Ways of Knowing Cities

Editors
Laura Kurgan &
Dare Brawley

with Isabelle Kirkham-Lewitt

Publisher
Columbia Books
on Architecture and
the City

Ether and Ore: An Archaeology of Urban Intelligences

Shannon Mattern

120

We are, in many regards, living in exceptional times. Yet few of the transformations and revolutions we've witnessed over the past three years have seemed progressive. We have a petulant baby in the Oval Office. The Cold War has returned. Evils and neuroses long thought buried have resurfaced. Walls and moats, fists and firebombs are our diplomatic tools. Science is suspect. If anything, we've been living through a populist lesson in historiography: history certainly is not a unidirectional march of progress.

With so much hope lost on the national front and in the global community, many have invested in the *city* as a potential locus of progressive action: the sanctuary, the bulwark of sustainable practices, the place where mayors and municipal institutions can make a difference. And they can do so thanks in part, ostensibly, to efficient algorithmic governance, empirical data-driven endeavors, and their commitment to digital equity, civic tech, and open data initiatives.

Yet in some cases, despite our broader historiographic reckonings, the proponents of these programs—particularly their corporate partners—practice a willful amnesia. Narratives of innovation and disruption depend upon a convenient disregard for the past—or a marshaling *of* that past to rewrite a history that positions their work as its apotheosis. Thus our contemporary ways of knowing cities rely to some degree on deliberate, if perhaps subconscious, forms of *un*knowing or revisionism.

But there's a rich material body of precedent to draw upon. Cities, including many far afield from our contemporary data hubs and R and D labs, embodied networked smarts and forms of ambient intelligence well before we implanted sensors in the streets.[1] Yesterday's cities—even our earliest human settlements—were just as smart, although theirs was an intelligence less computational and more material and environmental. For millennia, our cities have been designed to foster "broadcast"; they've been "wired" for transmission; they've hosted architectures for the production and distribution of various forms of intelligence and served as hubs for records management; they've rendered themselves "readable" to humans and machines; they've even written their "source code," their operating instructions, on their facades and into the urban form itself. They've coded themselves both for the administrative technologies, or proto-algorithms, that oversee their operation and for the people who build, inhabit, and maintain them.

Acknowledging these histories is more than just a rarefied academic concern. There is more at stake here than historiography. Systems of knowledge are inscribed in the built world. And these knowledge regimes are often shaped, contained, preserved, and distributed through the prevailing media technologies of their time. Technologies inform and are informed by urban epistemologies—and together they're made manifest in the material city: "technology mediates the ways that knowledge, power, and culture interact to create and transform the cities we live in."[2]

And we're not just talking about modern computational technology, as many media historians and urban and cultural historians have acknowledged. Archaeologists can also tell us a lot about the history of the city as a mediated environment—and, furthermore, they can expand our understanding of what has the potential to serve as a medium or even what constitutes urban data. Archaeologists have found communicative potential in brick walls, stone structural elements, dirt mounds, bone tools, and even cities writ large. By

examining how cities themselves have served as media (and how they've been mediated) across time, we'll see how media materialize in and through urban practices and processes—how they are the products of their urban environments and their human creators and users—and how those urban processes themselves are agglomerations of various media: stones and bones, streets and circuits, plazas and people.[3]

I invite you to join me in digging backward in time to examine how various historical—or what we might reductively call "old"—media forms have been given *urban* form: how their logics and politics and aesthetics have scaled up into the city. Let's start with some relatively recent technological resonances. Since the mid-nineteenth century, many cities' atmospheres have been charged with electric and electromagnetic telecommunications: telegraph and telephone wires and radio waves.[4] New communication systems remade cities around themselves: they incited the erection of new towers and broadcast buildings— from grandiose structures shrouded in mythology to humble shacks—and they frequently darkened the streets with their tangle of wires. While the city offered up a vast listening public and consumer base for broadcasters and service providers, the *material* city presented both material opportunities and barriers to their operation: its skyscrapers may have been ideal perches for antennae, but they also impeded the signals' dissemination.

Frank Lloyd Wright and Le Corbusier imagined that these new technologies would transform urban morphology, allowing for greater decentralization. Yet many historians suggest that those telecommunications technologies had both centripetal and centrifugal effects: concentrating businesses near the telecom exchange buildings, where customers could quickly access financial data and avoid signal attenuation, while also allowing for the dispersion of manufacturing and shipping facilities. They permitted company employees to settle along the streetcar lines, where they were only a phone call away from the downtown business office. There's even some speculation that the phone made the skyscraper a functional place of business: without a mediated means of communicating between floors, we would have needed countless bays of elevators to shuttle messengers delivering memos by foot. So many elevators, in fact, that they would have eaten up the floor plate.

Architectural historian Emily Bills argues that even Los Angeles—whose sprawl has been so often attributed to cinema and cars—owes its morphology to the telephone, which she calls "the first form of infrastructure to efficiently and effectively bind the greater Los Angeles area into a comprehensive multi-nucleated whole."[5] While early telephone networks, organized in a hub-and-spoke model, connected the city's downtown to its outlying agricultural areas, they didn't connect those agricultural communities to each other. Farming communities and growers' associations needed to share information with each other about weather, harvests, freight, and other business concerns—so they created their own phone lines, and communities grew around them. Farm-grown phone networks thus seeded Los Angeles's further decentralized development.

We might say that telecommunications' topology of derricks and switches and wires and exchanges reflected a market epistemology—a way of knowing and activating the city to facilitate the dissemination and operationalization of business information and to satisfy new domestic and commercial telecom customers. Of course, this market-driven way of knowing the city isn't new: the fact that the

Fig 1: Radio tower, Schenectady, New York. From Frederick E. Drinker and James G. Lewis, *Radio: Miracle of the Twentieth Century* (Washington, DC: National Publishing, 1922), i. © Underwood & Underwood.
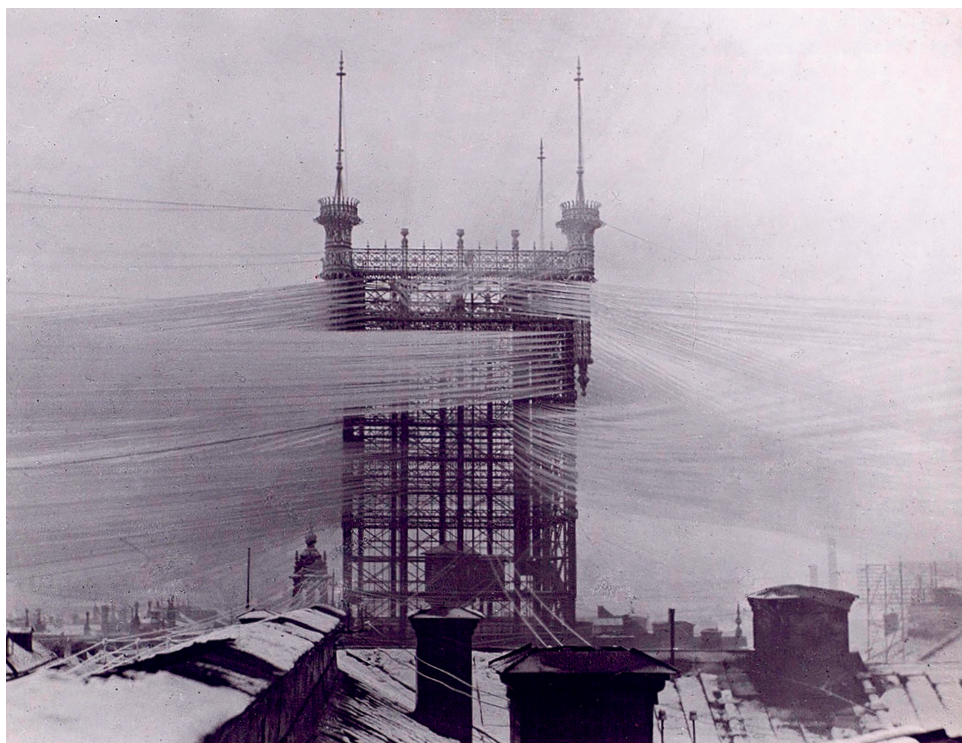
Fig 2: Stockholm telephone tower, circa 1890.
Courtesy of Tekniska museet.

city has served as a mediated space of exchange—of goods and services and information—has long impacted its material form and its inhabitants' lives.

New technologies exposed those inhabitants to new sensory experiences: new ways of listening in public, new ways of knowing their cities through *sound*. Brian Larkin writes about the arrival of colonial radio in Nigeria in the 1940s; loudspeakers installed outside the emirate council office, the public library, the post office, and other public places brought music and words, uttered in British accents, intended to win Nigerians over to the "power and promise of modern life."[6] For centuries, in the Islamic world, the call to prayer and, more recently, recorded sermons have resounded—mixing with the urban din, providing a means of spiritual orientation for the faithful, and, particularly in spiritually diverse cultures, inciting debates over spatial and sound politics. After centuries of dispute over the heights of minarets and the position of the muezzin who issues the call, some cities, responding to complaints of noise pollution, have decreed that those calls be broadcast via radio rather than cast into the urban air.

The urban infrastructures of telecom have proven themselves quite adaptable, retrofitable, for an Internet age and a terrain of connected devices. The new topologies of ethereal cellular communication and arrays of connected things still rely on networks of wires and poles and other material (often metal) gadgets. Our bodies can flow through the city streets with "seamless" coverage, never suffering a lost connection, because of a byzantine assemblage of hardwired antennae bolted to rooftops and facades, knit together with millions of seams, beaming imperceptible but still very much material waves at all that

SECTIONAL VIEW OF A
TELEPHONE BUILDING

A Typical American Central Office Building, Showing the Efficient Arrangement of the Various Departments
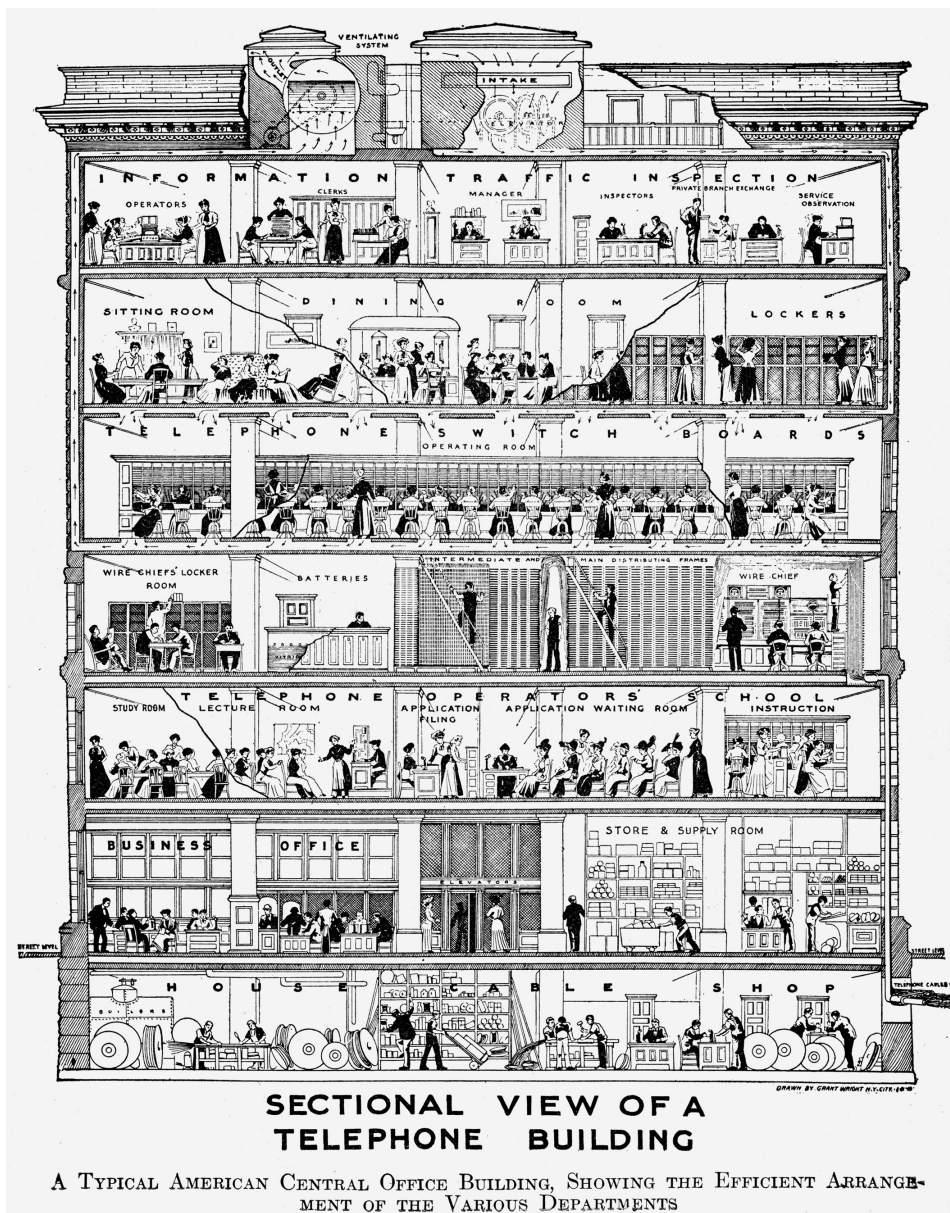
Fig 3: Sectional view of a telephone building, circa 1900. From Henry Chase Hill, *The Wonder Book of Knowledge* (New York: J. C. Winston, 1921).

populates the streets below. We inhabit a data space defined by various levels of intersecting protocols that direct our connections, facilitate or close off access, and thus subtly shape the geographies—both informational and physical—we are then able to explore.

Amid such indecipherable, proprietary, and even exploitative co-optations of the electromagnetic spectrum, we find some communities staking a claim to their own frequencies. While pirate radio was particularly prevalent in the 1960s,

Fig 4: Rooftop pirate radio transmitters in London. Still from a short documentary by Palladium Boots for its Exploration film series. "London Pirate Radio," YouTube, March 25, 2015, https://www.youtube.com/watch?v=1E0yqCPd5PY. © VBS.IPTV.

we see today, around the world, a resurgence of low-powered radio: resolutely local stations, often committed to homegrown music and to community news that, in conflict zones, become a lifeline. Even these informal broadcasts still rely on the city as an infrastructure. As Matthew Fuller writes of London's tower blocks: "The thicker the forest of towers, the more antennae perched above the city, the more the Radiant City, botched, radiates."[7] In such "botched" cities, where so much of the world's population lives, pirate radio sounds out the disjuncture, mismatch, time slippage, grafting, and hacking that characterize urban survival. The city might be "botched" or "broken up," as Fuller says, but still, it resounds. Improvisatory *resounding* and *listening* constitute its way of knowing. Wired or unwired, concentrated or dispersed, smooth or striated, the media city hums as it has for millennia.

Let's turn back the clock. Whereas today some governing bodies find it more efficient and convenient to delegate the work of listening and decision-making to the machine—allowing an algorithm to impartially churn through the ethical and moral dimensions of governance—such matters of computation were once matters of deliberation or decree.[8] Cities have historically provided space (either deliberately or accidentally) for the verbal articulations of democracy or dictatorship and for the vocal and bodily performances of public demonstration. Through archaeoacoustics, we can understand how ancient Athens's law courts, stoas, and auditoriums, each with their own geometry and materiality, cultivated orators' delivery and their audiences' engagement. Even the philosophers' "ideal city" itself often called for a particular infrastructure for the exchange of information: Aristotle prescribed a city that would contain no more people than could hear a herald's voice. Archaeologists and classicists, in seeking to understand how the Roman forum functioned acoustically as a space for speech and pageantry, have acknowledged that their own ways of knowing these ancient cultures rely on much more than the verbal script, as did the ancients' means of

engaging with the content of a proclamation or a eulogy. These were multisensory affairs. The forum and other public spaces "created a formal tableau" that assigned status to different sensory experiences: the smells of bodies and food, the heat of the sun, the visual and textural cacophony of statuary, and the epigraphy that covered those public artworks and buildings.[9]

Despite both ancient and contemporary planners' attempts to create cities as spaces of formal and visual order and acoustic harmony—spaces known through reason and rationality—we also know our cities to be terrains of cacophony and, at times, productive chaos. Voices of demonstration and collective dissent have long punctuated urban soundscapes, transforming streets and squares into resonance chambers for protest—places where counterepistemologies are produced. The particular material properties of those urban gathering spaces and their codes of operation also inform how collectives form and how voices are heard. Sites of infrastructural convergence are symbolically rich, often reinforcing the political messages of the people demonstrating there. But gatherings also often coalesce in underutilized, marginal spaces—*terrains vagues*—where, Saskia Sassen argues, threatened and otherwise "invisible" groups can "become present to themselves" and to others unlike them.[10]

In 2004, when the Nepalese civil war prohibited the public gathering of large groups of people, artist Ashmina Ranjit choreographed a procession of black-clad performers, directing them to walk silently in pairs through the streets of Kathmandu. In the procession, one member of each pair would drop to the ground in feigned death; the other would draw her outline in chalk. While the performers did not speak, some carried radios broadcasting cries and wails across all FM stations and the state-owned Radio Nepal: "Recorded and transmitted through the radio," Laura Kunreuther explains, "the sounds of mourning"—"mothers' sobs" symbolically lamenting the violence and loss in rural villages—"were transposed and remediated from their usual familial setting to a public, national one… The anonymity of crying became a means to create the *sense* and sensibility of public cohesion." It was a cohesion built from the convergence of broadcast and architectural acoustic infrastructures.[11]

Jane Webster notes that "individuals at all levels of ancient Roman society"—including slaves—made literary and nonlinguistic figural inscriptions, both painted and carved, on the city's surfaces.[12] These inscriptions have long served to codify architectural functions, proclaim power, mark territory, evoke beliefs, profess allegiances, direct ritual, announce laws, and identify those who are welcome and unwelcome. The Islamic world has a particularly rich epigraphic tradition. "In a largely aniconic culture"—that is, one that forbids the creation of images of sentient beings—Yasser Tabbaa explains, "public inscriptions were by necessity one of the primary visual means of political and religious expression and one of the few ways for a dynasty to distinguish its reign from that of its predecessor."[13] The aesthetic properties of those public texts—their color, materiality, and form—have played a key role in how and what they communicate. These scripts function haptically rather than merely visually. For instance, the floriated Kufic script, sometimes ornamented with gold and glass mosaic, was "deliberately ambiguous": it was both boldly visible and incomprehensible, seemingly inclusive and transparent but ultimately obfuscatory.[14] This urban code was thus encrypted.

Roman and Islamic inscriptions—an early form of urban markup, we might say—were often encoded on the humblest of geological substrates. And today

Fig 5: Epigraphy near the Qalawun complex,
Cairo, 2009. Photograph by Christopher Rose.

many urbanites have come to recognize that even their seemingly immaterial digital media are resolutely material—that their virtuality and seeming artificiality are dependent upon natural geologic components—copper, coltan, tungsten, silicon. Urban history manifests this entanglement: mud and its material analogues (clay, stone, brick, concrete) have supplied the foundations for human settlement and forms of symbolic communication, and they have bound together our media, urban, architectural, and environmental histories. Some of the first writing surfaces, clay and stone, were the same materials used to construct ancient city walls and buildings, whose facades also frequently served as substrates for written texts. The formal properties of those scripts—the shapes they took on their clay (or, eventually, parchment and paper) foundations— were also in some cases reflected in urban form: how the city molded itself from the materials of the landscape. Written documents have always been central to the operation of cities: their trade, accountancy, governance, and culture.

Think of all the other print-based forms of urban media that embody urban epistemologies and that "program" the material city: newspapers and their columns; filing cabinets and the enormous file of the skyscraper itself; early architectural treatises and their prescription of particular, repeatable spatial forms; "legible" building facades and urban forms; and libraries full of books. These media represent entire chapters of technological and urban history that we simply don't have time to explore here—but they, too, profoundly impact the way cities are designed, built, administered, experienced, and understood. We've been predicting a paperless era for decades, but print is still here: independent bookstores are experiencing a renaissance, our cities host vibrant niche publishing cultures, and the exchange and display of print materials in public spaces affords many urban dwellers a means of carving out a commons amid increasing corporatization and "platformization."

As we focus increasingly on digital and data-driven media technologies, it's important to recognize that cuneiform tablets and epigraphy are data too. That the old and the analog are still present and active. They are, as Raymond Williams explains, "residual": "formed in the past but still active in the cultural process, not only and often not at all as an element of the past, but as an effective element of the present."[15] We're still talking and listening and reading and writing and printing and filing. Our cities, past and present, mediate between various manifestations of intelligence—legal codes and copper cables, inscriptions and imaginaries, algorithms and acoustics, public proclamations and system protocols. They're both old and new, clay and code. A city that *knows* its dependence on both ether and ore is better equipped to accommodate temporal entanglement and epistemological plurality. And more capacious, historically attuned *ways of knowing* our cities—and of generating and operationalizing urban intelligences—produce cities that are ultimately much smarter, or *wiser*, than the sum of their intelligent parts.

SHANNON MATTERN is a professor at the New School for Social Research. She is the author of *Code and Clay, Data and Dirt* (University of Minnesota Press, 2018), *The New Downtown Library: Designing with Communities* (University of Minnesota Press, 2017), and *Deep Mapping the Media City* (University of Minnesota Press, 2015). She also contributes a regular long-form column about urban data and mediated infrastructures to *Places Journal*. You can find her at wordsinspace.net.

1   This paragraph is adapted from Shannon Mattern, *Code and Clay, Data and Dirt: 5000 Years of Urban Media* (Minneapolis: University of Minnesota Press, 2017), xi.

2   I draw here on the description of the conference that inspired this volume of essays: "Ways of Knowing Cities," Columbia University, February 9, 2018, https://www.arch.columbia.edu/events/816-ways-of-knowing-cities.

3   Mattern, *Code and Clay*, xxiv.

4   Much of the next seven paragraphs is adapted from Mattern, *Code and Clay*, chapter 1.

5   Emily Bills, "Connecting Lines: LA's Telephone History and the Binding of the Region," *Southern California Quarterly* 91, no. 1 (Spring 2009): 28.

6   Brian Larkin, *Signal and Noise: Media, Infrastructure, and Urban Culture in Nigeria* (Durham, NC: Duke University Press, 2008), 50.

7   Matthew Fuller, *Media Ecologies: Materialist Energies in Art and Technoculture* (Cambridge, MA: MIT Press, 2005), 15–16.

8   Much of this paragraph and the next is adapted from Mattern, *Code and Clay*, chapter 4.

9   Diane Favro and Christopher Johanson, "Death in Motion: Funeral Processions in the Roman Forum," *Journal of the Society of Architectural Historians* 69, no. 1 (March 2010): 15.

10   Saskia Sassen, "Does the City Have Speech?," *Public Culture* 25, no. 2 (April 2013): 217.

11   Laura Kunreuther, "Democratic Soundscapes," *Avery Review* 21 (January 2017), http://averyreview.com/issues/21/democratic-soundscapes.

12   Jane Webster, "Less Beloved: Roman Archaeology, Slavery, and the Failure to Compare," *Archaeological Dialogues* 15 (June 2008): 118. Much of this paragraph and the next is drawn from Mattern, *Code and Clay*, chapter 3.

13   Yasser Tabbaa, *The Transformation of Islamic Art during the Sunni Revival* (Seattle: University of Washington Press, 2001), 54.

14   Yasser Tabbaa, "Review of Islamic Inscriptions by Sheila S. Blair; Writing Signs: The Fatimid Public Text by Irene A. Bierman; Islamic Ornament by Eva Baer," *Ars Orientalis* 29 (1999): 182.

15   Raymond Williams, *Marxism and Literature* (New York: Oxford University Press, 1977), 122.