used railroad concessions to break up Diné homelands. To draw an easy historical arc “from trails to highways”<sup>13</sup> is not simply to primitivize native populations but more specifically to erase the way the infrastructural development that gave the United States its westward movement has fundamentally impacted tribal life, precisely by setting tribes off on unwanted human movements along lengthy crucibles, trails, and journeys home.



Map showing the location of the Atlantic and Pacific Railroad and the checkerboard land grants in Arizona and New Mexico (1883). Library of Congress

Overleaf: Detailed view of map.



A different telling of the spatial legacy of these paths can be heard in the work of scholars, activists, and architects who insist that for Indigenous communities, grid lines function as borders and inspire defiant crossings. Some of these crossings are central to the architectural supply chain of canonical buildings. The Mohawk steel workers who traveled weekly from their homes on the Akwesasne reservation to help build the World Trade Center in the 1970s used every passage across the U.S.–Canada border to refuse declaring themselves citizens of either nation-state.<sup>14</sup> Diné activists have been charting new transgressive paths to articulate rights by traveling long stretches out of Indian country to extraction sites, manifesting to energy companies that they bear the brunt of contamination from uranium, lead, arsenic, and other substances. **POROSITY**→69 Because toxicities travel through the porous earth, they penetrate the bodies and social relations of marginalized communities, sometimes paradoxically fueling new solidarities among them.



*Silent Choir (Standing Rock)*, 2017–22. Printed digital image; inkjet on vinyl. Variable dimensions. Courtesy of Raven Chacon

Micro-material porosity blurs the traditional boundaries that have demarcated territories, but it does not erase the effect of harder infrastructures, which have a disproportionate ability to attract and channel capital. Architect Joseph Kunkel describes how tribal affiliation and reservation housing constitute two radically distinct modes of occupying the land that must somehow be negotiated in order for federal funds to be accessed. **BUREAUCRACY**→99 Informal access also rubs against the state. Already by the late nineteenth century, a Diné matriarch temporarily took up a trading post on the edge of a reservation to capture and divert capital passing by her homelands.<sup>15</sup> The Great Migration of Black Southerners in the aftermath of the U.S. Civil War paradoxically dispersed a large amount of colonial furniture into the interiors of the North, because dealing in the “Antique Americana” market proved a good way for the formerly enslaved to accumulate wealth.<sup>16</sup>

Trail marker trees record a human weight applied once; but today the immense weight of territorial exploitation is continually borne by the bodies, settlements, and cultural practices of marginalized and marooned communities. Lands are constituted all over again through their actions, through their very relations, as they push back.

Paying heed to these alternate conceptions of land is crucial to unlearning various architectural “beginnings,” especially ones that root building idioms in land. This also means taking a hard look at how lands are relationally constituted through architecture in the dominant system of market capitalism, where land is a commodity, and trade, its main connective tissue.

### *Environment's End*

It may seem obvious today that the earth's surface is not endless and that land is a finite resource. The recent reconceptualization of architecture as an environmental art, and of humanity as a climactic force, seems to encourage an optimistic view of architecture's future, one wherein land will be less objectified and where building will be gradually disinvested from the colonial urge to settle. But declaring the dawn of a new era is often a way to proclaim a new frontier open for settlement. Many promises about the advent of an environmentally responsible future carry legacies of exploitation and tacitly aim to maintain them. If the belief in the endlessness of land has lasted so long, it is in part because new domains that were opened through design to maintain land's promise were not only spatial but also temporal.

The stories gathered in this booklet show how architectural technologies have helped regulate the “temporalities of capitalism” by tethering building activities to cycles of environmental production.<sup>17</sup> We have grouped these stories under four headings, each representing one abstraction that architecture and land have together been tasked with shoring up: Survey, Nature, Market, and Law. Survey defines the actions through which land becomes measurable; Market names the gestures that make land and its products exchangeable; Law offers a realm in which land and its dwellers become governable; and Nature designates the land's capacity to support life, and the accompanying image of fertility.

Far from separate processes, these abstractions are tenaciously intertwined and mutually reinforcing. Take, for example, the agricultural experiment station, a frontier-specific building type developed with the narrow aim of testing what a particular combination of soil, topography, human labor, and climate was capable of growing. The station's agency extends far beyond its modest footprint as



East Experiment Station, view of the rear of the building with greenhouses, 1918. Special Collections and University Archives, University of Massachusetts Amherst Libraries

an object in a field. Stations sustain the promise of perpetual abundance. **EXPERIMENTATION**→<sup>59</sup> During the last two hundred years, they were crucial to the impoverishment of soils through monoculture; to divorcing the prices of agricultural commodities from sustenance farming and human nutritional needs; to shaping the density of human settlements not only in rural geographies but also cities; and to convincing legislatures that the political autonomy of certain lands depends upon their economic competition with others. Their campuses, strewn about remote rural landscapes, structure global relations and environmental regulations. Put in terms of the four abstract categories in our booklet: stations were designed to “survey” the land, but they ended up changing “nature” by leveraging the ability to manipulate the “market” for agricultural commodities into policy and, ultimately, into “law.”



South of the Perry Land Office, photograph dated September 22, 1893.  
Courtesy of Oklahoma Historical Society

Architectural scholarship has the power to capture the ways environmental history has been embroiled with capital as process.<sup>18</sup> By focusing on land, the stories in this booklet show that even the most inert of building materials and straightforward of architectonic concepts can be endowed with financial life, through a conflation of natural and human temporalities. This is true of the serial building campaigns that propelled the development of the United States during the long nineteenth century. As James Belich argues, this development was but one regional aspect of a global “settlement revolution” that took place between 1783 and 1939 as the result of the explosive multiplication of anglophone populations.<sup>19</sup> Frontier architecture took part in these booms and busts by fueling speculations about the past or future. Trust lands provided one way to arrest frontier settlement in time, creating an alternate legal framework to fund public education in perpetuity. **EXCEPTIONS→97** The log-cabin architecture of land offices remained deliberately elemental to sustain a speculative market, by making land look as untouched as possible while plots were up for sale.

**SELLING→75** National monuments, created during recolonization as the frontier began to close and fold in on itself, offered an experience of indefinitely virgin nature by transposing geological formations from natural to human history. **ANTIQUITIES→103**

Not only horizontal expansion but also the invention of vertical ways of inhabiting the land accelerated the accumulation of wealth by giving the impression that the earth had developed new and miraculous productivities. In the nineteenth century, advances in mining and geology helped create a distinction between surface and subsurface as two separate realms, where different property rights and development speeds applied. **SECTION→41** Later, in global cities at the turn of the twentieth century, skyscrapers increased the rentability of the earth, by multiplying the ground and creating a newly insurable—and thus capitalizable—construction industry.

Chicago, the city where this booklet was printed and distributed and a city built on platforms stabilizing marshland, has undergone numerous cycles of demolition and reconstruction. Still, the ground remains largely un-remediated, because the technology of deep foundations allows architects to choose their own starting plane below the spongy top soil, avoiding the lengthy delays and community engagements such remediation entails. In most countries today, soil testing is a legally required step in any architectural process, meaning that the ground’s composition is analyzed and recorded every time a project is initiated. Such codification often provides a scientific rationale for the interruption of existing land management patterns and the erasure of human legacies, including eating habits, and familial structures. **ENGINEERING→63** Deeply site-specific, all of these technologies of verticality helped incubate a floating concept of the environment, unmoored from any particular place on Earth.



Raising a block of buildings on Lake Street, Chicago, illustration, 1857. Chicago History Museum, ICHI-059709



Declaring the dawn of an environmental age has had the effect of announcing the opening of yet another frontier, triggering a rush toward ecological futures as a newly-discovered endless resource. In today's political economy, buildings and infrastructures can make the land pay by apparently taking a page out of ecology's playbook to account for the life of human and non-human populations in new, expanded temporal horizons. When governments use retroactive property-titling to normalize informal settlements, they claim revenue from their citizens' future livelihood<sup>20</sup>—as opposed to drawing on surplus value they have already accumulated in the past. **PROPERTY TITLING**→79 In this manner, economic thinking is increasingly applied to living matter beyond money. Some of this newly bankable matter lives underground, such as the burying beetles protected in land plots called “conservation banks.” **ECOLOGY**→89 Presented as a gesture of ecological reparation, this type of land-based banking fuels new real estate frontiers by injecting capital's longevity right into animal life.

For all of these reasons, the faithful optimism that has accompanied the marriage of environmentalism and building technology should itself give us pause. The history of architecture and land in the Americas offers many cautionary tales about beliefs. After all, a doctrine of “good faith” inherited from British common law justified the enclosure of North American frontier land in theological, patriarchal, and racial terms. **PRE-EMPTION**→95 Today, the creed of environmentalism in architecture runs the risk of performing similarly: as a global, and unexamined, common-sense faith, which legitimates the idea that the future of “land” is out of the reach of human agency, whenever this is convenient to capital's ends. Only by recognizing the ways in which architecture partakes in the making of land can an environmental approach begin to answer questions about architecture's political aesthetics today.



Soil Lab Rammed Earth Workshop, North Lawndale on Chicago's West Side, 2021. Chicago Architecture Biennial. Photo by Jay Simon

## 100 Links

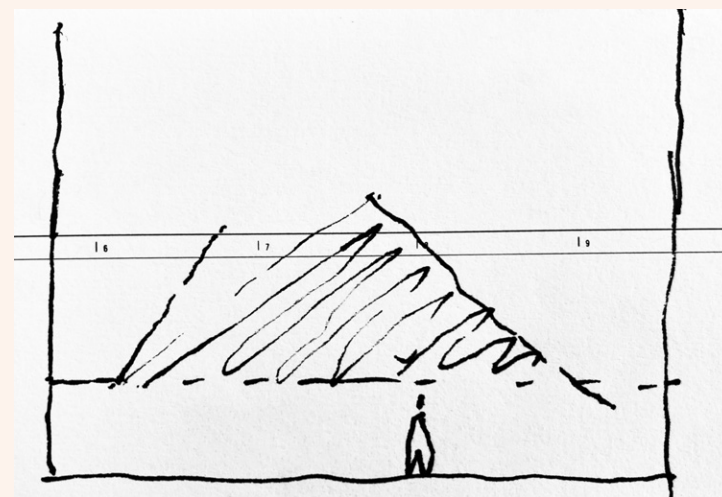
This booklet is published in conjunction with, and as a component of, an installation titled *100 Links* at the 2023 Chicago Architecture Biennial. Conceived and realized as a collaboration between the Buell Center and the architects AD-WO, the installation takes up the corner mound and the Gunter's chain, two historical techniques for measurement, and deploys them to produce new effects, questioning the ongoing rationalization of land.

The theme of the Biennial, *This is a Rehearsal*, calls on designers to establish future human relations with every project. It also tacitly poses a question: How can design avoid rehearsing—in the sense of re-enacting—past inequities? The question is especially weighty for architecture as a practice that carries landed legacies.

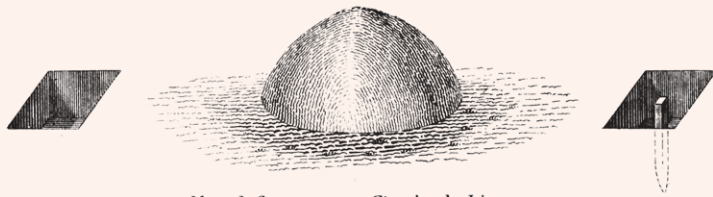
One answer is to trouble geometry's abstraction by recalling its material dynamics. The Gunter's chain was originally deployed to make taut political geometries. Yet through the simple act of making lines, it excluded the majority of people with the closest extant bodily relation to the earth—the Indigenous whose dwelling stewarded lands, and the enslaved whose labor realized the land's agricultural productivity. The dirt to make original corner mounds was dug out from square pits, whose Cartesian disposition supposedly made them neutral instruments of unquestioned validity. Yet as soon as they were made, these forms started eroding into overgrown lumps. Stories like these transform mound and chain from tools of abstraction into objects with historical life and weight. They provide alternate pathways to forge a position outside of what geography scholar Katherine McKittrick calls “the semantic closure principle”—that is, the forced interpretations of land and space as neutral and self-evident.<sup>21</sup> This includes the received idea the present booklet aims to dismantle:

the fiction that land is an endlessly available surface that precedes architecture.

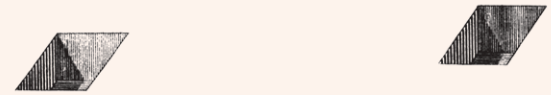
Visitors to *100 Links* are invited to unsettle land: by re-inhabiting the measurement tools that have made it; by finding solidarities across history and geography in the stories that accompany the installation; and by generating robust forms of unlanded freedom.



AD-WO and Buell Center, *100 Links* installation, Chicago Architecture Biennial, 2023. Early sketch by Emanuel Admassu



Mound Corner on Standard Line



Mound Corner Common to 4 Sections

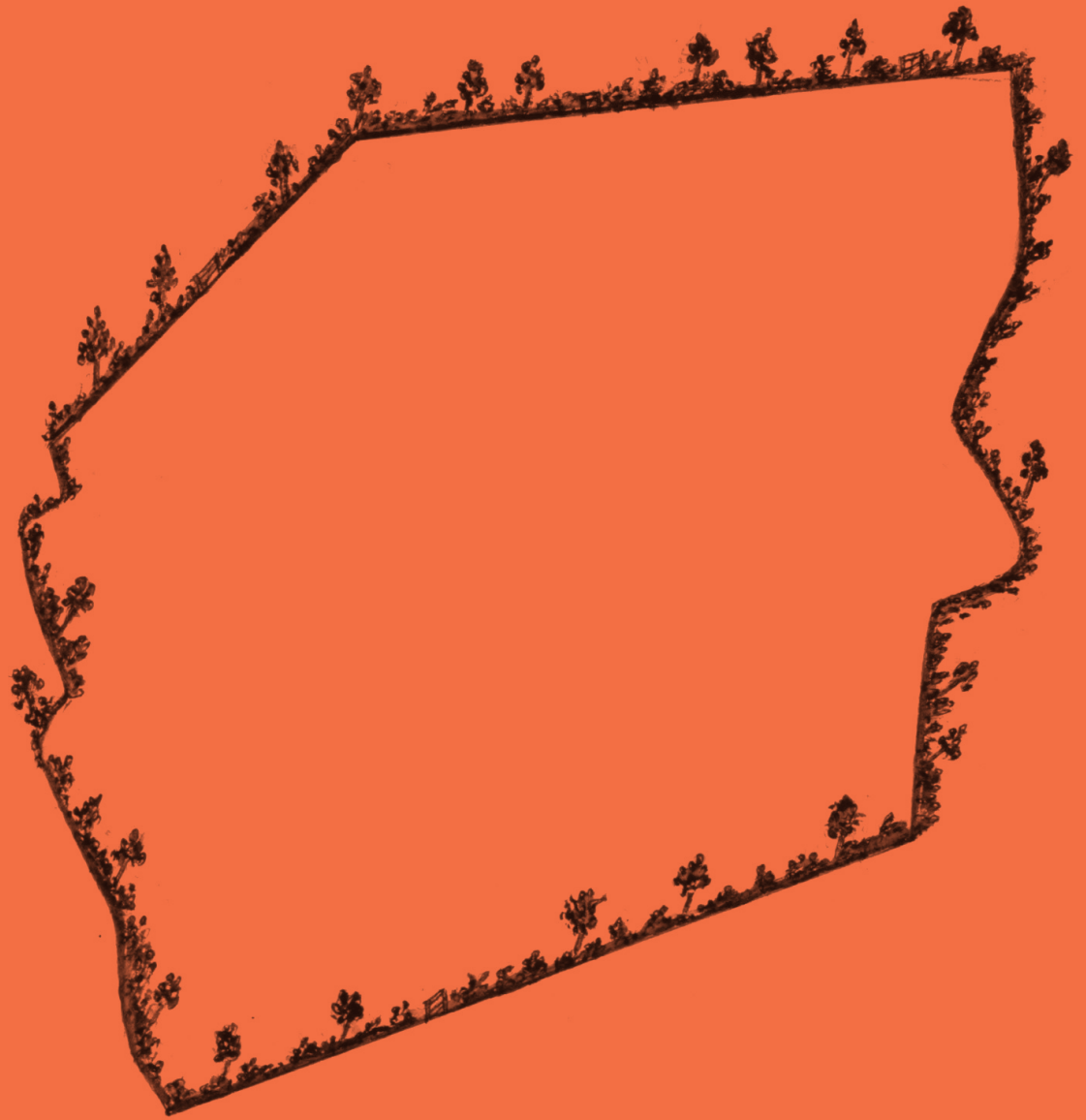


Quarter Section Mound Corner

Corner Mounds diagram, General Land Office, *Instructions of the Commissioner of the General Land Office to the Surveyors Generals of the United States* (Washington, DC: GPO, 1881)

## Footnotes

1. John Locke, *Second Treatise of Government*, cited in Herman Lebovics, "The Uses of America in Locke's *Second Treatise of Government*," *Journal of the History of Ideas* 47, no. 4 (October–December, 1986): 567–81.
2. Carol M. Rose, "Possession as the Origin of Property," *The University of Chicago Law Review* 52, no. 1 (1985): 73–88.
3. William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 2003).
4. Although generally associated with agricultural cultivation, the term "improvement" originally related to the raising of land value as reflected in rent. Thus, land was made more productive not by investing labor into it, as Locke asserted, but by making improvements that enhanced rental values. See Paul Warde, "The Idea of Improvement, c. 1520-1700," in Richard W. Hoyle, ed., *Custom, Landscape and Improvement in Early Modern Britain* (London: Routledge, 2019), 128–148.
5. As Uday Singh Mehta writes, "In the absence of a conception of belonging or territorial togetherness, liberals were unable to recognize and appreciate the political integrity of various nonconsensual societies." Uday Singh Mehta, "Liberalism, Empire, Territory," in *Liberalism and Empire: A Study in Nineteenth Century British Liberal Thought* (Chicago: University of Chicago Press, 1999), 121.
6. Glen Coulthard, *Red Skins, White Masks* (Minneapolis: University of Minnesota Press, 2016).
7. William A. Gleason, *Sites Unseen: Architecture, Race, and American Literature* (New York: New York University Press, 2011), 45–54.
8. Oren Yiftachel and Tovi Fenster summarize these "three options" in "Introduction: Frontiers, Development and Indigenous People," *Progress in Planning* 47 (1997): 251–59.
9. John W. Reps, "Thomas Jefferson's Checkerboard Towns," *Journal of the Society of Architectural Historian* 20, no. 3 (Oct. 1961): 108–14. See also Nicholas Blomley, "Law, Property, and the Geography of Violence: The Frontier, the Survey, and the Grid," *Annals of the Association of American Geographers* 93, no. 1 (2003): 121–14.
10. Thomas Jefferson, "Plan for Establishing Uniformity in the Coinage, Weights, and Measures of the United States," report submitted to the U.S. House of Representatives, Washington, D.C., July 13 1790
11. Eric Sanderson, *Manahatta: A Natural History of New York* (New York: Abrams, 2009).
12. For an early and symptomatic reading, see Raymond E. Janssen, "Living Guide-Posts of the Past," *Scientific Monthly* 53, no. 1 (July 1, 1941): 22–29; for a recent survey, see Timothy A. Schuler, "Looking for Signs," *Landscape Architecture Magazine* (28 Nov. 2016).
13. Raymond E. Janssen and Fay-Cooper Cole, *The Earth before Man: The Story of How Things Began* (Chicago: University of Knowledge, 1940), [364].
14. Audra Simpson, *Mohawk Interruptus: A Political Life across the Border of Settler States* (Durham: Duke University Press, 2014).
15. Teresa Montoya tells the story of Mary Yellowhorse in "Permeable: Politics of Extraction and Exposure on the Navajo Nation" PhD diss., New York University, 2019, 73.
16. Historian Alison Isenberg is currently at work on a book manuscript on this history of Antique Americana.
17. William Sewel, "The Temporalities of Capitalism," *Socio-Economic Review* 6 (2008): 517–37.
18. Jonathan Levy, "Capital as Process and the History of Capitalism," *Business History Review* 91 (Autumn 2017): 483–510.
19. Belich argues this population became an earth-transforming force, on par with the steam engine of industrial empires, in two phases: "explosive colonization," which "compressed time and supercharged growth" and is associated with the rise of massive cities, followed by "re-colonization," which "compressed space and reintegrated settler colony and metropolis" by giving those cities "extra hinterlands." James Belich, *Replenishing the Earth: The Settler Revolution and the Rise of the Angloworld* (New York: Oxford University Press, 2009), 9.
20. For a recent account of the global dynamics of occupancy rights and their effect on the definition and distribution of land, see Jo Guldi, *The Long Land War: the Global Struggle for Occupancy Rights* (New Haven: Yale University Press, 2021).
21. Katherine McKittrick, "Respite. Quiet. A House of Dreams," in *The New Centennial Review*, 22, no. 3 (Winter 2022), 37–55.



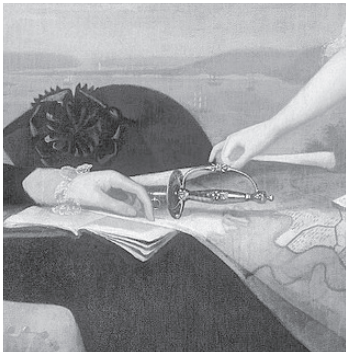
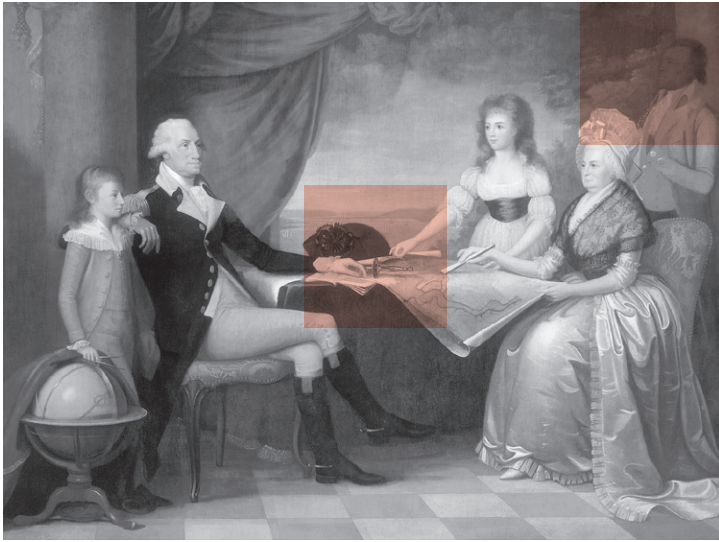
Survey

## Dispossession

The boundaries of land in the Americas have continually been redrawn in order to perpetuate the illusion of land as an endless resource available for settlement and cultivation. At stake was not only the physical occupation of land but the Western, humanist conception of the self grounded in ownership. Architect and scholar Mabel Wilson argues that this simultaneous definition of territories and subjectivities in the United States was the task of the surveyor. A purportedly objective, scientific mode of observation, **surveying reciprocally mediated between its object (the land) and its subject (the surveyor)**.

Both George Washington and Thomas Jefferson were well acquainted with the art of surveying, having helped chart the vast territories of the United States during the second half of the eighteenth century. Before entering the military, Washington produced more than one hundred surveys of the lands along the Potomac River. Jefferson's father, Peter Jefferson, made one of the most important maps of Virginia, depicting the state's waterways and mountain ranges in great detail. Furthermore, Washington's and Jefferson's expertise as surveyors was essential to the administration of their estates and plantations at Mt. Vernon and Monticello, respectively. According to Wilson, surveying knowledge served both a practical and a symbolic function: these men represented free subjects who were at once in control of themselves and of their properties.

Washington and Jefferson owned many treatises on mathematics, geometry, and cartography, and they



Edward Savage. *The Washington Family*, oil on canvas, 1789-1796.

proudly displayed surveying tools like maps, globes, and compasses around the interiors of their villas.<sup>1</sup> Edward Savage's portrait of the Washington family gathered around a map of the Potomac demonstrates that surveying and cartography were part and parcel of this culture of enlightenment. Washington rests his arm on the shoulder of his son, who stands next to a globe, a compass in his hand. Yet, Wilson poignantly reminds us, this gentile culture was built on the removal of Indigenous peoples from their ancestral lands and the fungible labor of Black persons from the Atlantic slave trade. She draws our attention to the background of the painting, where an enslaved man stands next to a picturesque vista of the Potomac, revealing conditions for the possibility of a formation of a free and self-possessed individual embodied by the surveyor.

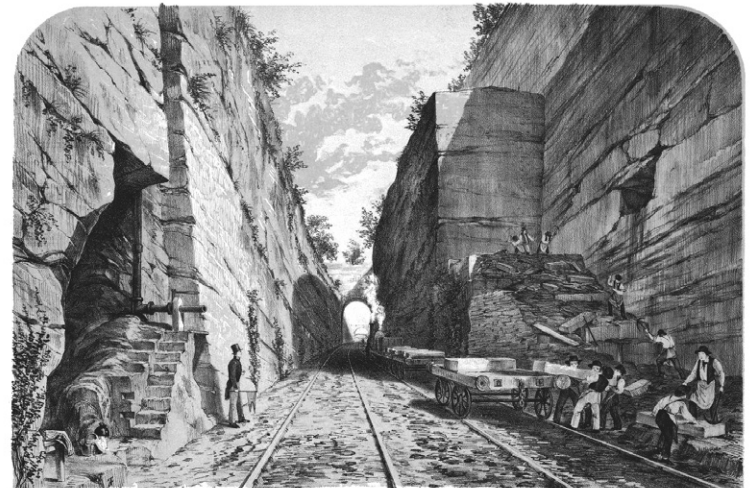
*Olive Mount Cutting, Views on the London & North Western Railway - Northern Division (Manchester: Bradshaw & Blacklock, Printers, 1848). Science Museum Group Collection.*

1. Mabel Wilson, "Conversations on Architecture and Land in the Americas: Land, Law, Labor," recorded February 3, 2023 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, [https://youtu.be/Ggh\\_urgZCQ](https://youtu.be/Ggh_urgZCQ). See also Mabel O. Wilson, *Building Race and Nation: Slavery, Dispossession, and U.S. Civic Architecture* (forthcoming).

## Section

During the nineteenth century, as common lands were appropriated by capitalist forces, the British rural poor persistently stood up against those who attempted to displace them from the land on which they lived and worked. In 1831 a group of free miners led by Warren James took over parts of the Forest of Dean in an act of resistance against the historical process that has come to be known as enclosure. This process deprived them of the customary rights over lands from which they drew their primary means of subsistence. While these men had the legal right to collect minerals from the forest floor, entrepreneurs sought instead to enclose the land and extract the coal that lay deep beneath it.

Architectural historian Zeynep Çelik Alexander argues that enclosure therefore occurred not only on the surface of land but also underground.<sup>2</sup> The excavation



William Smith, Geological table showing the superposition of strata in England and Wales, 1817. Geological Society, London

# GEOLOGICAL TABLE OF BRITISH ORGANIZED FOSSILS,

WHICH IDENTIFY THE COURSES AND CONTINUITY OF THE STRATA IN THEIR ORDER OF SUPERPOSITION;  
AS ORIGINALLY DISCOVERED BY W. SMITH, *Civil Engineer*; WITH REFERENCE TO HIS  
**GEOLOGICAL MAP OF ENGLAND AND WALES.**

ORGANIZED FOSSILS which Identify the respective STRATA.	NAMES OF STRATA on the Shelves of the GEOLOGICAL COLLECTION	COLOURS on the MAP of STRATA	NAMES in the MEMOIR and the PECULIARITIES of the STRATA.	PRODUCTS of the STRATA.
<i>Trochus, Rostellaria, Fucus, Grithus, Nautilus, Turbo, Gales, Teeth, and Bones</i>	London Clay	1	London Clay forming Highgate, Harrow, Shooters and other detached Hills	Septarium from which Purbeck's Roman Cement is made
<i>Murice, Turbo, Pectenulus, Cardia, Venus, Ostrea</i>	Gray	2	Clay or Brickearth with Interspersions of Sand and Gravel	(No Building Stone in all this extensive District but Abundance of Materials which make the best Bricks and Tiles in the Island)
<i>Flint, Alcyonia, Ostrea, Echini, Pliogostoma, Terrestrial Teeth, Pulates, Pliogostoma, Funeraria, Alcyonia, Venus, Chama, Pectinea, Terrestrial, Echini</i>	Chalk Upper	3	Chalk Upper part soft contains flints	Flints the best Road Materials
<i>Belonites, Ammonites</i>	Chalk Lower	4	Chalk Lower part hard contains none	Good Lime for Water Cements
<i>Turricella, Ammonites, Trigonia, Pecten, Wood</i>	Green Sand	5	Green Sand parallel to the Chalk	Firestone and other soft Stone sometimes used for Building
<i>Trochus, Nautilus, Ammonites in Malacca, Ostrea in a bed of Bones</i>	Brickearth	6	Blue Marl	
<i>Various Mollusks, Melania, Ostrea, Echini, and Spines</i>	Portland Rock	7	Purbeck Stone Kentish Rag and Limestone of the Vales of Pickering and Aylesbury	The first Quarry and building Stone downward in the Series
<i>Belonites, Ammonites, Ostrea</i>	Oaktree Clay	8	Iron Sand & Carstone which in Surrey and Bedfordshire contain Fuller's Earth and in some Places Ocher and Glau Sand	Kimberidge Coal
<i>Ammonites, Ostrea</i>	Coral Rag and Pisolite	9	Dark blue Shale producing a strong Clay Soil chiefly in Pictaria in North Wiltshire and Vale of Bedford	Fuller's Earth, Ocher and Glau Sand Some Lime used on these Sands in Sussex and Yorkshire
<i>Mollusca, Cardia, Ostrea, Avicula, Terrestrial</i>	Clay over the Upper Oolite	10	Combrash A thin Rock of Limestone chiefly usable lying in Clay	Makes tolerable Roads
<i>Pectinea, Teeth and Bones, Wood</i>	Sand & Sandstone	11	Forest Marble Rock thin Beds used for rough Paving and Slating	Coarse Marble, rough Paving and Slate
<i>Poor Encrinurus, Terrestrial, Ostrea</i>	Forest Marble	12	Great Oolite Rock which produces the Bath Firestone	
<i>Mollusca, Cardia</i>	Upper Oolite	13	Under Oolite of the Vicinity of Bath and the midland Counties	The finest Building Stone in the Island for Gothic and other Architecture which requires nice Workmanship
<i>Mollusks, Trochus, Nautilus, Ammonites, Pecten</i>	Fuller's Earth & Rock	14		
<i>Ammonites, Belonites as in the under Oolite</i>	Under Oolite	15		
<i>Numerous Ammonites</i>	Sand	16		
<i>Belonites, Ammonites in mats</i>	Marlstone	17		
<i>Pentamerus, Numerous Ammonites, Pliogostoma, Ostrea, Bones</i>	Blue Marl	18	Blue Marl under the best Pastures of the midland Counties	Excellent Lime for Water Cements
<i>Mollusks, Encrinurus in Malacca, Producta</i>	Lias	19	Blue Lias	Now used for printing from M.S. written on the Stone
<i>Numerous Vegetables, Ferns lying over the Coal</i>	White Lias	20	Red Marl and Gypsum soft Sandstones and Salt Rocks and Springs	
<i>Mollusks, Encrinurus in Malacca, Producta Trilobites</i>	Red Marl	21	Magnesian Limestone Soft Sandstone	Small Quantities of Copper and Lead and Calamine
<i>Mountain Limestone</i>	Redland Limestone	22	Coal Districts and the Rocks & Clays which accompany the Coal generally a Sandstone beneath	Grimestones, Millstones, Pavingstone, Iron-Stone and Fire-Clay from the Coal Districts
<i>Mountain Limestone</i>	Coal Measures	23	Derbyshire Limestone or Metalliferous Limestone	Lead, Copper, Calamine Marble
<i>Mountain Limestone</i>	Mountain Limestone	24	Red & Dunstone of the Southern and Northern Parts with Interspersions of Limestone marked blue	Some good Building Stone
<i>Mountain Limestone</i>	Red Rhab & Dunstone	25	Various Killas or Slate and other Strata of the Mountains on the West Side of the Island with Interspersions of Limestone marked blue	The Limestone polished for Marble Tin, Copper Lead and other Minerals The most durable building Stone in the Island for Bridges and other heavy Works
<i>Mountain Limestone</i>	Killas	26	Granite, Sienite and Gneiss	
<i>Mountain Limestone</i>	Granite, Sienite & Gneiss	27		

From the re-examination of the Authors numerous Specimens in the arrangement of his Geological Collection in the British Museum and his subsequent observations this list of the Strata has been improved and his future exertions will be in proportion to the encouragement which he receives from the Public.

The figures of Reference to the Colours and Names show what Strata are found in each County—thus to find the Strata & Products of Norfolk look to the corresponding figures above, 1, 2, 3, 4, 5, 7, 8, 10 & 11.

Bedfordshire 2, 4, 5, 7, 8, 10, 11, 16	Derby 28, 29, 30, 31	Hertford 28, 29, 30, 31, 32	Middlesex 1, 2, 4, 5	Rutland 28, 29, 30, 31, 32, 33	Warwick 22, 23, 25, 26, 27, 28, 30
Berk 2, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14	Dorset 1, 2, 4, 10, 21, 22, 23, 24, 25	Hertford 1, 2, 4, 5, 7	Monmouth 30, 31, 32	Sussex 28, 29, 30, 31, 32, 33	Westmoreland 30, 31, 32, 33, 34
Buckingham 2, 4, 5, 7, 9, 10, 11, 13, 14, 16, 18	Devon 5, 6, 26, 28, 31, 32, 33, 34	Huntingdon 11, 14, 16	Norfolk 1, 2, 3, 4, 5, 7, 8, 10, 11	Somerset 5, 6, 7, 11, 12, 14 to 33	Wilt 4 to 25, inclusive
Cambridge 2, 4, 5, 6, 7, 8	Durham 28, 29, 30, 31	Kent 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	Northampton 14, 16, 17, 18, 20, 21, 22, 23, 24, 25	Stafford 28, 29, 30, 31	Worcester 22 to 30
			Northumberland 22, 29, 31, 32	Suffolk 2, 3, 4, 5	York 4, 5, 7, 9, 10, 11, 14, 25, 26, 28, 29, 30, 31



of Earth's crust for railway construction and mining revealed the wealth of mineral resources residing in distinct layers along the geological cut. This led British mining engineers and mineral surveyors to perceive and represent land in section, in addition to the more traditional plan. In order to identify resources that would secure the future wealth of the British Empire, the Museum of Economic Geology in London invented forms of data visualization that mapped geological information in the vertical dimension, which—as Çelik Alexander suggests—speaks to an economic way of thinking that was less retrospective than prospective. While geological strata are inherently discontinuous, the charts printed by the Museum represented mineral resources as neat, parallel layers, distinguished by colors, letters, and numbers. **These idealized geological sections sought to claim minerals for future extraction in order to stabilize the unpredictabilities of the market.**

Moving from visual representation to built space, Çelik Alexander illuminates how geologists and surveyors standardized this information in a central database made available to engineers and entrepreneurs within the Museum building. Geological information was organized in the architectural section, with fossils and minerals exhibited vertically in an attempt to visually represent in microcosm the globe's geological composition. To look at the geological specimens lining the walls was to experience inhabiting Earth's crust. The Museum did not merely promulgate a sublime image of natural history, it showed how mineral resources could service capitalism as it expanded into previously “uncharted” territories.

2. Zeynep Çelik Alexander, “Conversations on Architecture and Land in the Americas: Building, Land, Coal,” recorded December 8, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/1IXnDn60kOo>. See also Zeynep Çelik Alexander, *Imperial Data: An Architectural History* (forthcoming).

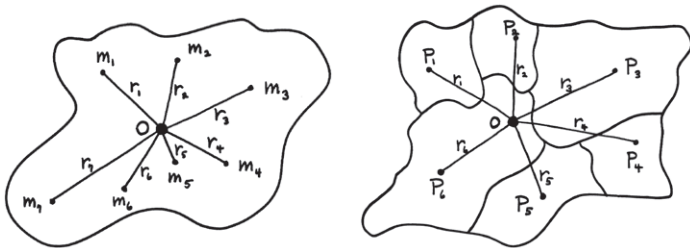
## Gerrymandering

In order for land to host a representative democratic polity, voting districts must be drawn—and redrawn. Legal battles over electoral redistricting may seem abstract, but the administrative geographies they delimit have clear-cut architectural and urban consequences. Architectural historian Benedict Clouette examines how electoral maps factored into Chicago debates over the location of racially segregated public housing complexes circa 1950.<sup>3</sup> Influenced by local aldermen, the Chicago Housing Authority stopped evenly distributing new public housing between Black and white neighborhoods and began piling units into predominantly Black areas. This electoral “packing” of Black residents within the South Side disenfranchised a high number of voters by concentrating them into fewer districts. A conspicuously seductive strategy during the heyday of modernism, **the selection of particular sites for high-density building types constituted gerrymandering by other means.**

Lake Meadows and Dearborn Homes on Chicago's South Side were among the first architectures to effect spatial realizations of gerrymandering, undergirded by the demarcation of blighted areas, in turn connected to racialized insurance practices reliant upon maps assessing the risk of mortgage default. These structural methods of discrimination and residential segregation persist in U.S. cities today.

As gerrymandering became increasingly automated, **the computer fundamentally transformed the way human bodies were represented for political ends.** Experiments in letting computers draw even the simplest of outlines, as historian Alma Steingart shows,

played a significant role in defining election districts in the 1950s and '60s.<sup>4</sup> Allegedly “blind to politics,” new computing technologies were expected to reconcile abstract space with social practice: this, however, was not the case. The technology’s purported neutrality proved to be a ruse, as implicit bias saturates human-programmed software. Yet, computational district maps became fundamental to the way in which legislative committees and community groups addressed problems of equity and inclusion in the urban sphere, the changing shape of district units and their representative cartographic outlines giving rise to real spatial transformations.



Districing options for Sussex County, Delaware drawn by computer, from Davis et al., “Legislative Distributing by Computer,” *Jurimetrics Journal*, Vol. 8, No. 4 (June 1968): 79-80.

3. Benedict Clouette, “Conversations on Architecture and Land in the Americas: Counting Land,” recorded March 24, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/IXqnYozzhxo>.
4. Alma Steingart, “Conversations on Architecture and Land in the Americas: Counting Land,” recorded March 24, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/IXqnYozzhxo>. See also Alma Steingart, “Law, Computing and Redistricting in the 1960s,” in *Political Geometry*, ed. Moon Duchin and Olivia Walch (Basel: Birkhäuser, 2022): 173–87.

Loebl, Schlossman & Bennett, Dearborn Homes, 1949-50. University of Chicago Photographic Archive, apf2-01574, Hanna Holborn Gray Special Collections Research Center, University of Chicago Library



Redistricting plans in Denver, Colorado, photograph (December 20, 1970). Duane Howell/Denver Post via Getty Images

## Data Mining



Piso Firme Program in Mexico during President Felipe Calderón Hinojosa's period, photograph, November 1, 2017. Piso Firme

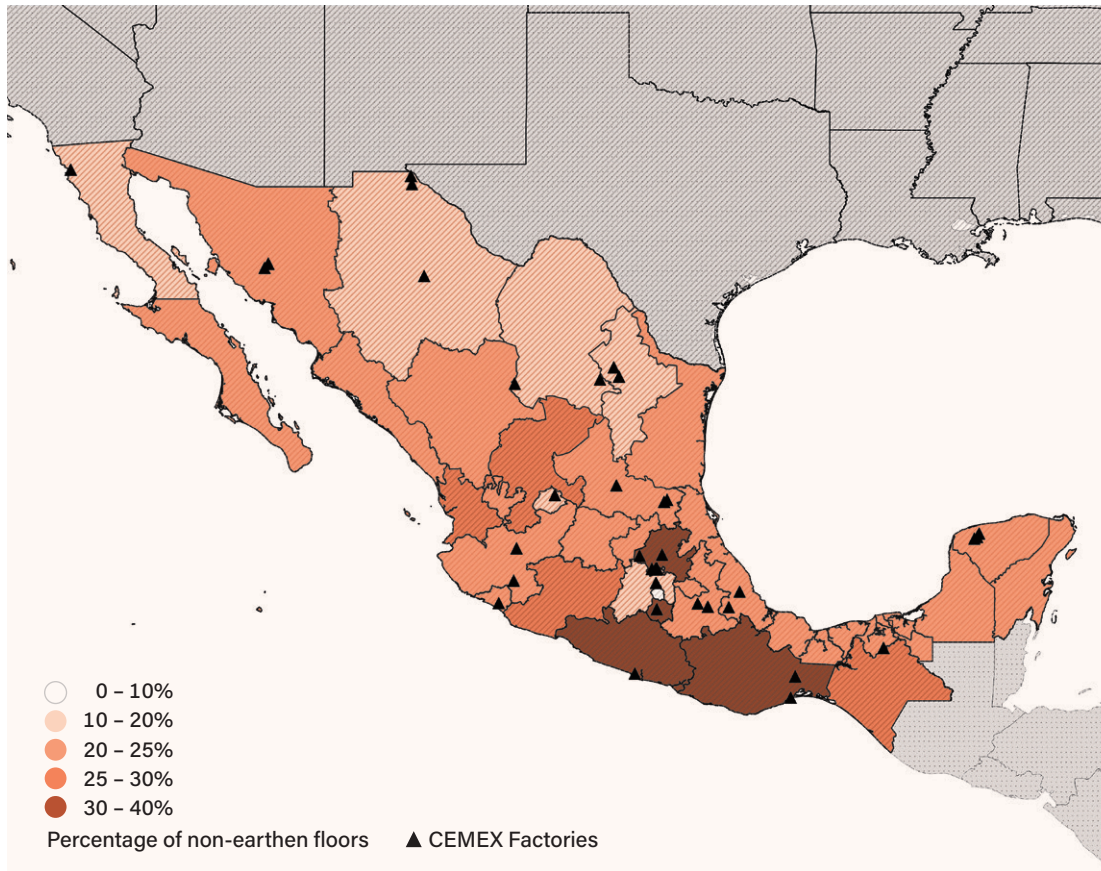
Data collected by the Mexican government about towns in the Piso Firme program were obtained by the Buell Center from the Population and Housing Census 2020 (*Censo de Población y Vivienda 2020*)

“What material is most of the floor in your home made of?” When Mexico’s 2000 census asked its citizens this question, close to three million respondents selected “tierra,” or earth.<sup>5</sup> But why, alongside the standard national household survey questions, did the government ask about dirt floors?

The official answer is that anyone who chose “tierra” would be eligible to receive free materials in order to update their floors to cement during the ongoing presidential term. Homeowners were charged with making the new grounds themselves, recruiting neighbors and family members to follow the provided instructions for mixing, pouring, and paving their floors.

The unofficial answer is that the mapping of lands and peoples is taking on increasingly diversified forms and refining its means of biopolitical control by penetrating into the individual domestic household.

STATE	MUNICIPALITY	LONGITUDE	LATITUDE	TOTAL POPULATION	TOTAL OF HOUSES	INHABITED HOUSES	HOUSES WITHOUT EARTHEN	HOUSES WITH EARTHEN FLOOR	HOUSES WITH FRIDGE	HOUSES WITH WASHING MACHINE	HOUSES WITH MICROWAVE	HOUSES WITH AUTOMOBILE	HOUSES WITH MOTORCYCLE	HOUSES WITH BIKE	HOUSES WITH RADIO	HOUSES WITH TV
Oaxaca	Total State			4132148	1570618	1126544	969778	149170	789838	531102	220657	278781	147417	199837	650517	823019
Oaxaca	Acatlán de Pérez Figuero	96°36'27.396" W	18°32'18.828" N	6341	2446	1882	1774	106	1568	1240	502	559	454	421	1122	1645
Oaxaca	Agua Escondida	96°35'26.486" W	18°28'42.040" N	10	21	6	2	4	0	0	0	0	0	0	2	2
Oaxaca	Arroyo de Enmedio	96°32'48.320" W	18°29'45.854" N	1517	517	437	424	13	391	308	70	138	176	49	247	393
Oaxaca	Arroyo de Pita	96°21'43.421" W	18°23'33.314" N	766	269	226	216	10	176	106	26	51	128	15	130	179
Oaxaca	Aserradero Segundo	96°38'38.574" W	18°27'01.467" N	123	46	37	26	11	24	12	3	6	7	1	16	25
Oaxaca	Barbasco	96°33'35.308" W	18°35'01.209" N	851	337	238	209	29	200	145	50	101	124	44	149	213
Oaxaca	Cañada San Antonio	96°38'20.309" W	18°27'34.733" N	768	238	192	166	26	144	121	34	47	35	18	78	128
Oaxaca	Cañamazal	96°29'38.676" W	18°33'56.396" N	663	199	174	159	15	155	113	49	69	89	19	95	147
Oaxaca	La Carbonera	96°25'36.233" W	18°26'46.963" N	866	325	249	229	18	202	168	32	73	106	16	152	184
Oaxaca	El Cedral	96°28'47.556" W	18°22'01.448" N	628	209	185	165	20	142	62	18	49	52	21	85	147
Oaxaca	Cerro Mojarra	96°35'51.285" W	18°23'30.136" N	2509	812	665	535	130	447	199	52	94	79	35	387	451
Oaxaca	Cosolapa Sarmiento	96°34'23.913" W	18°22'22.708" N	482	130	126	70	56	57	8	3	0	1	2	45	61
Oaxaca	La Defensa	96°32'29.150" W	18°30'06.572" N	821	273	224	218	6	211	180	73	88	79	21	104	201
Oaxaca	Esperanza	96°23'50.444" W	18°26'15.473" N	287	116	79	75	4	64	49	18	32	44	2	43	62
Oaxaca	La Estrella	96°38'16.097" W	18°33'25.146" N	152	61	49	41	8	29	22	4	8	13	4	28	35
Oaxaca	Guadalupe de los Reyes	96°37'51.934" W	18°33'11.945" N	527	194	159	138	21	131	91	27	43	30	13	106	139
Oaxaca	La Isleta	96°26'13.948" W	18°28'55.317" N	35	10	10	10	0	9	8	1	5	6	0	5	8
Oaxaca	Joliette	96°22'37.986" W	18°24'49.994" N	793	298	257	233	23	207	169	46	74	98	12	151	195
Oaxaca	La Junta	96°39'25.367" W	18°29'24.399" N	1030	347	281	265	15	219	145	46	94	84	61	116	234
Oaxaca	Las Maravillas	96°38'18.305" W	18°30'28.524" N	375	138	101	96	5	84	55	11	32	10	3	42	84
Oaxaca	La Michuca	96°25'25.033" W	18°29'47.804" N	15	10	6	2	4	6	4	2	2	4	1	5	6
Oaxaca	Ojo de Agua o Palma Cuat	96°29'03.459" W	18°26'27.795" N	415	143	113	108	5	98	75	25	44	44	46	76	99



Map identifying the percentage of homes with earthen floors per state, and locating CEMEX factories across Mexico.  
Map by Clarisse Figueiredo

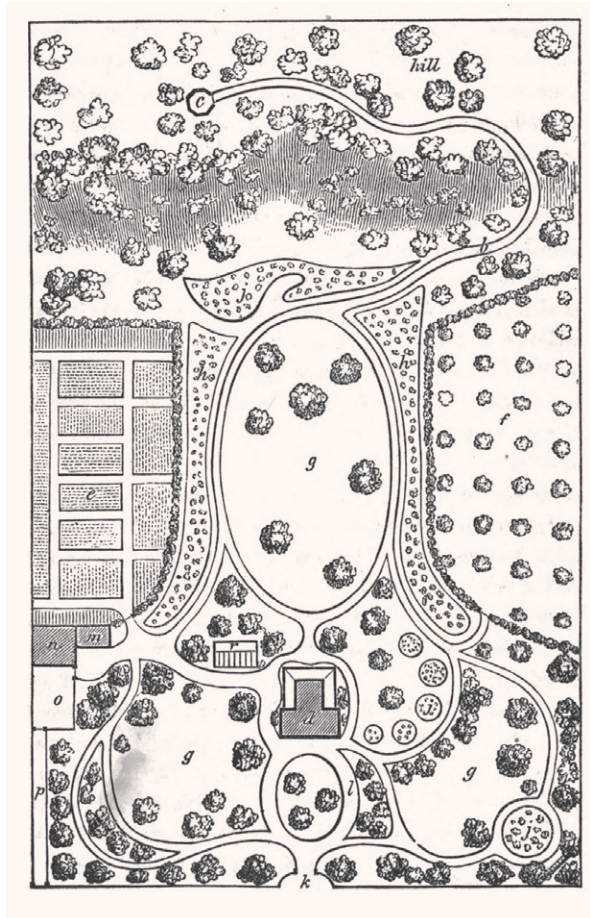
These means of control involve the construction industry and its ties with the state. The Mexican government, under the *Piso Firme*, or firm floor, project, selected poured cement—a building material that the country had in surplus—CEMEX’s rebranded antibacterial concrete paved floors across the country. Beyond bolstering the cement industry in Mexico, though, *Piso Firme* primarily helped to redefine the Mexican government’s quantification of its people. In the counting of floors as dirt or otherwise, the federal government counted its residents. That data was then organized into spreadsheets and made accessible online, with its contents sometimes anonymized, sometimes not. This counting created a metric—floor material, child health, maternal happiness—that claimed to measure poverty, and its results filtered into public policy. These so-called developmental strategies differed from earlier disciplinary techniques for managing people, which were largely imposed “from above.” *Piso Firme* instead called on individual subjects to take part in the administrative structures that governed them. **By taking part in *Piso Firme*, homeowners received raw materials from the government and gave them raw data in return.**

5. “Inhabited Housing Units and Their Distribution according to Main Building Floor Material,” in National Institute of Statistics, Geography and Informatics (INEGI), XII General Census of Population and Housing 2000. The archive of this entry has been investigated by Jordan R. Steingard and Clarisse Figueiredo de Queiroz for the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University.



Nature

## Improvement



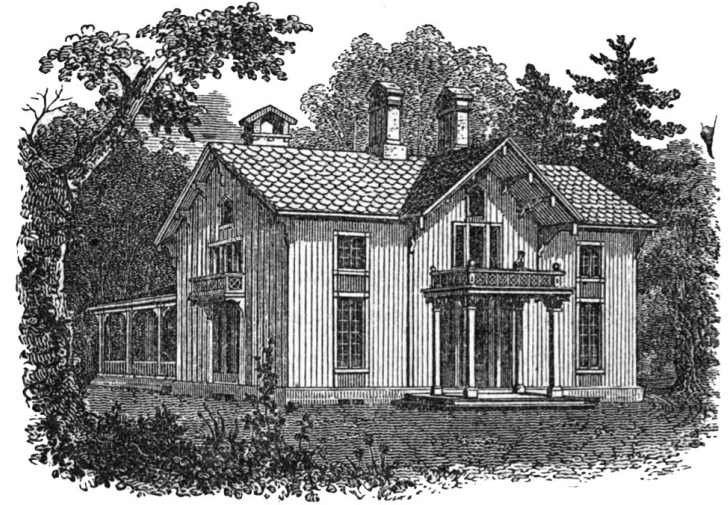
“Cottage Villa in the Bracketted Mode,” grounds layout, from Andrew Jackson Downing, *Cottage Residences* (New York and London: Wiley and Putnam, 1842)

Liberal and colonial ideologies have continually supported the physical settlement of land. One of the most important of these is the concept of improvement. Although generally associated with agricultural cultivation, the term had somewhat different origins and developed over time. Originally it related to the raising of land value as reflected in rent. Land was made more productive not by investing labor into it (as John Locke asserted) but by making improvements that would enhance its rental value. By the nineteenth century, improvement would become firmly wedded to the construction of dwellings and gardens. Cottages and country houses communicated that wild, untamed nature had been brought under control by the settlers who now occupied the land.

The cottage had not always carried such a connotation: in fact, initially it was seen as improvement’s opposite.<sup>1</sup> According to theorists of the Picturesque movement including William Gilpin and John Ruskin, the cottage was an outgrowth of nature—a primitive form of dwelling that had to be improved in order to make land attractive, both aesthetically and economically. In the eighteenth and nineteenth centuries, a veritable explosion of publications on cottages and country houses transformed the cottage into an active instrument of improvement. **The cottage went from being an object shaped by nature to one that shaped nature.**

In the eyes of the prolific designer and author Alexander Jackson Downing, cottages and country houses would produce a “community of rational enjoyments”<sup>2</sup> by helping to improve land, dwellings,

and humans, all at once. While they might seem parochial, Downing's writings had far-reaching implications beyond rural environments. In Chicago his books played a key role in the development of urban land. Real estate speculators like William Ogden read Downing closely, and saw houses and gardens as remedies to the brute forces of speculation. The cottage not only balanced the moral deficiencies of capitalism through the refinement of taste but it also made Chicago more attractive to investors who sought to define themselves as cultured gentlemen. Although these cottages and their attendant gardens have not survived, they laid the foundations for the Chicago public park system, which in turn helped cultivate the modern leisure class.



“Cottage Villa in the Bracketted Mode,” view, from Andrew Jackson Downing, *Cottage Residences* (New York and London: Wiley and Putnam, 1842)

1. The archive of this entry is currently under investigation by architectural historian Aleksandr Bierig for the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University. See also Aleksandr Bierig, “Restorations: Coal, Smoke, and Time in London, circa 1700,” *Journal* no. 18, 15 (Spring 2023), <https://www.journal18.org/issue15/restorations-coal-smoke-and-time-in-london-circa-1700/>.
2. Andrew [Alexander] Jackson Downing, *Rural Essays* (New York: G. P. Putnam, 1853), 142, quoted in Daniel Bluestone, *Constructing Chicago* (New Haven: Yale University Press, 1991), 11.



J. T. Palmatary, *Bird's-eye View of Chicago*, lithograph, 1857, detail.

## Experimentation



Citrus experiment station, Box Springs, California, ca. 1918.  
College of Natural and Agricultural Sciences, Riverside, California

Although the “rural” is often represented as the retrograde opposite of the “urban,” the countryside of the Americas was one of the paradigmatic theaters and sites of modernization in the long nineteenth century. In 1887 the Hatch Act established a network of agricultural research stations that fundamentally transformed the agroecosystems of the United States.<sup>3</sup> In order to address the so-called “rural problem”—a combination of issues ranging from declining soil fertility to rural emigration—these experimental laboratories tested out the latest scientific practices for pest control and crop fertilization. Their aim was to find what one agronomist referred to as the “precise prescription for guaranteed abundance.”<sup>4</sup> By developing methods for producing larger crops with higher yields for an ever-expanding commodities market, research stations sought to accelerate economic growth by accelerating natural growth. The Hatch Act thus opened up a new frontier for agricultural capitalism that further accelerated the exploitation of land, precisely at the moment when the spatial settlement of the United States had seemingly reached its completion.

Yet the “rural problem” that the experiment station sought to redress was not purely a technical one. The waning harvest and population movements that characterized the rural problem were the direct outcome of



monoculture practices that had devastated natural ecosystems. Agricultural stations thus promised technical solutions to social and political problems—indeed, to a problem of political ecology: the use, distribution, and imagining of land. While more radical alternatives were put forward by Socialist and Farmers’ Alliance associations, who sought to use stations to actively fight back against the expansion of tenant farming, the experimental drive in agricultural research ultimately came to reinforce the social system of modern capitalism.

Over the ensuing decades, research stations spread throughout the country and beyond, extending the “rural problem” on a global scale. Their inconspicuous architecture was appended to college campuses and dispatched into the countryside, where it met the needs of diverse agricultural regions. Main stations multiplied into smaller branches to address specific geographic and climatic zones. Postwar development agencies disseminated U.S. agricultural practices abroad, most notably in Brazil: university partnerships, training programs, USDA projects, and American industrialists’ interests have entwined the two countries ever since.

3. The archive of this entry is currently under investigation by architectural historian Cecília Resende Santos for the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University.
4. Samuel W. Johnson, quoted in Norwood Allen Kerr, *The Legacy: A Centennial History of the State Agricultural Experiment Stations, 1887-1987* (Columbia, MO: Missouri Agricultural Experiment Station, University of Missouri, 1987), 4.



Hydro-Cy Fumigation Advertising. Doug Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2005)

## Engineering



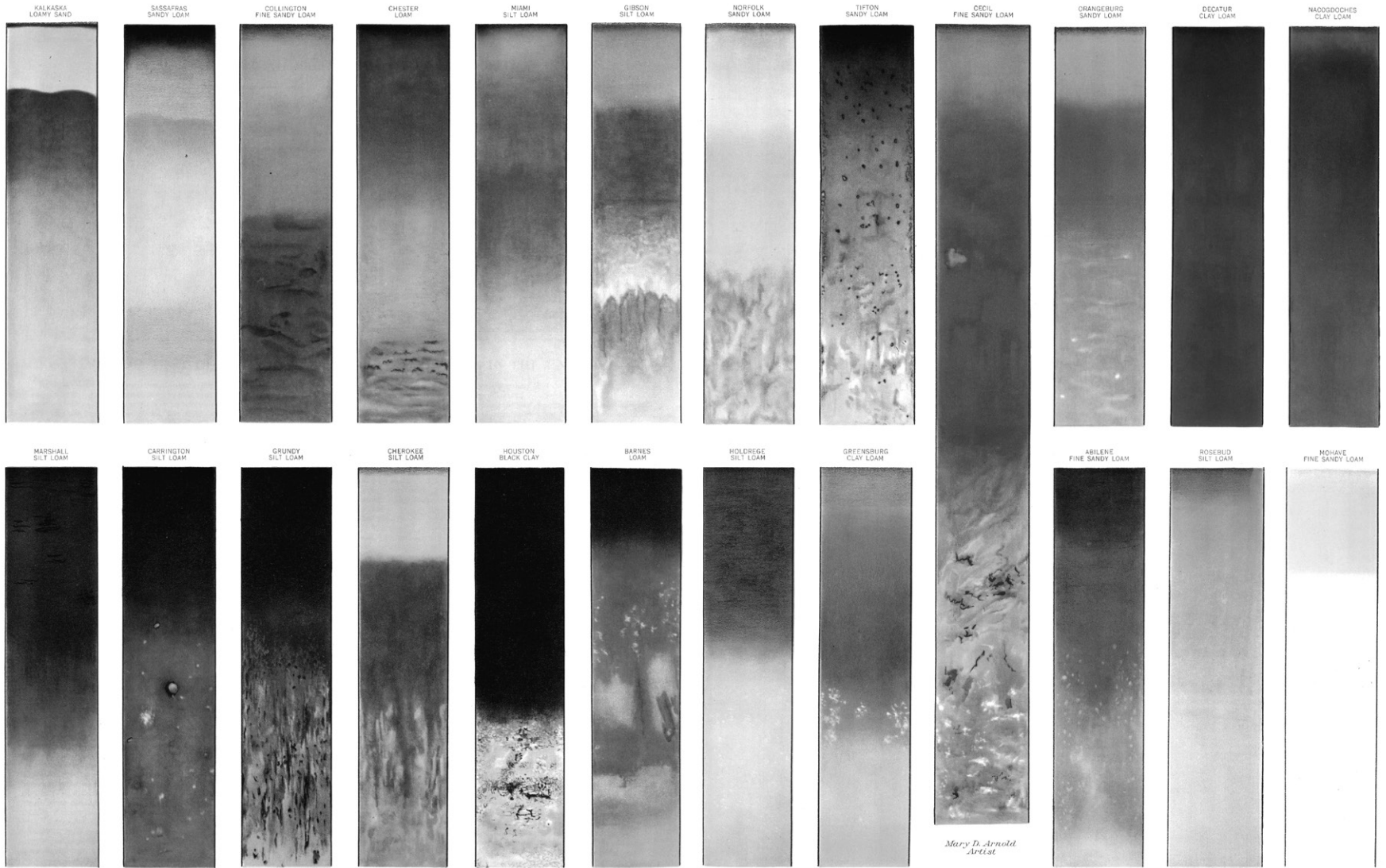
A field of black beans irrigated with wastewater near Tepatepec, Hidalgo, Mexico (1 April 2017). AP Photo/Rebecca Blackwell

The fact that soil itself is a human product is often overlooked in architecture. Although the term “geotechnics” conjures up images of the laboratory analysis and design of foundations, the soil taxonomies used by architects and engineers artificially classify land by fixing the names and properties of soil into types. But the colorful patches of their grids in fact record both natural and human history.

Some people are acutely aware of the human-making of soil. In 2018, for instance, hundreds of Mexican farmers protested against the opening of the multi-billion-dollar Atotonilco wastewater treatment plant in the Mezquital Valley. Although untreated city water irrigated and fertilized crops efficiently, government officials argued that the customary farming technique constituted a health hazard, and they demanded the plant’s construction. However, as landscape architect and researcher Seth Denizen explains, regional farmers feared the change to the treated water supply would ultimately impoverish local communities.<sup>5</sup> Engineering, while presented as a tool of enlightenment, served to discredit the knowledge that farmers had amassed over generations: how to manage the valley’s composite soils and understand their delicate chemistries.

### COLOR PROFILES OF REPRESENTATIVE SOILS OF THE GREAT SOIL GROUPS

Color of soil is shown to a depth of 5 feet, except Cecil fine sandy loam which is shown to 10 feet



Mary D. Arnold  
Artist

GREAT SOIL GROUPS AND THE REPRESENTATIVE SOILS SELECTED FROM EACH GROUP

PODZOL SOILS  
Kalakea loamy sand

GRAY-BROWN PODZOLIC SOILS  
Sassafras sandy loam  
Collington fine sandy loam  
Chester loam  
Miami silt loam  
Gibson silt loam

RED AND YELLOW SOILS  
Norfolk sandy loam  
Tifton sandy loam  
Cecil fine sandy loam  
Orangeburg sandy loam  
Decatur clay loam  
Naddodoches clay loam

PRAIRIE SOILS  
Marshall silt loam  
Carrington silt loam  
Grundy silt loam  
Cherokee silt loam  
Houston black clay

CHERNOZEM SOILS  
Barnes loam  
Holdredge silt loam  
Greensburg clay loam  
Abilene fine sandy loam

DARK-BROWN SOILS  
Roselud silt loam

DESERT SOILS  
Mohave fine sandy loam

U.S. G. 1937 & Co., Inc.

Color Profiles of Representative Soils. Curtis F. Marbut, *Atlas of American Agriculture* (Washington, DC: U.S. Department of Agriculture, 1936)

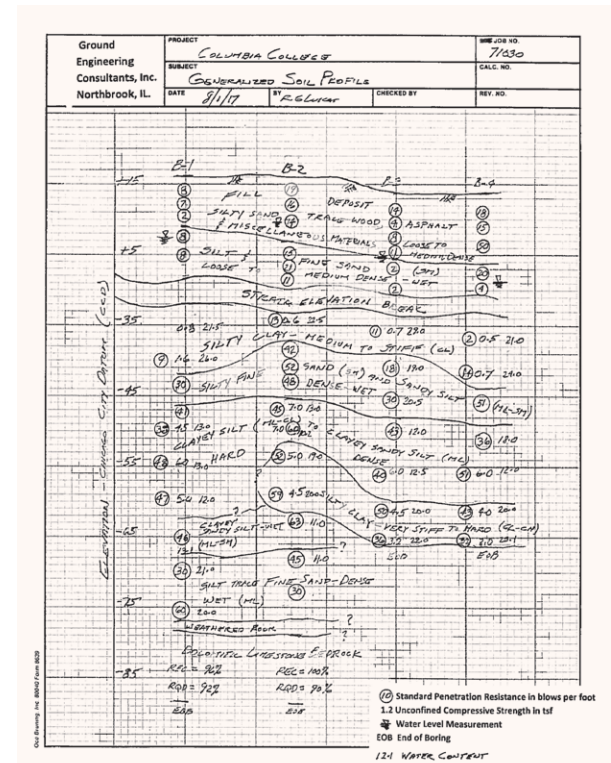
This clash between finding human traces in the ground and the desire for virgin soil has a particularly deep history in Chicago. In the aftermath of the Great Fire of 1871, skyscraper building campaigns spurred on geotechnical analysis. The heart of the city, in the words of one *New York Times* reporter, was by 1891 a great “jelly-cake” of mushy soil, where constructions in iron and mortar risked slow burial.<sup>6</sup> The city nevertheless underwent relentless cycles of demolition and rebuilding, motivated by market forces, red-lining, and state-sponsored violence. Today, geotechnical reports reveal decades of tunnel boring, land contamination and in-filling, layers of silt deposits, wood, asphalt, and miscellaneous rubble—all a material index of Chicago’s human history. Although such reports usually recommend remediation prior to new construction, this costly process is almost always avoided. A new, artificial “jelly-cake” remains. As architect Linda Chavez Baca notes, architects in Chicago must navigate this layered ground through flexible construction methods.

To reckon with forms of knowledge that do not fully translate into scientific patterns is to reassemble an image of the soil that accounts for social relations.<sup>7</sup>

5. Seth Denizen, “Conversations on Architecture and Land in the Americas: Soil, Land, Fill,” recorded October 20, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/jdfMSkKGw4s>.
6. “The Crust at Chicago,” *The New York Times*, October 18, 1891, 4.
7. Linda F. Chavez Baca, “Conversations on Architecture and Land in the Americas: Soil, Land, Fill,” recorded October 20, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/jdfMSkKGw4s>.

“What shall it profit Chicago to have taken the prairies and the wheat fields and the distant lairs of wolves and bears in its municipal embrace if the proud palaces in the haunts of its Board of Trade must sink in a smother of slimy ooze? Who shall restrain the great layer of jelly in Chicago’s cake?”

“The Crust at Chicago,” *The New York Times*, October 18, 1891.



P.E Lukas and G. Robert, “RE: Subsurface Exploration And Geotechnical Engineering Recommendations At 8th Street And Wabash Avenue In Chicago, Illinois-GEC Job No 71030” (Northbrook, Illinois: Ground Engineering Consultants, Inc., August 7, 2017)

## Porosity

Neither earth nor water, permeable grounds in riparian areas upset received ideas about landed legacies and national borders. Processes of absorption and accumulation offer an alternative understanding of how land is settled: they show that some human relations resist documentation. For anthropologist Vanessa Agard-Jones, the ubiquitous space of the beach in the Caribbean is a repository saturated with memories of past lives.<sup>8</sup> The black sand on the western coast of French Martinique takes its color from the volcanic eruption of Mount Pelée in 1902. The unprecedented eruption ravaged the city of Saint-Pierre, a place divided along racial lines yet also a place where theaters, brothels, and carnival celebrations have blurred those lines in the sexual sphere. Agard-Jones takes the sand as a starting point to trace the oblique permanence of same-sex desire and transgression. Like the sandy grounds, Black and Queer bodies on the island bear the burden of enduring coloniality. Their exposure to racism, sexism, homophobia, and transphobia couples with exposure to toxic chemical substances, as when a pesticide containing the endocrine disruptor Chlordecone entered the Antilles for banana farming in the 1970s. That the industrial compound had been produced in former plantation sites in Virginia hints at the unexpected connections racial capitalism makes through “chemical kinship” across the Americas.<sup>9</sup> As the toxic substance moved into the soil and waterways, it was absorbed by bodies, linking the United States and Martinique through chemical infrastructures. Yet the severity of chemical exposure deeply differentiates the sites, as does the extent of remediation envisioned for them, or not.



The volcanic eruption of Mount Pelée in Martinique, photograph, 1902. Library of Congress

Ongoing debates across the Americas articulate sovereignty in this fashion: around porosity and in claims against chemical contamination. The Gold King Mine spill in Colorado and its impact on Diné communities downstream not only shows how toxic contamination challenges indigenous sovereignty but also how these challenges produce new, politically assertive solidarities. Moving across state lines, the media maker and anthropologist Teresa Montoya follows the traces of three million gallons of arsenic, lead, cadmium, and other metal sulfides that flowed from the extractive enterprise into Cement Creek and disrupted farming communities in Navajo Nation.<sup>10</sup>

Montoya's images portray how settler colonialism permeates the land and how it continues to make frontiers, both through the movement of substances and through mass media's aestheticization of toxicity's haunt.

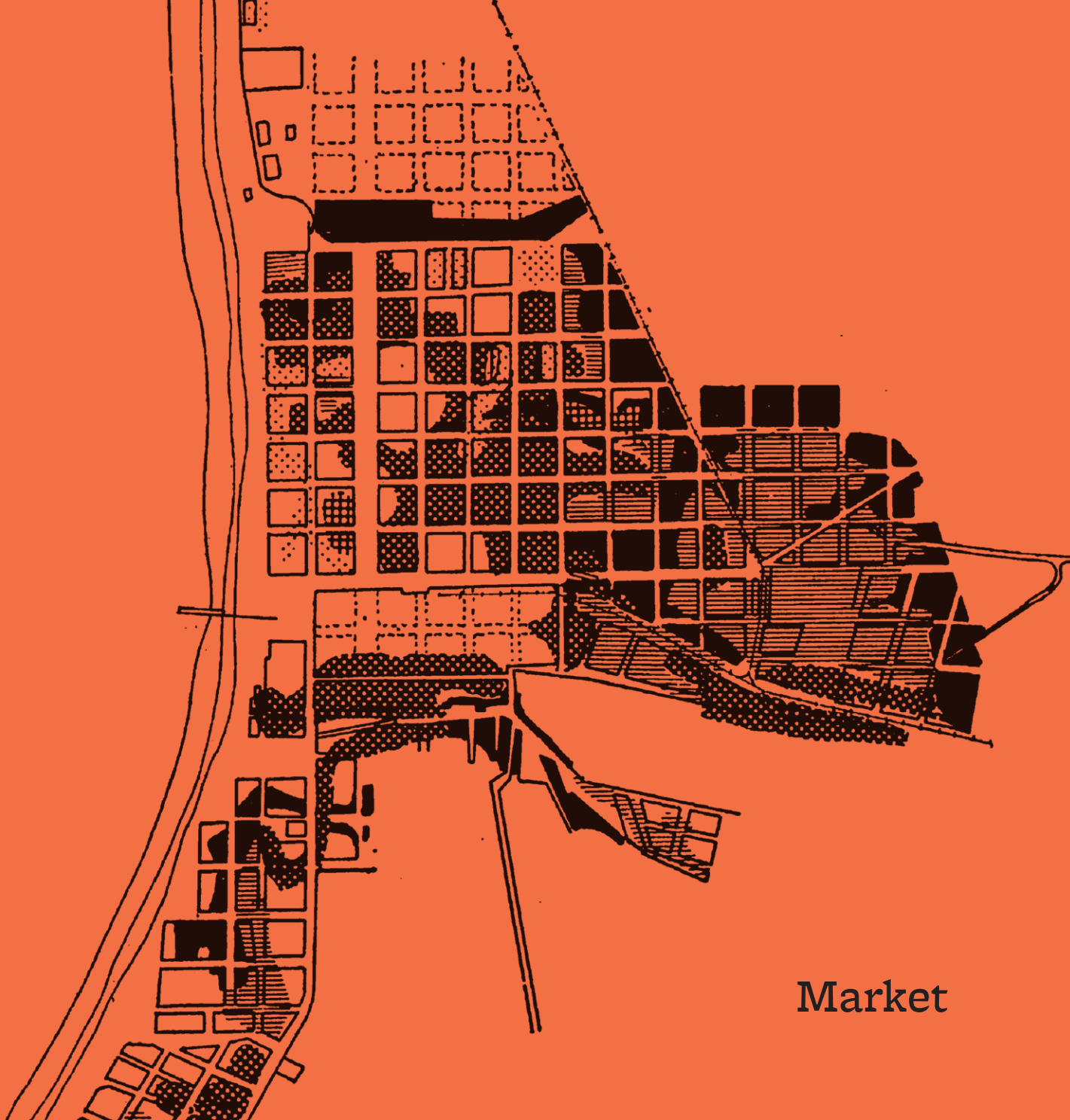
8. Vanessa Agard-Jones, "What the Sands Remember," *GLQ: A Journal of Lesbian and Gay Studies* 18, no. 2-3 (2012): 325-46.
9. Vanessa Agard-Jones, "Conversations on Architecture and Land in the Americas: Soil, Land, Fill," recorded October 20, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/jdfMSkKGw4s>.
10. Teresa Montoya, "Yellow Water: Rupture and Return One Year after the Gold King Mine Spill," *Anthropology Now* 9, no. 3 (2017): 91-115; Teresa Montoya, "Conversations on Architecture and Land in the Americas: On Trust Land," recorded February 24, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/jW0deFq9Uiw>.



Acid mine discharge, which flows regularly through the sloped corridors of the San Juan Mountains, leaving a permanent mineral stain on rocks and soil, 2017. Photograph in *Tó Éitso / Yellow Water* series by Teresa Montoya



A group of scientists and mining industry employees study bags containing various concentrations of treated mine wastewater at the Gladstone interim water treatment plant, 2017. Photograph in *Tó Éitso / Yellow Water* series by Teresa Montoya



Market

## Selling

“I never saw a busier place than Chicago was at the time of our arrival. The streets were crowded with land speculators, hurrying from one sale to another. A negro, dressed up in scarlet, bearing a scarlet flag, and riding a white horse with housings of scarlet, announced the times of sale. At every street-corner where he stopped, the crowd flocked round him; and it seemed as if some prevalent mania infected the whole people. The rage for speculation might fairly be so regarded. As the gentlemen of our party walked the streets, store-keepers hailed them from their doors, with offers of farms, and all manner of land-lots, advising them to speculate before the price of land rose higher.”

Harriet Martineau, *Society in America*  
(London: Saunders & Otley, 1837)

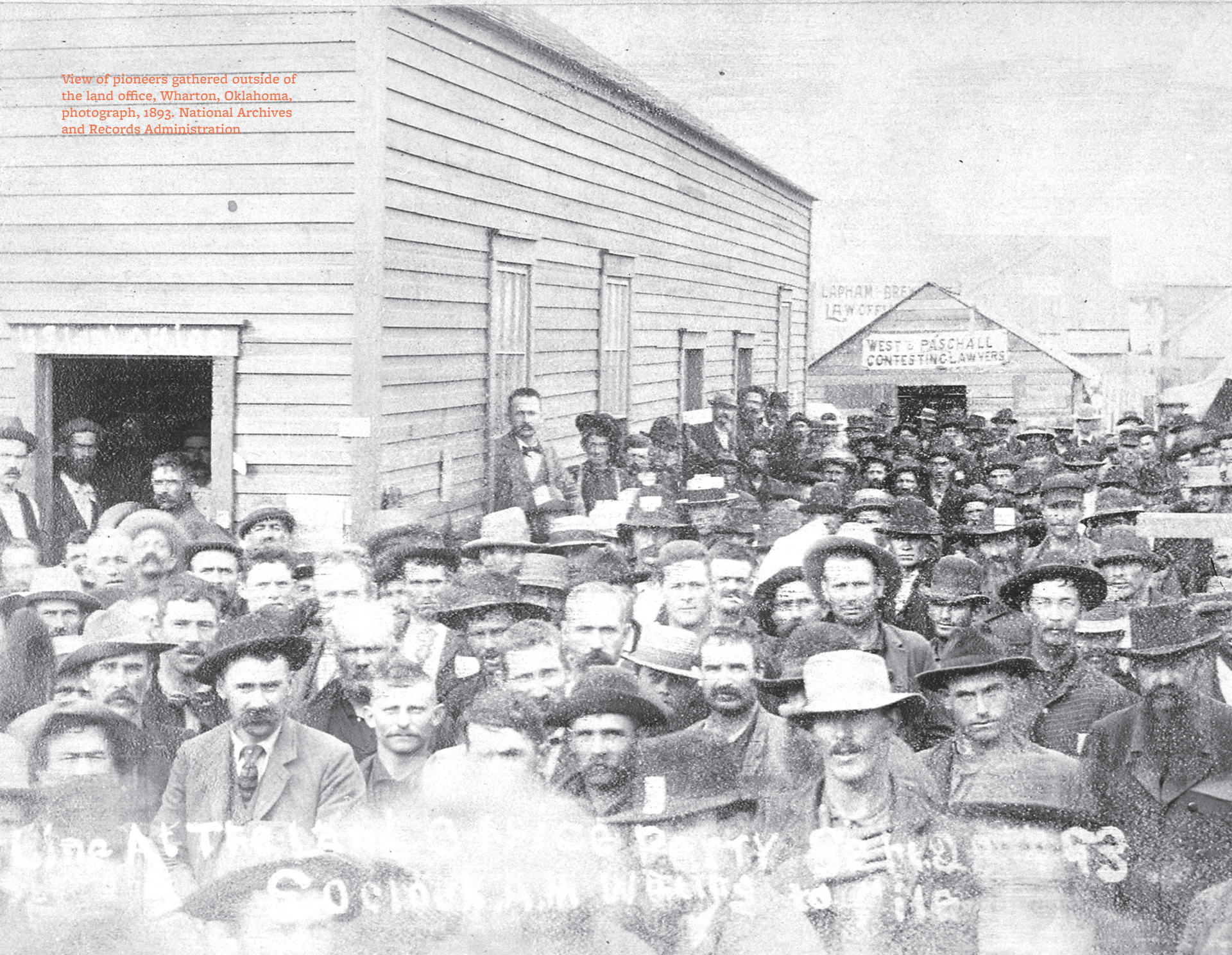
After it was surveyed, but before it could be settled, U.S. land had to be bought. As the American frontier expanded westward during the nineteenth century, settlement became increasingly predicated on institutions that regulated processes of exchange, through which a new idea of the public emerged.

The buying and selling of land would take place in buildings known as land offices, which were once the most ubiquitous form of federal architecture in the United States.<sup>1</sup> As a haunting 1893 photograph of the crowd gathered outside the Oklahoma land office shows, this was not the public of the Republic of Letters or the bourgeois public sphere, but a public made up of white pioneers who came together in pursuit of their own individual self-interest to take part in a booming real estate market. Every district had its own land office, and it was there that settlers came in contact with the state. In this public space of the frontier, Indigenous peoples from whom the land had been stolen were clearly excluded. The U.S. government declared Native American homelands “public domain land” and divided them up into smaller parcels that could be sold off to settlers. Standing for hours outside the offices during auctions, settlers waited in line to purchase a legal deed naming tracts of “public domain land” as their property.

Despite the drive for bureaucratic control, land offices became the site of feverish though varied speculative activity. Harriet Martineau’s deleterious portrayal of the Chicago land office—with its crowded streets and Black man on horseback, dressed in scarlet, making announcements—attests to the mania for land



View of pioneers gathered outside of the land office, Wharton, Oklahoma, photograph, 1893. National Archives and Records Administration



and the peculiar, irrational practices that pushed settlement of the frontier forward.<sup>2</sup> Yet little or no trace remains of these temporary wooden structures: after all the land was sold off to speculators, they were almost immediately dismantled. Ephemeral though their physical architecture may have been, these offices laid down the boundaries that mark the nation as a whole, and their most lasting legacy is in helping shape a new kind of market-driven subject whose ghostly presence still haunts public space to this day.



“¿Qué son los Títulos de Propiedad?” [What are property titles?] SINAMOS [National Social Mobilization Support System], Peru, pamphlet illustration, 1971

1. The archive of this entry is currently under investigation by architectural historian Lucia Galaretto for the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY.
2. Harriet Martineau, *Society in America* (London: Saunders and Otley, 1837).

## Property Titling

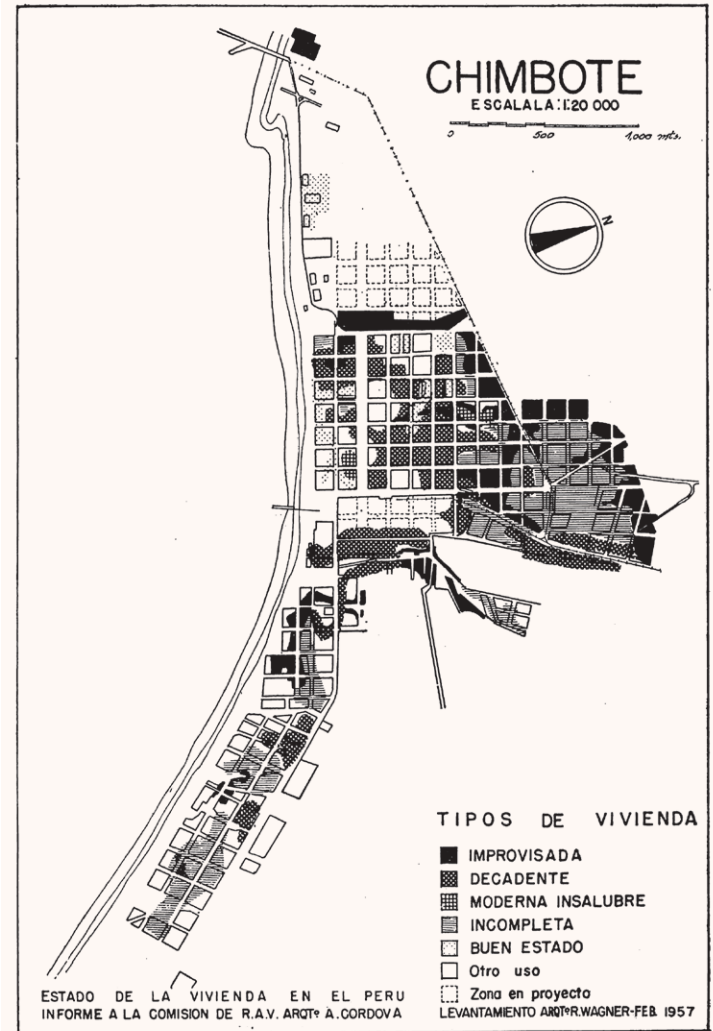
The distinction between “formal” and “informal” housing lies less in architecture and more on paper.

As global financial capitalism gained clearer edges in the late twentieth century, it was sharpened by legal mechanisms that “made the land pay” in new ways.<sup>3</sup> Property titles, a longstanding and all-too-ubiquitous element of capitalism, were asked to perform a different kind of work in this credit economy: to claim value that would be generated from land in the distant future, as opposed to value already accumulated on land in the past. Political theorist Timothy Mitchell identifies Lima, Peru as one of the places where these forward-looking mechanisms first got their start.<sup>4</sup> In the 1990s a group led by the development economist Hernando de Soto distributed property titles to poor residents of the city’s so-called informal neighborhoods, which had been occupied without formal land purchases or the involvement of development agencies. In reaching out with a title to the inhabitants (many of whom came from outside the city) de Soto sought to transform them into capitalist entrepreneurs. These property titles, which formalized the connection between a person and land, brought with them a particular set of obligations: to obtain and repay mortgages, to invest time and money in one place, and to refrain from landed forms of life that might detract from that title’s desirability for future recipients. As Mitchell argues, the property titling program was constructed as a “natural” experiment—carried out in the “natural” conditions of impoverished urban areas—that was intended to demonstrate that formal

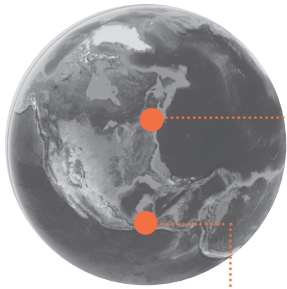
ownership had the capacity to unlock previously untapped potentials of land.<sup>5</sup>

De Soto's plan laid the foundations for a new phase in the development of capitalism itself, building a speculative economy that secured future flows of revenue through credit, debt, and rent. Insofar as these devices captured value that was yet to come, the expanded temporal horizon of the property title (and of the land itself) was fundamental to what is known as the neoliberal turn.

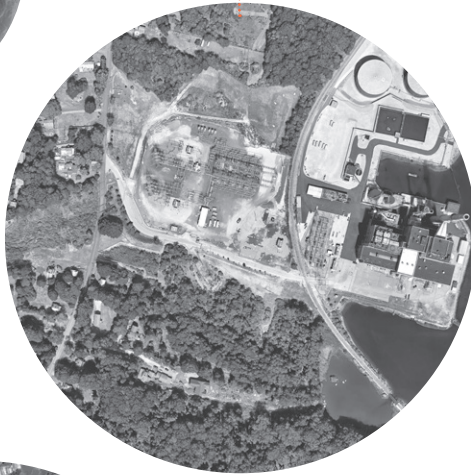
3. Cass Gilbert, *The Engineering Record*, June 30, 1900, 623–24.
4. Timothy Mitchell, "Conversations on Architecture and Land in the Americas: Making the Land Pay," recorded April 7, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/Iy9HGGx9Pjc>.
5. Timothy Mitchell, "The Work of Economics: How a Discipline Makes Its World," *European Journal of Sociology* 46, no. 2 (2005): 297–320.



Plan of Chimbote, Peru, February 1957, featured in "Types of Housing: Improvised, Decadent, Modern and Unhealthy, Incomplete, Good Condition," in Adolfo Córdova, *La vivienda en el Perú* (Lima: Comisión para la Reforma Agraria y la Vivienda, 1958)



CONNECTICUT  
59 METRIC TONS  
OF CARBON



GUATEMALA  
23 TREES



Aerial views of the Connecticut coal plant and the Guatemalan town where trees were planted to offset the plant's emissions (2023).  
Satellite imagery from Google Earth

## Offsetting

The Kyoto Protocol of 1997 formalized a mechanism by which carbon emissions produced in one place could be compensated for through the sequestering of equivalent emissions in another place. Known as “offsetting,” the mechanism established that this place must be elsewhere—indeed, could be *anywhere*—producing a policy that has served as the blueprint for today’s global carbon marketplace.

But Kyoto had a telling precedent. The first carbon offset project was imagined in the boardrooms of the northeastern United States and implemented in the highlands of western Guatemala. Led by executives of the energy giant AES Corporation, the PNO3 agro-forestry project provided a way to mitigate the emissions generated by a 183-megawatt coal-fired plant built on the Connecticut coast. For AES, fifty-two million trees planted en masse south of the border would absorb into biomass all the carbon produced by their facilities over the course of fifty years. The director of the World Resource Institute called it “one of the most far-sighted and socially responsible decisions that any company has ever made.”<sup>6</sup>

Based on the idea that within two weeks carbon emitted at any given point on Earth could move anywhere in the atmosphere, the location of the carbon sequestration trees would be left open. This novel spatial framework tied pollution, global atmospheric conditions, and land use together at the planetary scale. From that point on, what occurred in the town of Uncasville, Connecticut became directly relevant to the village of San José Ojetenam, Guatemala. This market-based

technique thus linked two disparate, previously unconnected locales—the site of emissions and the site of capture.

While the project radiated with ambition and optimism, the odd selection of the River Tamarind (*Leucaena leucocephala*) for its high carbon capture capability met with local resistance. Villagers preferred cultivating fruit-bearing or firewood-producing trees, and differing goals between actors ultimately led to the project's abandonment. Still, PNO3 influenced the subsequent interest in—and even obsession with—carbon capture, even though its contiguous logic meant complying with multiple international protocols and institutional arrangements at the expense of those managing the forest on the ground. At a crucial moment, PNO3 created an allure around carbon capture, through redemptive language that spurred global actors to invest in carbon offsetting projects.

6. Associated Press, "A Lot of New Leaves For Firm", *Chicago Tribune*, October 7, 1988.

“[T]he philosophy that they [Guatemala’s National Forest Institute INAB] have [is] that a forest is a resource that needs to be commercially exploited ... [T]he people don’t really adapt to the plans that they bring ... This doesn’t mean that we don’t use the forest, but we use it in a traditional form that we have adapted over time. We see the kind of management INAB proposes as contradictory to what we (the communities) have practiced before. In Totonicapán, there is a community forest that has great importance as a water source, and this type of management doesn’t fit with what INAB is proposing ... definitely the community never will accept [commercialization], because it will cause problems in the water supply for communities.”

Totonicapán community member, 2001, cited in Hannah Wittman and Charles Geisler, “Negotiating Locality: Decentralization and Communal Forest Management in the Guatemalan Highlands,” *Human Organization*, Vol. 64, No. 1 (Spring 2005): 62-74.

*Leucaena leucocephala*,  
(Lamarck) de Wit, *Taxon*  
10: 54. 01 October 1961





ECONOMIC

## Ecology



Scientist “releasing” one of fifty American burying beetles from the Cincinnati Zoo & Botanical Garden into Fernald Nature Preserve, photograph (2015). Cincinnati Zoo

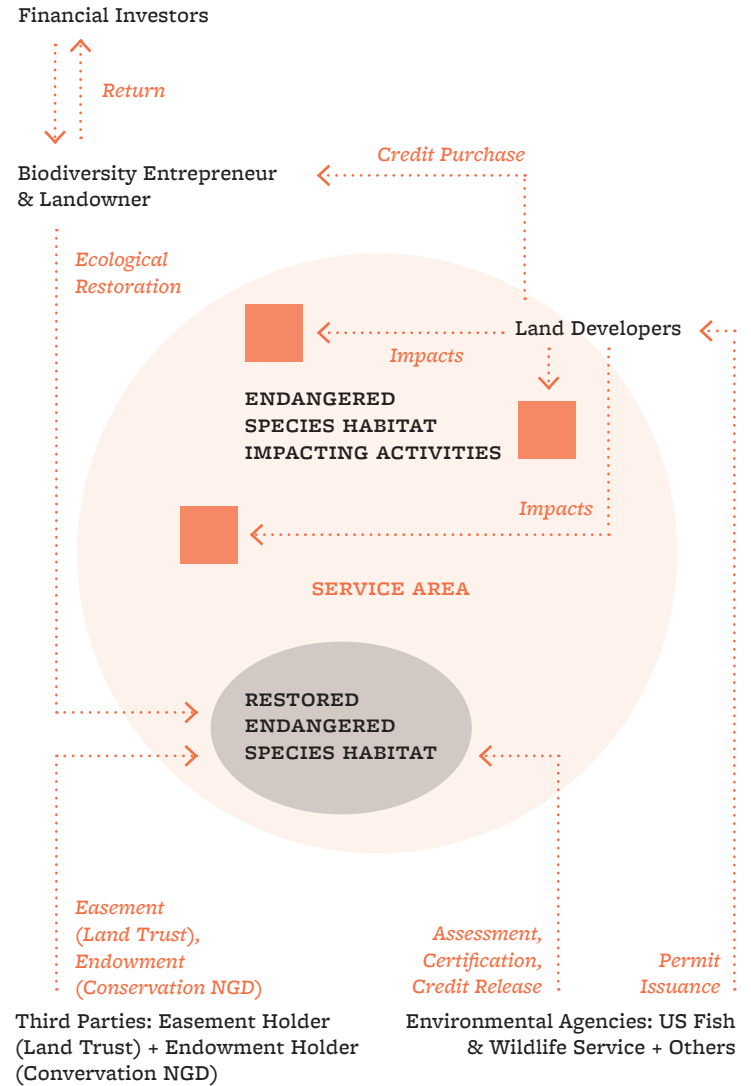
The American burying beetle, a black and orange insect about the size of a U.S. quarter that thrives beneath the earth’s surface, has become entwined with private investors, developers, markets of exchange, and credit systems. According to sociologist Stéphanie Barral, the insect is the medium through which new development opportunities are created.<sup>7</sup> This may seem surprising given that the beetle is a protected species: the insect’s protection status, however, is precisely what has allowed for new forms of real estate to emerge.

The competing interests of environmental conservationists and fossil fuel companies collided at one of the beetle’s last ephemeral habitats, in eastern Oklahoma. The location houses more than just the insect: it boasts a high demand for new building developments and fossil fuel exploration. In their collision, the two forces formed an uneasy alliance. The middle ground reached by conservationists and business executives is known as a “conservation bank”: a permanently protected and managed environment that mitigates the impact on species nearby.

Barral’s research examines the many uses of the “bank,” particularly the way it serves as an instrument to manage developer discontent. Many local developers find the removal of parcels of land from the economy to be anathema. But the U.S. Endangered Species

Act—among other government regulations—does so in order to protect and maintain biodiverse regions. The designed solution, then, gives developers the opportunity to expand into otherwise unavailable parcels of land in exchange for investment in the protection or conservation of the adjacent land in question. This “conservation banking” has become a common solution to real estate upsets around the world.<sup>8</sup>

The resulting entanglement between protected species and private investors ultimately encourages both development *and* conservation: the land in which the beetle lives merges with the developer’s spreadsheet, on which the insect’s life is valued.



7. Stéphanie Barral, “Conversations on Architecture and Land in the Americas: Making the Land Pay,” recorded April 7, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/ly9HGGx9Pjc>.
8. Stéphanie Barral, “Conservation, Finance, Bureaucrats: Managing Time and Space in the Production of Environmental Intangibles,” *Journal of Cultural Economy* 14, no. 5 (2020): 549-563.

“Diagram showing the implementation of the no-net loss principle through conservation banking in the USA,” adapted from the original by Stéphanie Barral, featured in “Conservation, Finance, Bureaucrats: Managing Time and Space in the Production of Environmental Intangibles,” *Journal of Cultural Economy* 14, no. 5 (2020).



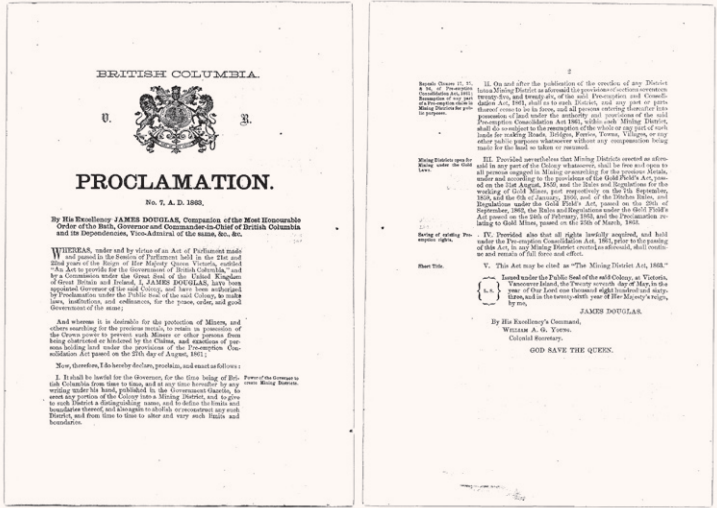


Law

# Pre-emption

British law played an important role during the settlement of the Americas, legitimating Anglo claims to territory where land was—and is—inhabited by non-Anglo peoples. During the nineteenth century in Canada, the British colonial government used the legal reasoning of pre-emption to justify the enclosure of land. In her critical study of this doctrinal transformation, legal scholar Brenna Bhandar shows how pre-emption became a primary means of enclosure in British Columbia, establishing a settler economy based on appropriating the sovereign territories of Indigenous peoples.<sup>1</sup>

Although not explicitly formulated in racial terms, the earliest law was embedded in racial and patriarchal regimes of ownership. According to the first Proclamation of British Columbia of January 4th, 1860, “all unoccupied and unreserved and unsurveyed land” was declared open to pre-emption. Derived from British common law, this doctrine of pre-emption enabled white settlers to acquire property titles on the condition that they settle and improve the land. This doctrine also relied on a juridico-theological concept of “good faith,” to articulate an expectation that settlers should act in an honest and virtuous manner towards Indigenous peoples. Yet while the law explicitly stated that Native villages and settlements were off limits, white settlers regularly laid waste to these homelands to ensure they would become available for pre-emption. Bhandar thus reveals how **the right of pre-emption helped legitimate the violent theft of land by the bona fide settler who expropriated land in “good faith.”** Even in a place where the law recognized the presence of Indigenous peoples, it still legitimized the enclosure of



James Douglas. Mining District Act, 1863. John Keenlyside Legal Research Collection. RBSC-ARC-1300-13-115



Members of the Nisga'a Land Committee, photograph, 1913. Nisga'a Lisims Government

land as if it were raw and uninhabited, by marshaling oaths and allegiance to justify dispossession.

This strategy continues to unfold on Canadian soil today, even if the law might seem to have lost its theological aura. Seemingly outmoded notions of pre-emption and good faith remain a cardinal point in struggles over land to this day.<sup>2</sup>

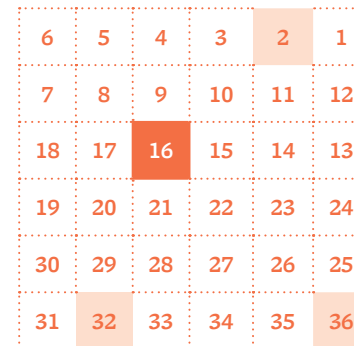


Washington Elementary School, photograph, late nineteenth century. Shiloh Museum of Ozark History

1. Brenna Bhandar, *Colonial Lives of Property: Law, Land, and Racial Regimes of Ownership* (Durham, NC: Duke University Press, 2018); Brenna Bhandar, "Conversations on Architecture and Land in the Americas: Land, Law, Labor," recorded February 3, 2023 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, [https://youtu.be/Ggh\\_urgZCCQ](https://youtu.be/Ggh_urgZCCQ).
2. See, for instance, the 1997 ruling of *Delgamuukw v The Queen* in which the Chief Justice proclaimed: "[T]he Crown is under a moral, if not a legal, duty to enter into and conduct those negotiations in good faith. Ultimately, it is through negotiated settlements, with good faith and give and take on all sides, reinforced by the judgments of this Court, that we will achieve what I stated in *Van der Peet* to be a basic purpose of s. 35(1)—"the reconciliation of the pre-existence of aboriginal societies with the sovereignty of the Crown."

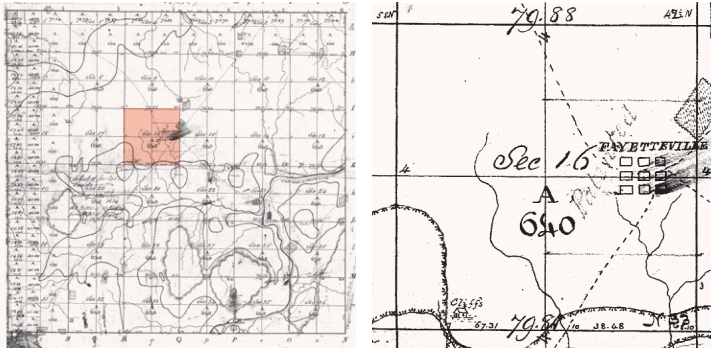
## Exceptions

The Land Ordinance of 1785 established a Cartesian system for surveying territory in the United States, a system that made land compatible with the mechanisms of free exchange. Since that time, the American landscape has almost exclusively been identified with uniformity, repetition, and abstraction. Embedded within the Jeffersonian grid, however, was a recurring exception. Known as Section 16, it designated that the sixteenth section of each township was to be used in support of public education. While this anomaly might initially appear to contribute to the public good, these one-square-mile sections of land held in trust by the state complicated the way in which land was valued, because it gave rise to the coexistence of two radically different temporal horizons.



1 MILE

Diagram showing sections reserved for education within a 36-square-mile area; initially section 16 was reserved, in early states; subsequently, sections 16 and 36, or sections 2, 16, 32, and 36, were reserved in later states. Diagram adapted from Lincoln Institute of Land Policy, *State Trust Lands in the West* (2016)



Section 16 of Township 16, Little Rock, Arkansas, survey plat, 1831.  
 General Land Office Records, Bureau of Land Management

The Jeffersonian grid atomized the U.S. territory into interchangeable bits of property that could move between different owners. What Section 16 hoped to accomplish was to “freeze” particular zones of the grid by claiming them as state trust lands in perpetuity (along with the revenue they continually generated). As a regulatory mechanism, it pushed back against the inherent instability of a real estate market based on private property and individual self-interest by taking this land out of the usual settlement patterns and mining it for the public good. But in doing so, the federal government created an internal tension, between the permanent setting aside of some land, on the one hand, and the implied fungibility of other land, as a commodity, on the other.

State trust lands were thus intricately connected with the logics of the market from which they were ostensibly exempted. Proving the rule of unintended consequences, state trust lands have become entangled in a larger question of whether or not the liberal state can induce people to put their trust in governance.

## Bureaucracy

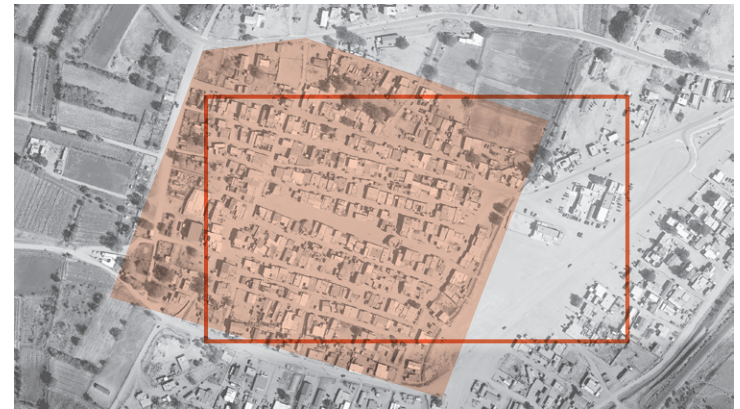
That a staggering two-hundred thousand people within U.S. Indian Country are currently homeless means federal investment in tribal housing is urgently needed. Yet because these areas are under the jurisdiction of the U.S. Department of Housing and Urban Development, any planning has to go through a federal mechanism that fundamentally encroaches on Indigenous self-government. Architects working alongside Indigenous groups are leveraging planning bureaucracies to assert community values and support their ongoing stewardship of their environment—even when this means wrestling with the borders delimiting Native from settler governments. Since tribe and housing rely on two radically different modes of belonging, land is constantly redefined, in tribal housing development, by the conflict between indigenous and colonial knowledge.

Internal frontiers go a long way back. The alternated land ownership pattern known as checkerboarding was devised in the nineteenth century as a federal tool for promoting railroad development. Federal and private companies split the land bordering the tracks following a numbered grid, appropriating even- and odd-numbered plots respectively. Railroad allotments added to relocation acts and treaties that fragmented the large territories inhabited by Indigenous communities. They served to delineate the borders between Federal and Indigenous jurisdiction, shrinking the survival spaces of already displaced communities and prompting them to adopt Western forms of private property. Subsequent institutions have reinforced the settler state’s spatial and social architecture by deploying paternalistic forms of

governance through trusts and reservations. In tribal housing developments today, land dispossession is perpetuated through regulated neglect and bureaucratic processes that reassert state control.

Working with Kewa Pueblo communities in northern New Mexico, architect Joseph Kunkel notes how the historical village's federally recognized boundaries failed to accommodate indigenous histories of the built environment.<sup>3</sup> Their new survey makes visible the misalignment between what the community has historically deemed to be their village and the National Historical Boundary now cutting through their houses. Since the early twentieth century, these same communities have largely sustained themselves by producing traditional objects for sale. While these art-making practices allow for cultural expression, the traditional stone-grinding techniques used in their production also release overwhelming volumes of microparticles, bringing poor air quality into Indigenous peoples' homes. Harnessing federal funds to return control of dwelling spaces to local communities, Kunkel uses collaborative design methods to remedy this health hazard by separating well-ventilated maker spaces from domestic ones. The proposed housing schemes acknowledge the customary production of hand-formed pottery and shell bead necklaces while reversing a history of contamination by design.

3. Joseph Kunkel, "Conversations on Architecture and Land in the Americas: On Trust Land," recorded February 24, 2022 at the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY, video, <https://youtu.be/jW0deFq9Uiw>.

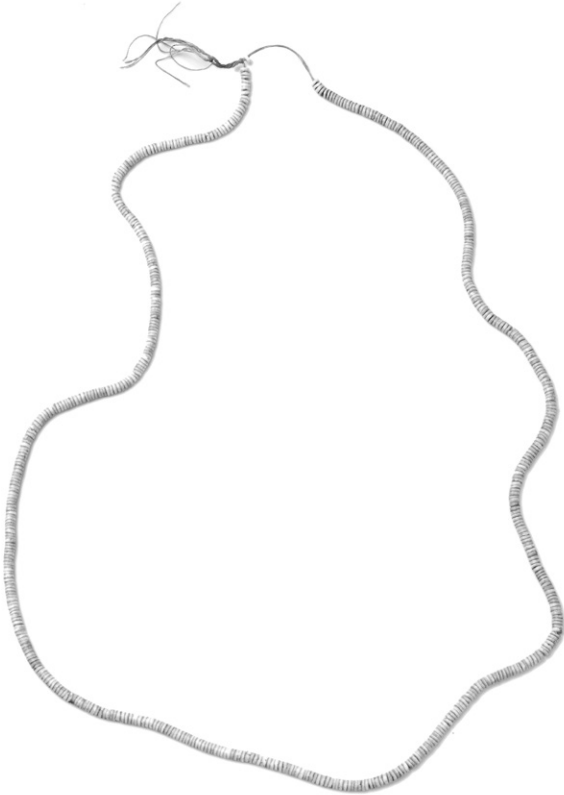


Map illustrating the national historic boundary as declared by the National Park Services (red line), and the historic boundary as stated by the community of the Santo Domingo Pueblo, New Mexico, also known as Kewa Pueblo (shaded area), (2021). Diagram adapted from map by Joseph Kunkel, MASS / Sustainable Native Communities Design Lab



Workshop space in Wa-Di Housing Development, 2018. Photograph AOS Architects.

## Antiquities



Gift of Harriet C. Cushman, 2000. Courtesy of the Peabody Museum of Archaeology and Ethnology, Harvard University, 2000.23.50

During colonization campaigns in the United States, white explorers were consistently drawn to natural landmarks that could grant meaning to the land they surveyed. But the ways they assigned cultural, religious, political, and even historical meaning to landscape in the Americas irrevocably failed to understand the knowledge and life systems that stewarded this “nature.”

In the early twentieth century, the U.S. government sought to settle the contested values ascribed to natural and human-made environments through conflation. On September 24, 1906, President Theodore Roosevelt proclaimed Devils Tower in Wyoming the first “national monument” as part of the Antiquities Act.<sup>4</sup> This 867-foot-tall monolith was formed through the underground cooling of magma that entered sedimentary rock layers approximately 40 million years ago. As the sedimentary rock eroded over the course of the next 30 million years, the magma slowly became exposed. Native Americans who inhabited the region long before white settlers arrived referred to this geological formation as “Bear’s House.” A late nineteenth-century expedition led by Colonel Richard Irving Dodge ostensibly misinterpreted the indigenous name to mean “Bad God’s Tower.”

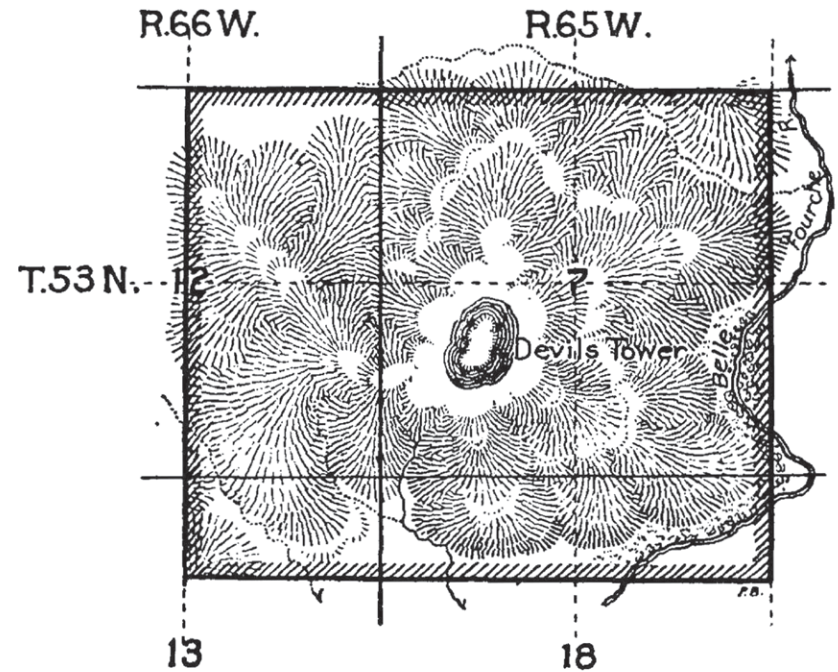
The Antiquities Act subsequently inscribed Devils Tower into a square that was determined by the Public Land Survey System. In trying to give greater definition to the monument, the map reveals the irreconcilability between the Cartesian logic of the grid and the complex formation of the natural landscape. The square is indifferent to the curved topographic lines that spill out from its boundaries. The square represented the most

recent layer of human history imposed onto the long geological history of the site.

During the late nineteenth and early twentieth centuries, Indigenous peoples were forcibly removed from these territories, so that the experience of a sublime, untouched wilderness could be offered for consumption to a predominantly white leisure class, eager to get in touch with nature and to forge a connection to “their” nation’s deep history.

These two contradictory modes of representing land evidence a more general tension between categories of nature and culture in the Antiquities Act.

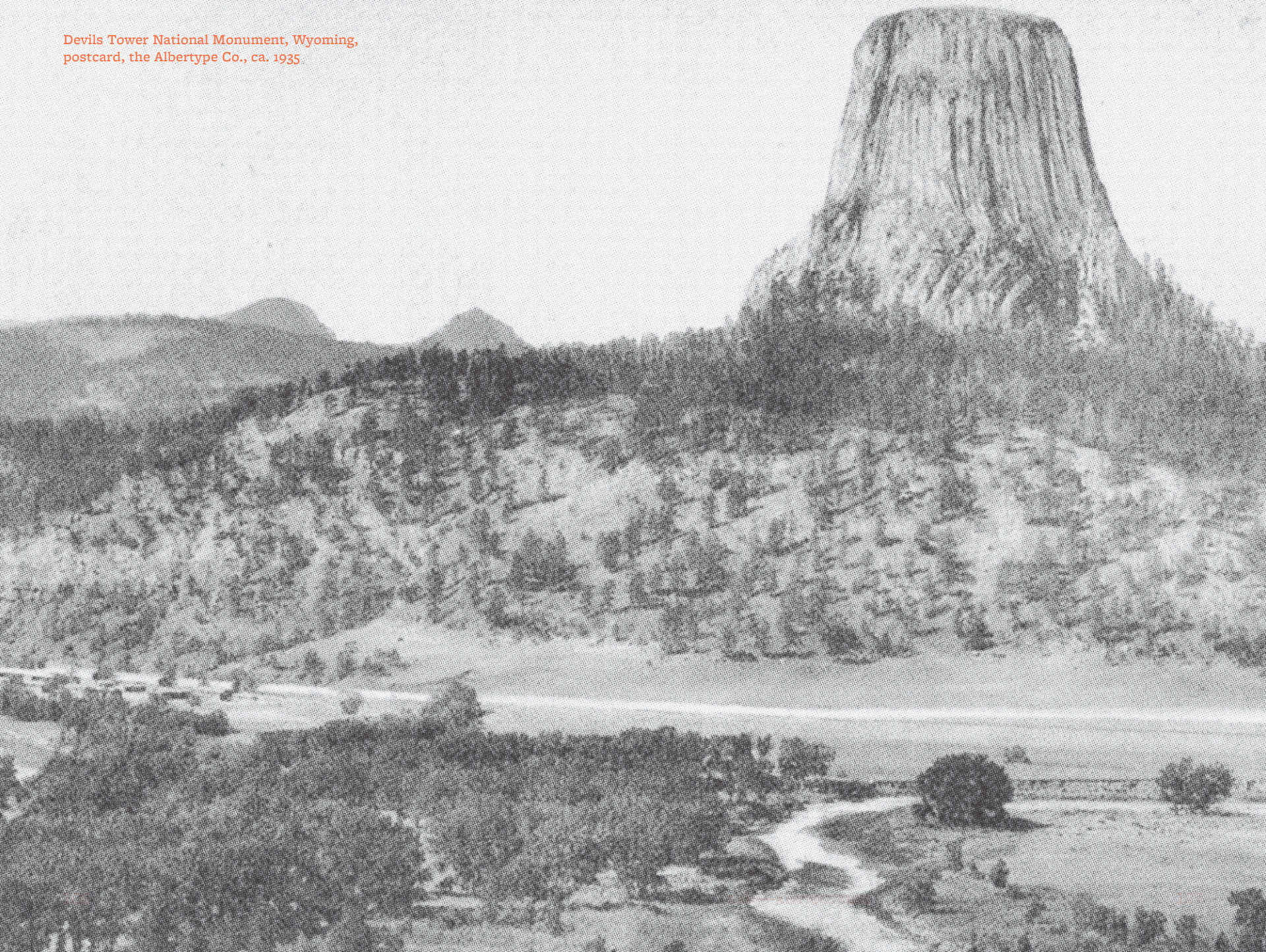
To declare Devils Tower a “national monument” was the outcome of the Romantic cult of nature turning back onto itself, forcing land formations into an anthropocentric imaginary.



Thomas Alan Sullivan, *Proclamations and Orders relating to the National Park Service up to January 1, 1945* (Washington, DC: U.S. Department of the Interior, 1947)

4. The archive of this entry is currently under investigation by architectural scholar Catherine George Weilein for the Temple Hoyne Buell Center for the Study of American Architecture at Columbia University, New York, NY.

Devils Tower National Monument, Wyoming,  
postcard, the Albertype Co., ca. 1935.





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Land precedes architecture: this is one of the basic assumptions underlying building culture today. But this assumption rests on a fictional vision of land as an available surface, “a piece” of which has to be secured before anything can be designed or built. This fiction plays a key role in the life of frontier nations. It is particularly essential to the history of architecture and settlement in the United States.

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