

A City Is Not a Computer

A City Is Not a Computer: Other Urban Intelligences

Shannon Mattern

Published by Princeton University Press
Princeton and Oxford
in association with *Places Journal*

Copyright © 2021 by Princeton University Press

Princeton University Press is committed to the protection of copyright and the intellectual property our authors entrust to us. Copyright promotes the progress and integrity of knowledge. Thank you for supporting free speech and the global exchange of ideas by purchasing an authorized edition of this book. If you wish to reproduce or distribute any part of it in any form, please obtain permission. Requests for permission to reproduce material from this work should be sent to permissions@press.princeton.edu

Published by Princeton University Press,
41 William Street, Princeton, New Jersey 08540
In the United Kingdom: Princeton University Press,
6 Oxford Street, Woodstock, Oxfordshire OX20 1TR
press.princeton.edu

Back cover illustration: Christoph Morlinghaus, *Motorola 68030*, 2016

All Rights Reserved

ISBN (pbk.) 978-0-691-20805-3

ISBN (e-book) 978-0-691-22675-0

British Library Cataloging-in-Publication Data is available

Designed and composed by Yve Ludwig in Akkurat and Chronicle

Printed on acid-free paper. ∞

Printed in United States of America

10 9 8 7 6 5 4 3 2 1

Public Knowledge

For millennia libraries have acquired resources, organized them, preserved them, and made them accessible (or not) to patrons. Libraries have had to at least comprehend, and in some cases become, a key node within evolving systems of media production and distribution. Consider the medieval scriptoria where manuscripts were produced, the evolution of the publishing industry and book trade after Gutenberg, and the rise of information technology and its webs of wires, protocols, and regulations.¹ At every stage, the contexts—spatial, political, economic, cultural—in which libraries function have shifted, so that they’re continuously reinventing themselves and the means by which they provide those vital information services.

Libraries have also assumed a host of ever-changing social and symbolic functions. They’ve been expected to symbolize, through their collections and physical space, the eminence of a ruler or state or city, to integrally link knowledge and power—and, more recently, to serve as “community centers,” “public squares,” or “think tanks.” Even those seemingly modern metaphors have deep histories. The early Carnegie buildings of the 1880s were community centers with swimming pools and public baths, bowling alleys, billiard rooms, even rifle ranges, as well as, of course, book stacks.² As Andrew Carnegie’s funding program expanded internationally—to more than 2,500 libraries worldwide—secretary James Bertram standardized the design in his 1911 pamphlet “Notes on the Erection of Library Buildings,” which offered grantees a choice of six models, believed to be the work of architect Edward Tilton.³ Notably, they all included a lecture room.

Around a decade ago we started seeing the rise of a new metaphor: the library as “platform,” a term that refers to a base upon which developers create new applications, technologies, and processes.⁴ As we saw in chapter 2, the platform metaphor has more recently migrated to cities, too, in the form of “platform urbanism,” and to economics, in the form of “platform capitalism.”⁵ In an influential 2012 article in *Library Journal*, technologist David Weinberger proposed that we think of libraries as “open platforms”—not only for the creation of software but also for the development of knowledge and community.⁶ Weinberger argued that libraries should open up their entire collections, all their metadata, and any technologies they’ve created, and allow anyone to build new products and services on top of that foundation. The platform model, Weinberger wrote, “focuses our attention away from the provisioning of resources to the foment”—the “messy, rich networks of people and ideas”—that “those resources engender.”

We might say that the ancient Great Library of Alexandria, part of a larger museum with botanical gardens, laboratories, living quarters, and dining halls, was a *platform* not only for the translation and copying of myriad texts and the compilation of a magnificent collection but also for the launch of works by Euclid, Archimedes, Eratosthenes, and their peers. Contemporary libraries are platforms for book clubs, seniors’ support networks, and podcasting teams. Their fabrication labs and makerspaces are platforms for the production of architectural models or rudimentary robots or, during the COVID-19 pandemic, personal protective equipment for undersupplied medical staff. Their small business incubators are platforms for local entrepreneurs. Their auditorium stages are platforms for local authors, musicians, playwrights, and dancers.

As Dale Leorke and Danielle Wyatt write in *Public Libraries in the Smart City*, one of few studies that links the two themes, libraries are “increasingly positioning themselves as innovation hubs of the new economy, supporting entrepreneurial activity and the skills required to thrive in a digital future.” In recent

years they've deployed sensors to monitor visitor flows, robots to retrieve materials from storage, RFID tags to track book circulation, and machine learning to add metadata to digitized collections. I used to receive countless invitations to webinars exploring how the blockchain would revolutionize libraries (I'm glad this phase has passed). Libraries are "being conscripted into smart city narratives," which has both "reinforced and revitalized" their importance to their cities and "imposed new expectations and pressures." Leorke and Wyatt provide examples from Singapore, Australia, and Scandinavia, where libraries have been explicitly written into their cities' or nations' "smart city" or national digital infrastructure initiatives (figs. 24 and 25). They're meant to support "lifelong learning" as citizens retool for an expanding digital knowledge economy, to introduce patrons to new technologies, and to facilitate their interactions with increasingly automated government services (officials in Wichita thought they might use the libraries to allow patrons to interact with new smart city tech, like gunshot detection sensors—yikes!) (fig. 26).⁷

The platform metaphor has limitations. For one thing, it smacks of Silicon Valley entrepreneurial epistemology, which prioritizes "monetizable" "knowledge solutions"—in other words, intellectual property. Media scholar Tarleton Gillespie points out that the elastic character of the term "platform" in the tech world—it's simultaneously structural, computational, and political, and it connotes openness, neutrality, and egalitarianism—makes it easily marketable. Platforms promise all things to all stakeholders, yet they're infused with the prejudices of their creators.⁸ Just as the Dewey Decimal System embodies the ideology of its creator (Dewey was a notorious racist, sexist, and anti-Semite), so do Facebook, Reddit, and Signal.⁹ Further, the platform's contemporary association with digital media tends to bracket out the similarly generative capacities of low-tech, and even *nontechnical*, library resources and services.

Finally, "platform" evokes a particular structural vision: a flat, two-dimensional stage on which resources are laid out



24. Helsinki Central Library Oodi, Helsinki, Finland, exterior.

25. Helsinki Central Library Oodi, Helsinki, Finland, top floor.



26. Technology Petting Zoo, Austin Public Library, Austin, Texas.

for users to *do stuff with*. The platform—like the dashboard interface—doesn’t have any implied depth, so we’re not inclined to look beneath it or behind it, or to question its structure or logics. We look to the truth on the screen without examining the data, algorithms, code, and cables that produce that truth. This is precisely the sort of uncritical thinking that facilitates the spread of misinformation, the adoption of technical fixes for social ills, the fetishization of computational models, and the embrace of a robust dashboard as the epistemological apotheosis. Contrary to Weinberger’s recommendation, we need to pay attention not only to the “foment”—the “messy, rich networks of people and ideas” that take shape on an institutional or technical platform—but

also to its “provisioning of resources”: how those resources are created, sourced, organized, stored, and made available to us.

I propose instead that we look at the library as an infrastructure—one that can, and should, play a central role in theories and practices of digital urbanism. Thinking about the library as a network of integrated, mutually reinforcing, evolving infrastructures—in particular, architectural, technological, social, epistemological, and ethical infrastructures—can help us better identify what roles we want our libraries to serve, and what we can reasonably expect of them.¹⁰ What ideas, values, and social responsibilities can we scaffold within the library’s material systems: its walls and wires, shelves and servers? In this chapter we’ll consider how the library functions both as a knowledge infrastructure and a social infrastructure—one that provides critical services, especially for those marginalized populations who are either irrelevant to or criminalized by the smart city’s all-seeing sensors and all-knowing databases. We’ll examine how public and academic libraries do, or could, play important supplemental or adversarial roles in cities powered by proprietary technological platforms and monitored by automated surveillance networks. Can we build digital and material infrastructures that allow a library to serve simultaneously as an epistemological scaffolding, access provider, infrastructure manager, privacy trainer, material culture conservator, data trust, zone of digital security, champion of open-access materials and sustainable public-interest technologies, and space of social connection and inclusion?

The Need for Institutional Scaffolding

In Toronto, the public library system was recruited into the Sidewalk Toronto plan about halfway through the design process as a means of quelling concerns about data collection and privacy. The Toronto Region Board of Trade proposed that the library, a trusted, neutral third party, could host the development’s data as part of a Toronto Data Hub. Library spokesperson Ana-Maria

Critchley told the *Star* that the library was a fitting and willing partner: “Public libraries are defenders of digital privacy and have expertise in data policy and information management.” Yet “given the complexity of the issues and the expertise and consultations that would be required to inform the work,” she said, the library “would absolutely require extra resources.”¹¹ Critchley’s caveat reflects the complicated roles, and compromised positions, libraries often hold in this new age of digital media and networked urbanism. Libraries can support their cities (and the municipalities’ corporate tech partners) in expanding digital access, promote digital skills and critical digital literacies and environmentally sustainable practices, and facilitate the launch of start-ups and other forms of digital entrepreneurship. As in the cases of Singapore and Toronto, libraries can also serve as an ethical concession, a smokescreen, in otherwise controversially invasive, oppressive, discriminatory digital governance and urban development projects. Yet in order to serve such roles, libraries in most parts of the world would “absolutely require extra resources.”

Two decades ago, when I was researching my first book, I traveled around the United States to visit dozens of new libraries designed to serve as anchors for civic life, urban development, and social connection for a multigenerational public facing a wave of new digital media. In more recent years I’ve had the pleasure of visiting spectacular new and renovated library buildings, from Seoul to Helsinki, that support a range of activities—reading, listening, gaming, eating, coding, quilting, physical computing—in spaces designed to foster vibrant interactions between people, media, ideas, and their material environments (Those reading patios in Austin! Those tech labs in Helsinki! That view of the Dublin Bay from the Dún Laoghaire Library reading room! [figs. 27 and 28]). Yet outside Scandinavia and Singapore—and a few other regions of the world that guarantee generous support for public infrastructure—libraries, despite their vibrancy, are often underresourced in both operations and maintenance. When the roof leaks, the HVAC system is on the fritz, and there’s only one functional electrical outlet in the



27. Reading patio, Austin Public Library. Lake Flato Architects and Shepley Bulfinch.

28. Reading Room, dlr LexIcon, Dún Laoghaire, Ireland. Carr Cotter & Naessens Architects.

whole branch, it's hard to imagine finding the time and resources to manage a data hub.¹² This is in part why libraries figure into so few smart city narratives.

The 2008 and 2020 economic crises exacerbated the institution's challenges. Austerity measures in the UK precipitated the closure of almost eight hundred libraries between 2010 and 2020, and in the United States, privatization led to the diminishment of many other urban social services, whose responsibilities often then fell on the laps of librarians—while their own budgets declined and open hours were constricted.¹³ On any given day, a public librarian is likely serving teachers and students in public schools with no libraries of their own, facilitating GED classes and job-training programs for unemployed patrons, hosting story hours and discussion groups, responding to dozens of reference requests, helping their communities sift through a rapidly expanding morass of misinformation, coordinating morning activities for seniors and afterschool agendas for kids with working parents, and offering various means of support for the homeless, the mentally ill, and other marginalized communities. Librarians in many cities and towns are trained to administer Narcan to counteract opioid overdoses, and during the 2020 pandemic, librarians in San Francisco and Phoenix were reassigned to help with COVID-19 contact tracing. Imagine the noncomputational, embodied intelligences required to juggle such a range of responsibilities.

Given what we know about the epistemological limitations of the city-as-computer mode of thinking, the myriad forms of urban intelligence that don't lend themselves to datafication or "entrepreneurialization," and the threats posed by oppressive, discriminatory urban technologies, librarians could be staking out a more productively adversarial position in relation to the surveillant, extractive smart city. As an institution that has long been committed to patron privacy, and one that is increasingly embracing principles of digital justice, libraries can—and must—position themselves as "spaces of exception" to exploitative digital urbanism. Frequently romanticized as "oases" amid

urban clamor and commercialization, libraries are perhaps instead more like “special epistemological zones” (kind of like less devious, less capitalist “special economic zones”) that resolutely embody *unsmart* knowledge politics and uphold the ideals of inclusion, equity, and justice above efficiency, convenience, profit, and the tangle of compromised values undergirding capitalism in its various permutations: racial, platform, surveillance capitalism, and so forth.¹⁴

Particularly in the wake of the COVID-19 pandemic and the Movement for Black Lives uprisings, libraries—both public and academic—need to continually reflect on their commitments to justice and inclusion. At last count, in 2017, 87 percent of American librarians were white.¹⁵ Stories of patrons and librarians facing discrimination or hostility for their race, class, sexual identity, or disability are not uncommon.¹⁶ How might the institution build physical and social infrastructures that scaffold more inclusive collections, services, and values?

To begin, libraries need to reevaluate their ideological relations to the tech and publishing industries they depend on for “content,” software, and hardware, and to the increasingly technologized and privatized governments who fund them—all of whom regularly make decisions that undermine core library values and put segments of their patrons at risk. They can choose materials, contract with vendors, and build systems that embody different values. They can model a principled critique of the novelty and innovation that pervade commercial media and consumer culture. Perpetual pursuit of the new, after all, promotes materialistic acquisitiveness, planned obsolescence, environmental irresponsibility, superficial analysis, and aesthetic capriciousness, and it legitimates a form of what some might call “cancel culture.” While “keeping current”—being up to date, learning relevant skills—is a valuable goal, it’s important to place that pursuit in a larger cultural, political-economic, pedagogical, and institutional context: What knowledges and ethics are we aiming to cultivate here? What kind of communities and societies are we building? What ends does “currency” serve?

Library as Knowledge Infrastructure

Let's imagine libraries that are robustly and reliably funded, positioned as a critical infrastructure, as a city's core of public knowledge. Imagine what a library could be if it, rather than a police dashboard or an urban operating system, were taken as the quintessential emblem of urban intelligence. How might libraries consciously construct knowledge infrastructures that double as an ethical scaffolding—one that encompasses the inclusive range of urban intelligences that we discussed in chapter 2?¹⁷

Our library would, of course, feature media in a range of formats, each with its own recognized affordances. In most of the new libraries I've visited in the past decade, books, the modern library's mainstay, are prominently displayed. The stacks themselves are often a central architectural feature, or their aesthetic treatment—open, accommodating, suffused with warm light—is symbolic of the institutional ethos. Most institutions prioritize open access and offer furniture, fenestration, and lighting to ensure that patrons can choose the environmental conditions in which they physically and mentally engage with resources. The management of those materials, however, might rely on high-tech logistical systems, as is the case with the New York and Brooklyn public libraries, whose shared “floating” collection moves between the systems' branches based on demand via the BookOps distribution facility in Queens, and the off-site storage facility in Princeton, New Jersey, which serves Princeton, Harvard, and New York University, as well as the research libraries of the New York Public Library (NYPL) (fig. 29).¹⁸ Even though most libraries are now acquiring more digital than physical resources, particularly after the 2020 pandemic, their material collections still often exceed their shelf capacity—and shared collections and off-site storage are among the tech-enhanced means of sharing those resources among multiple institutions within a geographic region.

How these materials are acquired is as important as how they are displayed and managed. Libraries can make ethically driven choices about what “content” they procure and which



29. RECAP Storage Facility, Princeton, New Jersey.

vendors they contract: they can choose (or not) to support small, local, minority-owned independent presses; large corporate publishers with restrictive e-book lending policies; university presses that emphasize open access; copyright-conservative, paywall-heavy publishers like Elsevier, who are known to charge fifty dollars for a single-day article rental; or conglomerates like Thomson Reuters and RELX, huge media and publishing conglomerates who also happen to be major data brokers for US law enforcement.¹⁹ In 2019 the University of California cut ties with Elsevier because of its exorbitant costs and restrictive access policies. Procurement is political—both in the police department, as we saw earlier, and in the library.

Collection development can prioritize forms of media and types of knowledge that resist standardization and metrics, that might stymie standard classification schemes, that might not hold traditional forms of “value,” and that most likely can’t be parsed by a machine. Zines and comics often share the shelves with codices, and special collections are often given pride of place. The Brooklyn Public Library (BPL) and many other institutions feature the work of local authors and manage large local history collections.²⁰ I remember taking my “Data Archive Infrastructure” class on a behind-the-scenes tour of the BPL, where we encountered the “morgue”—the expansive clippings collection—for the *Brooklyn Eagle*, the defunct local paper once edited by Walt Whitman, in its full, yellowed, analog glory. And while take-out menus might seem to be an invasive print species, always sneaking into our mailboxes and under our doors, the NYPL collects historical menus that offer windows onto local culinary, cultural, business, and design history, and that can also serve as proxies for tracing immigration history and the movement of ethnic enclaves around the city. Family photos, films, and ephemera also collectively tell a community’s story; many libraries invite patrons to bring their scrapbooks and shoeboxes to the library, where they can learn how best to digitize that material, which they can then share with relatives and neighbors *and* contribute to the “community digital archives” at the library.²¹

Uptown from where the NYPL’s menu collection resides at Forty-Second Street, the Schomburg Center for Research in Black Culture houses manuscripts, archival records, rare books, moving images, recorded sounds, photographs, prints, and artworks that capture African American, African Diaspora, and African experiences; it’s also home to the singular Lapidus Center for the Historical Analysis of Transatlantic Slavery. The Schomburg is an institution of international value and repute, but it encompasses forms of knowledge that have played profound roles in shaping its neighborhood, Harlem, and city. I’ve written elsewhere about dozens of such collections of Black intellectual and cultural heritage, both “official” libraries and

“fugitive” collections, which often consciously transgress institutional conventions, operating outside the demands placed on (or imposed by) state-supported and commercial institutions.²² We find similarly transgressive knowledge politics in Vancouver, at the Xwi7xwa Library, which stewards indigenous knowledge and culture, ensuring that indigenous epistemologies and philosophies are represented in the collection and its classification, as well as in the materials’ manifestation in the library building, and their activation through programs and services.²³

The methods of engagement and analysis a library then permits its patrons to practice *on* those media are themselves representative of a politics of knowledge: who gets to make it, and how. Digital humanities labs, conservation labs, and media forensics labs enable readers, listeners, and viewers to deploy a variety of technologies in analyzing these media both as texts and as material objects—both of which can provide insight about the places, people, and ideas they represent. At the Andrew Heiskell Braille and Talking Book Library in New York, assistive technology coordinator Chancey Fleet works with a tactile graphics embosser and 3-D printer to make tangible models of visual materials—maps, architectural drawings, diagrams, and so forth—which serves to translate resources into new modalities for greater accessibility.²⁴ And at the new Greenpoint Library and Environmental Education Center in Brooklyn, which my “Anthropology and Design” class toured while it was still an active construction site, green roofs and other sustainable building systems transform the space itself into an object lesson—a demonstration of the environmental knowledge patrons encounter in the collection and in programmed events.

Of course, with all these new tools and activities come new spatial requirements. Library buildings must incorporate a wide variety of furniture arrangements, lighting designs, acoustic conditions, and indoor-outdoor spaces to accommodate multiple sensory registers, modes of working, postures, and more. Librarians and designers have been acknowledging—and designing *for* rather than designing *out*—activities that make noise

and can occasionally be a bit messy.²⁵ In other words, there's greater recognition that knowledge is embodied, situational, and irreducible to computational form.

Some of the more unorthodox elements of the library's program have benefited from intellectual framing and local contextualization. In the early 2010s it seemed that every library felt compelled to add a makerspace, yet those institutions didn't always have a clear sense of why such a facility supported their mission. It simply felt obligatory—a compulsory “platform” for rebranding the library and marketing it as freshly relevant in an age that demanded digital fluency. Since then, many librarians, critical technologists, and scholars have examined the gender, racial, and class dynamics of the maker movement, as well as the neoliberal, turn-your-hobby-into-cash assumptions undergirding some maker ideology, and they've compellingly reframed these library labs as sites of knowledge production and community activism.²⁶ At the Bubbler in the Madison Public Library in Wisconsin, for instance, the staff work with local teachers to weave media production and computational fabrication into thoughtfully conceived lesson plans (fig. 30). Their Making Justice program, organized in collaboration with juvenile justice agencies, engages more than five hundred at-risk youth in creating “graphic and 3D art, photographic, spoken word, storytelling, performance, and video projects documenting themselves, their communities, and the justice system.”²⁷

“Consuming” all this media requires thoughtful framing too. Few librarians would look at information as an off-the-shelf commodity. It's not merely “content” to be promoted via a “platform” for instant likes. It's not “data” to be fed into a “dashboard,” thus producing an objective visualization. Instead, librarians have long embraced critical information literacy, which involves examining resources to better understand how they're produced, presented, and valued, and how the institution of the library itself—its political history, its classification systems, its institutional structure, and so forth—shapes the ways that knowledge acquires and represents power.²⁸ We can



30. As part of the Whoopensocker elementary residency program, youth from the Bridge Lake Point Waunona Neighborhood Center make zines at the Bubbler in the Madison Public Library.

supplement information literacy with media literacy, which examines how information or knowledge (recall our discussion in chapter 2 of the distinction between these terms, and why it matters) is given form; and data literacy, which encourages patrons to think about data's provenance—its origin, custody, and ownership (and the very fact that data *are made* rather than simply, passively extracted from the world). Such issues are rarely addressed on a dashboard. Then there's algorithmic literacy, which proposes that we should be aware of how algorithms shape everything from our search results to our Amazon

recommendations to who is deemed “high risk” by a policing platform or mortgage broker, and infrastructural literacy, which encourages us to think about the cables, satellites, and modes of distribution through which information reaches us (and bypasses marginalized populations). Finally, digital justice adds an ethical imperative to our critique: it reminds us that the above questions are not merely of academic concern but a matter of access, participation, ownership, and power—particularly for disenfranchised communities.²⁹ It’s important that we explore these various lenses of analysis in the library, because they’re needed in the greater world too.

Librarians can bring these critical questions to bear in guiding patrons through the selection and analysis of resources—or the creation of new ones. You’ll recall that the Toronto Public Library was invited to serve as a data hub for the Sidewalk project. That relationship never panned out, but some libraries do serve as repositories, or trusts, for their cities’ public data. Prepared with the aforementioned critical frameworks, librarians and their patrons can together *curate*, or care for, data more responsibly, too, so those data respect the lives and environments they represent, and so they can ultimately prove more useful for members of the local community. As Trevor Owens, the head of digital content management at the Library of Congress, told me a few years ago, libraries could become a “kind of middle ground for civic data initiatives. That is, the libraries should be spaces where anyone can learn about the data that are being collected about them, or about their communities, and also learn how they can use those data themselves and have a voice in how they are collected, managed, and used.”³⁰ The Pittsburgh-based Civic Switchboard project has heeded this call: they work with various communities to establish their local libraries as “data intermediaries,” connecting data publishers, data users, and other members of the local data ecosystem (e.g., universities, nonprofits, community organizers, etc.), who then join forces to “enhance data quality, provide feedback mechanisms to publishers, and build tools that enable broader data use.”³¹

These various literacies can be modeled in a consultation over the reference desk. There are several organizations and initiatives dedicated to preparing librarians to discuss these critical concerns with their patrons. The Library Freedom Project, for instance, is a partnership among librarians, technologists, attorneys, and privacy advocates that offers workshops on surveillance threats and privacy rights, responsibilities, and strategies.³² The Digital Privacy and Data Literacy Project (DPDLP) “teaches NYC library staff how information travels and is shared online, what risks users commonly encounter online, and how libraries can better protect patron privacy.”³³ The DPDLP wanted to translate its pedagogy for patrons, too, and it decided to experiment with a new modality: an exhibition. In 2018, in partnership with the Metropolitan New York Library Council, New York City’s three library systems, and the Mayor’s Office of the Chief Technology Officer, my colleagues Greta Byrum, Erin Davis Anderson, and I commissioned ten local artists to create site-specific artworks in branch libraries distributed throughout the boroughs of New York City. The artists’ work—which included an installation about race and surveillance, a workshop inviting teenagers to deconstruct the logics of targeted advertising, a series of tech liberation protest signs, and a Wi-Fi-blocking Faraday cage—reached out to communities that are often digitally marginalized and at risk of harm from predatory surveillant systems (fig. 31).³⁴ The Mozilla Foundation’s Glass Room, which I’ve visited in New York with my students, and again in Berlin, operates on a similar premise: it adopts an Apple store aesthetic to display “art, design, and tech objects that explore data, privacy, and our relationship with the technologies and platforms we use in our everyday lives” (fig. 32).³⁵ Quite a few of the public and academic libraries I’ve visited have dedicated gallery space, which allows them to feature artwork from the community, thus recognizing these aesthetic forms as critical components of local knowledge. Or they can use the space for participatory and pedagogical projects, like those I’ve described here, that support the informational mission of the institution.



31. Mimi Onuoha, *The Protest We Never Had*, Gravesend Library, Brooklyn, New York. *Privacy in Public* exhibition, December 1, 2018 through February 1, 2019.

32. The Glass Room, a pop-up tech literacy exhibition, curated by the Mozilla Foundation and the Tactical Technology Collective, New York, 2018.

Many libraries also include facilities and supplies for communities to make media of their own: from film and recording studios to printing workshops to computer and citizen science labs. Oodi in Helsinki, which opened in late 2018, boasts enviable production facilities. As local newspapers are bought up and summarily gutted by publishing conglomerates and private-equity firms—precisely the kinds of businesses that make bloodless, “data-centered” decisions—some mastheads are revived in their local libraries.³⁶ University libraries often encompass their university presses, infusing the publishing enterprise with their capacious appreciation for multiple forms of knowledge production, their prioritization of access, and, in some cases, an appreciation for experimentation with the *forms* in which knowledge is materialized and distributed.

In short, librarians can cultivate collections and contract with vendors to ensure that their stacks and servers are stocked with data, information, and knowledge that reflect the breadth of intelligences in their communities. Those materials all represent a particular politics of knowledge too. Who gets to make knowledge, and what forms does it take? How is it stored and classified, and what systems of valuation are implied in those decisions? Who gets to access it, and how? These are questions one doesn’t typically *get* to ask when adopting a totalizing urban operating system or a monopolistic vendor’s “knowledge base.” That’s why any library operating in productive resistance to technosolutionist platform-think must recognize that procurement and collection development are responsibilities of the highest epistemological and political significance.

Yet, of course, that content is shaped and distributed through various technologies: routers and readers, audio players and collection viewers, annotation devices and captioning tools and dashboards and the like. Rather than always relying on proprietary commercial tools with stringent user restrictions and little concern for the privacy of their users’ data, some libraries build their own tools. The now-defunct NYPL Labs,

the Harvard Library Innovation Lab, the Library of Congress's LC Labs, the State Library of New South Wales's DX Lab, and tech teams embedded in many university libraries all build public technologies to facilitate the discovery, analysis, and dissemination of knowledge.³⁷ In recent years funders like the Ford and New America Foundations have supported work on public-interest technology (which some folks regard as simply a rebranding of what used to be called "civic tech"), which is designed to serve the public good rather than secure a profit.³⁸ As tech policy analyst Mutale Nkonde emphasizes, public-interest tech always attends to the "asymmetrical power systems that lead to the weaponization of technological systems against vulnerable communities," and it aims to minimize those harms.³⁹

Architect and cartographer Laura Kurgan, computer scientist Lydia Chilton, and data journalist Mark Hansen at Columbia University are engaged in a long-term process to develop public-interest technologies for libraries; they're particularly interested in developing tools that counter the logics of surveillance and data extraction, and that support librarians' work in connecting their most vulnerable patrons to information resources and social services.⁴⁰ Similarly, technologist and former BBC executive Matt Locke has envisioned a "Public Media Stack." He wonders: How would our digital networks look and function differently if they *weren't* funded by venture capital and focused on likes and hits and attention-grabbing, polarizing content? What if, instead, they were designed to foster discovery and critical analysis?⁴¹ Locke held his first summit at the Metropolitan New York Library Council (where I was board president between 2019 and 2021), which suggests that libraries could play a role in envisioning and supporting such a system.

It's important to acknowledge that those alternatives can be modest—local, contextual, scaled to suit the needs and knowledge of particular communities. My friend and colleague Greta Byrum, with whom I curated the *Privacy in Public* exhibition across New York City's libraries, is a community networks expert who collaborates with marginalized and disenfranchised

groups, especially those who live in areas that are too remote, or not sufficiently profitable, to be attractive to commercial internet service providers. Through extensive fieldwork and highly participatory, iterative design, Byrum and her colleagues in Community Tech NY work closely with their partners to design networks that embody the values of the community. Their work “looks beyond the goal of simply connecting people to the internet to ask how purpose-built and community-defined technology can contribute to well-being and resiliency”—how connectivity might allow neighbors to organize and address issues like unemployment and environmental health problems, and to share local knowledge. “Libraries are so often the most critical digital infrastructure in places where we work,” Byrum told me, “both because they provide access to technology, and also because they offer digital support and resources in a safe and trusted environment. . . . Our central community technology principle is to fit technology to our human relationships, not the other way around—and we work with libraries because they already embody and model this in practice.”⁴²

Many of the principles underlying Byrum’s work mirror those informing the Detroit Digital Justice Coalition, who themselves draw inspiration from the “Principles of Working Together,” developed at the 1991 People of Color Environmental Leadership Summit. Those principles link digital access to other forms of social, environmental, and housing justice: they espouse common ownership, alternative energy, recycling and salvaging, and the use of technology to “promote environmental solutions.”⁴³ Knowledge infrastructures, they acknowledge, are about so much more than information; they’re part of a larger ecosystem of access and equity. Many librarians have explicitly taken up the issue of environmental justice, asking how their collections, services, and facilities, and even their institutional practices—including material storage and data retention—can promote environmental resilience.⁴⁴ As Byrum’s work demonstrates on a microscale, and as Locke’s aspirations demonstrate at the macroscale, we need to understand how our libraries

function *as*, and as *part of*, infrastructural ecologies—as sites where spatial, technological, intellectual, and social infrastructures shape and inform one another. And we must consider how those infrastructures can embody the epistemological, political, economic, and cultural values that cities and communities want to define themselves, rather than those imposed by a commercial platform or oppressive state.⁴⁵

Library as Social Infrastructure

Basic community information needs are often drawn into relief precisely when they're not met. By mid-March of 2020 most American libraries had shut their doors (fig. 33).⁴⁶ Some cities still circulated physical materials, either via a “contactless” pick-up system or bookmobile (fig. 34). And while their reading lounges, cafés, and media labs sat empty for a few months, librarians rushed to move as many of their services and programs online as possible: from children’s story hours and author talks to ESL classes and reference services. As Harvard librarian John Overholt proclaimed on Twitter, “There is nothing at all contradictory about believing that libraries are essential to a healthy democratic society and believing that physical access to library collections is not essential in the midst of a deadly pandemic.”⁴⁷ Nearly all libraries enhanced their electronic offerings, promoting their public domain resources and in some cases drawing on “emergency libraries” or benefiting from vendors’ temporarily lenient copyright allowances. Some wondered if the crisis would give public institutions new leverage in their long fight against corporate publishers’ and media companies’ exploitative rights management restrictions.

E-book circulation soared. Librarians curated digital collections of trusted health information to help their patrons filter out the studies that had not been peer-reviewed and the conspiracy theories. They compiled reading lists on pandemics and self-care and, come June, after the murder of George Floyd in Minneapolis, they added bibliographies on the legacies of



33. Muhlenberg Branch of the New York Public Library, closed during the COVID-19 lockdown, June 2020.

34. A contactless book pick-up system at the Bull Run Library, Manassas, Virginia, June 2020.

racism and white supremacy. When it became clear that governments and tech companies were planning to harvest users' health and geolocation data for the purposes of contact tracing, some digital privacy advocates called for data collectives and data trusts to ensure that the public determined how their data would be governed and used. The International Federation of Library Associations and Institutions advocated that libraries play key advocacy and educational roles on these matters. Facing a concurrent unemployment crisis, libraries also enhanced their online career resources and job-search services. Meanwhile, some librarians called their senior patrons at home to check in, while their buildings became distribution centers for meals or child-care centers for frontline workers.

As schools, doctors' offices, and other workplaces moved online, a segment of each community found itself without the proper services or equipment to stay connected—and thus without the means to submit homework assignments or file for unemployment. Some of those folks hung out in library parking lots and on their front stoops, catching errant Wi-Fi. In some cities, librarians loaned out hotspots and laptops, or they dispatched Wi-Fi-equipped bookmobiles to “digitally redlined” neighborhoods. In other cities, they referred patrons to local community tech networks. In still other places, Digital Navigators, supported by the National Digital Inclusion Alliance, provided one-on-one tech support to digitally marginalized residents, helping them find affordable home internet service and computer equipment, and offering crash-course digital skills tutorials by phone. Just imagine trying to trace all these high-touch, ad hoc operations on an emergency-response dashboard in some space-age control center.

“Never before did people need access more—in a day and age where the government is requiring more and more to happen online—than during a pandemic,” Linda Johnson, president of the Brooklyn Public Library, told the *Markup*. “It’s a true perfect storm: the deprivation is more extreme than ever, and the need is higher.”⁴⁸ The director of Toledo’s libraries, Jason Kucsma,

suggested that this storm compelled libraries to consider just how elastic their mission could be: “Libraries have picked up a lot of the work to fill the gaps, but . . . communities will realize that there are very big gaps in how we met [their] basic needs. . . . We are here to serve our communities in ways that make sense but we cannot be everything to everyone.”⁴⁹

This isn’t the first time we’ve celebrated the library’s versatility and dependability—and simultaneously feared for its exhaustion. Libraries took on the role of community refuge, switchboard, and dispatch center during the 2011 earthquake in Japan and again during Hurricane Sandy in New York in 2012. Even in noncrisis situations, people turn to libraries to access the internet, take a GED class, get help with a résumé or job search, seek referrals to other community resources, and to escape the summer heat or winter cold. As the Center for an Urban Future (CUF) found in their multiyear study of New York City’s branch libraries, public libraries are often seen as “opportunity institutions,” opening doors to, and for, the disenfranchised.⁵⁰ In their influential 2013 report, CUF highlighted the benefits to immigrants, seniors, individuals searching for work, public school students, and aspiring entrepreneurs: “No other institution, public or private, does a better job of reaching people who have been left behind in today’s economy, have failed to reach their potential in the city’s public school system or who simply need help navigating an increasingly complex world.”⁵¹ And few institutions are asked to take on such a wide and expanding list of demands without a proportionate increase in budget.

When I visited the San Francisco Public Library in 2003, I recall many staff members expressing consternation over the building’s public restrooms. The central library’s location in the Tenderloin district made it accessible to the city’s sizable homeless population, who often used the bathrooms to perform their daily ablutions—or to lock themselves away in solitude for an hour or two. The staff was sympathetic but torn. The institution, like so many of the other libraries I visited, was struggling to balance its obligations to patrons with varying degrees and kinds of needs.

Six years later—by which time the influx of technology firms had greatly exacerbated income inequality and housing shortages in the city—San Francisco added a social worker to its library staff. Leah Esguerra now coordinates a team of several formerly homeless individuals who serve as health and safety associates, and together they connect patrons to mental health and homeless services, help them find jobs and food, and offer referrals for substance-abuse counseling and legal support.⁵² Esguerra and her colleagues became a model for many other institutions, who now have outreach divisions that perform similar roles.

As library historian Wayne Wiegand addresses in *Part of Our Lives: A People's History of the American Public Library*, public libraries have been home to various social services—for immigrants, seniors, shut-ins, hospitals, nursing homes, schools, the disabled, and so forth—for more than a century.⁵³ Practicing librarians know this very well. Public health, urban planning, and community organizing researchers and practitioners have also long recognized the library's social role in the civic sphere. Some libraries have physically colocated with other city services: Seattle's Ballard branch includes a separate entrance for a "little city hall," and the Chicago Housing Authority and Chicago Public Library have collaboratively built three facilities that combine the two services. The renovated Martin Luther King Jr. Library in Washington, DC, is planning to include spaces for government agencies too.⁵⁴

In the 1960s, development economists began using the term "social infrastructure" to distinguish services and resources like education, research, physical health, and "psychic" well-being from such physical infrastructures as transport, communications, and utilities.⁵⁵ Much of my earlier work, including a 2014 article called "Library as Infrastructure," examines how libraries often serve as social infrastructural supplements to (and, at times, smokescreens for) urban development plans, and how the library's technological systems, physical space, intellectual mission, and social responsibility can reinforce or undermine one another. Today the idea of the library as a "social infrastructure"

is associated with sociologist Eric Klinenberg, who, in 2018, published a popular and widely celebrated book on the topic, *Palaces for the People*. This work builds on his 2002 book, *Heat Wave*, where he made the case that vital public culture in Chicago neighborhoods drew people out of sweltering apartments during the 1995 heat wave, and into cooler public spaces, thus saving lives.⁵⁶

While Klinenberg's work has set professional and policy agendas over the past several years, it overlooks a critical discussion about the *limits* of the social infrastructural mandate. Yes, we can and should celebrate the library for building vital social connections and welcoming all comers, but we also have to look at how the institution's physical infrastructures—its architectures, technical systems, staff capacity, and operating budgets—might limit its ability to continually accommodate an ever-diversifying program, one made even more complicated as unemployment rises and other social services and cultural resources are hobbled. At some point, we might need to acknowledge that we have stretched this program to its limit, and that no single physical infrastructure can effectively scaffold such a motley collection of social services. Journalist Anne Helen Peterson, inspired by Klinenberg's work, spoke with librarians about their expanding social mandate. Her interviewees echoed what I found in my fieldwork in 2003 and 2014: "libraries cannot fix . . . everything, and if we're being asked to fix everything, pay us appropriately."⁵⁷ Perhaps what we need instead, rather than an ever-more resilient and accommodating library and librarians, is a more robust ecology of social services—for mental health, education, restorative justice, housing, and so forth—each playing to its strengths and exploiting its staff members' specialized training (and each, as Angela Davis posits, also providing an alternative to mass incarceration).⁵⁸

We have to reckon, too, with the fact that this noble vision of a benevolent, egalitarian institution, however singular and celebration-worthy it might be, does not match all patrons' experiences. As we discussed earlier, libraries, like most institutions, are still grappling with legacies of racism, white supremacy,

colonialism, and ableism. The rosy vision doesn't match all staff members' contemporary experiences; some have suffered verbal or physical assault by mentally unstable patrons, or even coworkers. Some have been violently attacked, and others killed. Librarian Amanda Oliver notes that librarians carry extraordinarily heavy loads, which include attending to some people who "have been failed by society." Those folks, she says, commonly end up either in police custody or at the library. Yet rather than reinforcing a carceral regime in her own institution, she calls upon libraries to reallocate their security funds to "social workers, mental health crisis workers, de-escalation training and other supportive systems."⁵⁹ This is part of the responsibility that comes with being "free to all."

For Klinenberg, the built environment and spaces of public gathering are critical resources in social infrastructure; they "influence the breadth and depth of our associations," "promote civic engagement and social interaction," and "buffer all kinds of personal problems—including isolation and loneliness."⁶⁰

I agree: the library-as-physical-place is a powerful force in the public realm. But as our earlier discussion has shown, the physical is only one dimension of the library's infrastructural function. During the COVID-19 pandemic, we saw that virtual space was the primary medium through which the library performed its informational and social functions. Anthony Marx, president of the New York Public Library, wrote an op-ed for the *New York Times*, setting an agenda for the postpandemic library. At the top of his list: investing in "digital and virtual technologies and expertise."⁶¹ In order to serve its epistemological and social functions, the library needs to ensure that as many people as possible have access to appropriate technological infrastructure, both inside and outside the library walls.

Library as Ontological Infrastructure

The social depends on the technical. And in light of the entangled disruptions of 2020 and the broader intrusion of surveillant

and extractive technologies into the urban realm, it's imperative that we think carefully about how to build those public-interest technical systems and tools: how to use them as scaffoldings for social connection; how to integrate them into the built environment, whether our libraries or our homes or our cities' public spaces; how to design them such that they give material form to the epistemologies defining our institutions; and how to ensure that they embody the values of inclusion and justice. Nate Hill, executive director of the Metropolitan New York Library Council, is cautious about ensuring that these new tools focus on "systemic infrastructural issues and decades of technical debt"—including concerns about local knowledge and connectivity, privacy and resource-sharing—rather than entrenching and enabling the expansion of the library's program to encompass more and more social services.⁶²

Information studies scholar Safiya Noble has made frequent calls, often amid gatherings of librarians and other information professionals, for public alternatives to Google, Facebook, and the like. Mere *reform* of the systems we have, she suggests, won't cut it: "It's disingenuous to ask advertisers to change their business practices and expect them to operate like public interest information spheres or portals, because that's not what they were designed to do. What we need is greater investment by taxpayers in civic alternatives, which . . . would help us understand digital advertising platforms like Google, Facebook, and others, for what they are, rather than thinking of them as the public library, which they are not."⁶³

In fact, Noble argues, these commercial platforms are *inimical* to the public realm, not only because they abet the spread of conspiracy theories, violence, voter suppression misinformation, and prejudiced, dehumanizing content but also because their workforce lacks meaningful diversity and relies disproportionately on precarious labor; their business model depends on the expenditure of vast amounts of natural resources for their manufacture, distribution, operation, and disposal; and they rely on public roads and public post offices and benefit from publicly

educated employees while failing to pay taxes to support those resources. Their risk is infrastructural and epistemological: “These companies . . . play a key role in the decimation of shared knowledge and education as a public good. While we seek remedies [to our social ills] based on evidence and truth that can shape policies in the collective best interest, Big Tech is implicated in displacing high-quality knowledge institutions—newsrooms, libraries, schools and universities—by destabilizing funding through tax evasion, actively eroding the public goods we need to flourish.”⁶⁴

Noble is worth citing at length, and we’d be wise to heed her advice. She reminds us that *reform* is not sufficient for an irredeemably exploitative, extractive tech industry (and, similarly, not for a fundamentally broken criminal justice system, as many have argued). Instead, we need what Ruha Benjamin calls “abolitionist tools”—tools designed to “resist coded inequity, to build solidarity, and to engender liberation,” including perhaps new public-interest alternatives that could be stewarded through a robustly supported library system.⁶⁵

The library’s sociotechnical infrastructures—they’re always both, social and technical, simultaneously—have to serve multiple publics simultaneously too. Not only do they need to ensure access and security for the most disenfranchised communities in our cities and create the conditions of possibility for digital and social justice, but they also need to provide spaces of opportunity for those with resources to share, such as in Brooklyn, where local artists and designers teach classes at the library, or in some other cities, where tech-savvy teenagers volunteer their time to offer basic tech tutorials to seniors, while those seniors in turn contribute their life stories to youth-led oral history projects. The library’s privileged, skilled, and well-resourced users can bring their knowledge and talents to the library and offer them up as public services. They can also contribute to the ongoing development of the institution’s civic technologies and digital infrastructures. Many of these folks, well versed in critical information literacy, know what’s at stake: they’ve glimpsed

that technodystopian world built from the internet up—some of them may even have helped to build it—and now they want to imagine the world otherwise.

Following Noble's and Benjamin's leads, let's imagine an abolitionist world in which a portion of the funding that once propped up the prison industrial complex and our municipal data-extraction empires was redirected to where it would do the greatest good, and especially for the most marginalized populations—to social services and public infrastructures, like schools and libraries. Imagine those public infrastructures were further supported by appropriate taxation of commercial digital platforms and other corporations. Media scholar Ethan Zuckerman, in advocating for the creation of an auditable and accountable “digital public infrastructure,” reminds us that the post office—which, as I write this, in late 2020, is under grave threat in the United States—has, in some countries, historically had oversight of telecommunication and public broadcasting.⁶⁶ Perhaps we can learn from history and imagine a network of public infrastructures for the creation, storage, and dissemination of public knowledge: universities, libraries, broadcasting, print media, the postal service, telecommunications, local data intermediaries, and digital infrastructures working together, as a public epistemological ecology?

Until we get there, perhaps the library can still offer an otherwise, an *otherworld*, a space of exception to the commercially and carcally networked city—a city that, today, watches and tracks and scores and sorts, and metes out reward and punishment inequitably. We could develop “useful,” productive knowledge and equip ourselves to live critically and consciously among the automated digital systems, while also leaving room for slow and inefficient ideas, for the “unexpected, the irrelevant, the odd and the unexplainable.”⁶⁷ We could stare back at all the surveillance cameras and sensing technologies that are looking at us, reverse-engineer the algorithms that determine what bits and bodies rise to the top, question the technical protocols and legal policies that limit who has access to knowledge. Rather

than merely consuming data fed to us via platforms, we could recognize the deep and distributed infrastructures and human intelligences that scaffold our institutions of knowledge and program our values. We could acknowledge the biases and legacies of injustice that still suffuse those institutions, and work toward their abolition. We could reflect on the environmental impacts of our internet searches and streaming services, and work to develop practices and tools to minimize our ecological footprints. We could do all these things at the library—but not only here.

Rather than building an institution, or even a whole society, with venture capital and proprietary technical modules manufactured by Great Men—from Dewey and Carnegie to Zuckerberg and Andreessen—we could instead imagine communal spaces, public-interest technical systems, and social contracts that mutually reinforce one another and advance more inclusive and just epistemological and ethical values: a library that uses its infrastructures to care for, maintain, and build the rich diversity of public knowledges that already define our cities.⁶⁸

Maac, 3rd ed. (New York: CRC Press, 2010), 2347–60, <https://pages.gseis.ucla.edu/faculty/bates/articles/information.html>; and Rafael Capurro and Birger Hjørland, “The Concept of Information,” in *The Annual Review of Information Science and Technology*, ed. Blaise Cronin, vol. 37 (2003), 343–411, <http://www.capurro.de/infoconcept.html>.

52. Warren S. McCulloch and Walter H. Pitts, “A Logical Calculus of the Ideas Immanent in Nervous Activity,” *Bulletin of Mathematical Biophysics* 7 (1943): 115–33. See also Gualtiero Piccinini, “The First Computational Theory of Mind and Brain: A Close Look at McCulloch and Pitts’s ‘Logical Calculus of Ideas Immanent in Nervous Activity,’” *Synthese* 141 (2004): 175–325.

53. John von Neumann, *The Computer and the Brain* (New Haven, CT: Yale University Press, 1958).

54. Matthew Cobb, *The Idea of the Brain: The Past and Future of Neuroscience* (New York: Basic Books, 2020), x.

55. Robert J. Marks and Yuri Danilov, “Is What We Know About the Brain All Wrong?,” *Mind Matters*, September 20, 2019, <https://mindmatters.ai/2019/09/why-the-brain-is-not-at-all-like-a-computer/>.

56. K. S. Lashley, quoted in Magda B. Arnold, *Memory and the Brain* (Hillsdale, NJ: Lawrence Erlbaum Associates, 1984), 107.

57. Max Liboiron, “The Power (Relations) of Citizen Science,” CLEAR, March 19, 2019, <https://civillaboratory.nl/2019/03/19/the-power-relations-of-citizen-science/>; Gleb Raygorodetsky, *The Archipelago of Hope: Wisdom and Resilience from the Edge of Climate Change* (New York: Pegasus, 2018); Paola Rosa-Aquino, “To Share or Not to Share?,” *Grist*, November 21, 2018, <https://grist.org/article/indigenous-knowledge-climate-change-solution/>.

58. Shannon Mattern, “The Big Data of Ice, Rocks, Soils, and Sediments,” *Places Journal*, November 2017, <https://placesjournal.org/article/the-big-data-of-ice-rocks-soils-and-sediments/>.

59. Marcus Foth, Nancy Odenaal, and Gregory N. Hearn, “The View from Everywhere: Towards an Epistemology for Urbanites,” in *Proceedings of the 4th International Conference on Intellectual Capital, Knowledge Management and Organizational Learning*, Cape Town, South Africa, 2007.

60. Tom Verebes, “The Interactive Urban Model: Histories and Legacies Related to Prototyping the Twenty-First Century City,” *Frontiers in Digital Humanities* 3, February 2016, <https://doi.org/10.3389/fdigh.2016.00001>.

61. See, for instance, the work of Michael Batty. My original “The City Is Not a Computer”

article, which was published in 2017, served as the namesake and a source of inspiration for a 2018 class at MIT’s Department of Urban Studies and Planning, where designers and planners imagined how they might more critically integrate technology into their practice (Eric Huntley, “A City Is Not a Computer: Histories and Theories of the Computational City,” MIT Urban Planning, Fall 2018, <https://dusp.mit.edu/subject/fall-2018-11s195>). The students’ work was published at “The Data Plays for a Year,” 2018, <https://data.wrong.website/>.

62. Taeyoon Choi, “Hello, World!,” *Avant.org*, June 5, 2017, <http://avant.org/project/hello-world/>.

Chapter 3: Public Knowledge

1. See Matthew Battles, *Library: An Unquiet History* (New York: W. W. Norton, 2003); Lionel Casson, *Libraries in the Ancient World* (New Haven, CT: Yale University Press, 2001); Fred Lerner, *The Story of Libraries* (New York: Continuum, 1999).
2. Casson explains that when Alexandria was a brand-new city in the third century BC, its founders enticed intellectuals to the city—in an attempt to establish it as a cultural center—with the famous museum, “a figurative temple for the muses, a place for cultivating the arts they symbolized. It was an ancient version of a think-tank: the members, consisting of noted writers, poets, scientists, and scholars, were appointed by the Ptolemies for life and enjoyed a handsome salary, tax exemption . . . free lodging, and food. . . . It was for them that the Ptolemies founded the library of Alexandria” (33–34). On the Carnegie libraries, see Donald Oehlerts, *Books and Blueprints: Building America’s Public Libraries* (New York: Greenwood Press, 1991), 62.
3. Abigail A. Van Slyck, *Free to All: Carnegie Libraries & American Culture, 1890–1920* (Chicago: University of Chicago Press, 1996).
4. Ian Bogost and Nick Montfort, key figures in the rise of “platform studies” within media studies, regard platforms as the “underlying computer systems that support creative work.” “Platform Studies: Frequently Questioned Answers,” *Proceedings of Digital Arts and Culture 2009*, University of California, Irvine, 1.
5. Sarah Barns, *Platform Urbanism: Negotiating Platform Ecosystems in Connected Cities* (London: Palgrave Macmillan, 2020); Nick Srnicek, *Platform Capitalism* (Cambridge, UK: Polity, 2016).
6. David Weinberger, “Library as Platform,” *Library Journal* (September 4, 2012), <https://www.libraryjournal.com/?detailStory=by-david-weinberger>.

7. Dale Leorke and Danielle Wyatt, *Public Libraries in the Smart City* (London: Palgrave Macmillan, 2019), 5, 10. See also Cailin Crowe, "The Library Is a Smart City's 'Hub for Digital Intelligence,'" *Smart Cities Dive* (website), January 27, 2020, <https://www.smartcitiesdive.com/news/library-smart-city-hub-digital-intelligence-incusion/569012/>; Ellen P. Goodman, "'Smart Cities' Meet 'Anchor Institutions': The Case of Broadband and the Public Library," *Fordham Urban Law Journal*, 41 (2014); Shannon Mersand, Mila Gascó-Hernandez, Xiaoyi Zhao, J. Ramon Gil-Garcia, G. Brian Burke, Megan Sutherland, and Miguel Figueroa, "The Role of Public Libraries in Engaging Citizens in Smart, Inclusive and Connected Communities," Research Foundation of State University of New York, 2018, <https://www.ctg.albany.edu/projects/imls2017/>; Donna Scheeder, "UN Science, Technology and Innovation Forum 2018, Side Event on Smart, Sustainable Cities," June 5, 2018, <https://www.ifla.org/node/53202>; Danielle Wyatt, Scott Mcquire, and Danny Butt, "Libraries as Redistributive Technology: From Capacity to Culture in Queensland's Public Library Network," *New Media & Society* 20, no. 8 (2018): 2934–53.
8. Tarleton Gillespie, "The Politics of 'Platforms,'" *New Media & Society* 12, no. 3 (2010): 352. See also Jean-Christophe Plantin, Carl Lagoze, Paul N. Edwards, and Christian Sandvic, "Infrastructure Studies Meet Platform Studies in the Age of Google and Facebook," *New Media & Society* 20, no. 1 (2018): 293–310.
9. Melissa Adler, "Classification Along the Color Line: Excavating Racism in the Stacks," *Journal of Critical Librarianship and Information Studies* 1, no. 1 (2017): 26, <https://doi.org/10.24242/jclis.v1i1.17>; Jonathan Furner, "Dewey Deracialized: A Critical Race-Theoretic Perspective," *Knowledge Organization* 34, no. 3 (2007): 144–68; Hope A. Olson, "The Power to Name: Representation in Library Catalogs," *Signs* 26, no. 3 (2001): 639–68.
10. See also Alan Latham and Jack Layton, "Social Infrastructure and the Public Life of Cities: Studying Urban Sociality and Public Spaces," *Geography Compass* 13 (2019), <https://doi.org/10.1111/gec3.12444>; Louise Rondel, Laura Henneke, and Alice Corble, "A Network of Infrastructures?: Exploring Public Libraries as Infrastructure," *Streetsigns*, July 1, 2019, <https://cucrblog.wordpress.com/2019/07/01/a-network-of-infrastructures-exploring-public-libraries-as-infrastructure-by-louise-rondel-laura-henneke-and-dr-alice-corble/>.
11. Quoted in Donovan Vincent, "Toronto Public Library Should Control Data Collected at Quayside, Board of Trade Says," *Toronto Star*, January 9, 2019, <https://www.thestar.com/news/gta/2019/01/09/toronto-public-library-should-control-data-collected-at-quayside-board-of-trade-says.html>.
12. David Giles, with Jonathan Bowles and Gail Robinson, eds., "Branches of Opportunity," Center for an Urban Future, January 2013, <https://nycfuture.org/research/branches-of-opportunity>.
13. Ian Anstice, "Public Libraries in the Age of Austerity," in Aeron Davis, ed., *The Death of Public Knowledge: How Free Markets Destroy the General Intellect* (London: Goldsmiths Press, 2017), <https://goldsmithspress.pubpub.org/pub/zsvtx5rf/release/1>; Alice Rose Corble, "The Death and Life of English Public Libraries: Infrastructural Practices and Value in a Time of Crisis," Dissertation, Goldsmiths College, January 2019; Alison Flood, "Britain Has Closed Almost 800 Libraries since 2010, Figures Show," *Guardian*, December 5, 2019, <https://www.theguardian.com/books/2019/dec/06/britain-has-closed-almost-800-libraries-since-2010-figures-show>; Mattern, "Our Libraries Are Not Failing Us, We Are Failing Them," *Architectural Review*, January 4, 2019, <https://www.architectural-review.com/essays/campaigns/outrage/outrage-our-libraries-are-not-failing-us-we-are-failing-them/10038575.article>.
14. See Shannon Mattern, "Stacks, Platforms + Interfaces: A Field Guide to Information Spaces," Association of College & Research Libraries Annual Conference, Baltimore, March 23, 2017.
15. Kathy Rosa and Kelsey Henke, "2017 ALA Demographic Study," American Library Association Office for Research and Statistics, <http://www.ala.org/tools/sites/ala.org/tools/files/content/Draft%20of%20Member%20Demographics%20Survey%2001-11-2017.pdf>. See also Chris Bourg, "The Unbearable Whiteness of Librarianship," *Feral Librarian*, March 3, 2014, <https://chrisbourg.wordpress.com/2014/03/03/the-unbearable-whiteness-of-librarianship/>; Rose L. Chou and Annie Pho, eds., *Pushing the Margins: Women of Color and Intersectionality in LIS* (Sacramento, CA: Library Juice Press, 2018); American Library Association, "Diversity Counts," <http://www.ala.org/aboutala/offices/diversity/diversitycounts/divcounts>; Rebecca Hankins and Miguel Juárez, eds., *Where Are All the Librarians of Color?* (Sacramento, CA: Library Juice Press, 2016); and April Hathcock, "White Librarianship in Blackface: Diversity Initiatives in LIS," *In the Library with the Lead Pipe*, October 7, 2015, <http://www.inthelibrarywiththeleadpipe.org/2015/lis-diversity/>.

16. Erica Barnett, "People of Color, Especially Children, Most Likely to Be Asked to Leave Seattle Libraries," *South East Emerald*, August 22, 2018, <https://southseattleemerald.com/2018/08/22/people-of-color-especially-children-most-likely-to-be-asked-to-leave-seattle-libraries/>; Fobazi Ettarh, "A Chronic Lack of Nuance & a Love of the Hypothetical: A Library Story," *WTF Is a Radical Librarian Anyway?*, October 27, 2019, <https://fobaziettarh.wordpress.com/2019/10/27/a-chronic-lack-of-nuance-a-love-of-the-hypothetical-a-library-story/>; Meredith Farkas, "When Values Collide," *American Libraries*, November 1, 2018, <https://americanlibrariesmagazine.org/2018/11/01/when-values-collide/>; Lindsay McKenzie, "Racism and the American Library Association," *Inside Higher Ed*, February 1, 2019, <https://www.insidehighered.com/news/2019/02/01/american-library-association-criticized-response-racism-complaint>; Amanda Oliver, "Racism, Violence, and Police in Our Public Libraries," *Medium*, June 8, 2020, <https://medium.com/@aelaineo/racism-violence-and-police-in-our-public-libraries-cd3983ac6044>; Crystal Paul, "Amid Outcry, Seattle Public Library Weighs Decision to Provide Venue for 'Radical Feminist' Event Criticized as Anti-trans," *Seattle Times*, December 9, 2019, <https://www.seattletimes.com/seattle-news/amid-outcry-seattle-public-library-weighs-decision-to-provide-venue-for-radical-feminist-event-criticized-as-anti-trans/>; Karla J. Strand, "Disrupting Whiteness in Libraries and Librarianship: A Reading List," 2019, <https://www.library.wisc.edu/gwslibrarian/bibliographies/disrupting-whiteness-in-libraries/>.
17. Paul Edward defines knowledge infrastructures as a "robust network of people, artifacts, and institutions that generate, share, and maintain specific knowledge about the human and natural worlds." *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, MA: MIT Press, 2010).
18. BookOps, <https://sites.google.com/a/nypl.org/bookops/home>; Shannon Mattern, "Middlewhere: Landscapes of Library Logistics," *Urban Omnibus*, June 24, 2015, <https://urbanomnibus.net/2015/06/middlewhere-landscapes-of-library-logistics/>; RECAP, <https://recap.princeton.edu/>.
19. Ivy Anderson et al., "Open Statement: Why UC Cut Ties with Elsevier," *Berkeley Library News*, April 25, 2019, <https://news.lib.berkeley.edu/uc-elsevier-statement>; Brianna Bell, "Defund the Police, and Defund Big Data Policing, Too," *Jurist*, June 23, 2020, <https://www.jurist.org/commentary/2020/06/sarah-lamdan-data-policing/>; Lindsay McKenzie, "UC Drops Elsevier," *Inside Higher Ed*, March 1, 2019, <https://www.insidehighered.com/news/2019/03/01/university-california-cancels-deal-elsevier-after-months-negotiations>.
20. Brooklyn Public Library, *Now > Next: Strategic Plan 2018*, <https://www.bklynlibrary.org/strategicplan#>.
21. Andrea J. Copeland, "Public Library: A Place for the Digital Community Archive," *Digital Technology & Culture* 44, no. 1 (2015): 12–21; Bill LeFurgy, "10 Resources for Community Digital Archives" posts at the *Signal*, Library of Congress, <https://blogs.loc.gov/thesignal/2013/06/10-resources-for-community-digital-archives/>. See also the Memory Lab Network, <https://memorylabnetwork.github.io/>, and the XFR Collective, <https://xfrcollective.wordpress.com/>.
22. Makiba J. Foster, "Navigating Library Collections, Black Culture, and Current Events," *Library Trends* 67, no. 1 (2028): 8–22; Shannon Mattern, "Fugitive Libraries," *Places Journal*, October 2019, <https://placesjournal.org/article/fugitive-libraries/>; Schomburg Center for Research in Black Culture, <https://www.nypl.org/about/locations/schomburg>; Vanessa K. Valdés, *Diasporic Blackness: The Life and Times of Arturo Alfonso Schomburg* (Albany: State University of New York Press, 2017).
23. Karen Adjei, "Indigenous Academic Library Services as a Model for Centering First Nations Cultures, Communities, Collections," *Library Journal*, June 6, 2019, <https://www.libraryjournal.com/?detailStory=indigenous-academic-library-serves-as-model-for-centering-first-nations-cultures-communities-collections>; Ann M. Doyle, Kimberly Lawson, and Sarah Dupont, "Indigenization of Knowledge Organization at the Xwi7xwa Library," *International Journal of Library and Information Studies* 13, no. 2 (2015): 107–34; "Welcome Indigenous Peoples into Your Library," State University New South Wales, <https://www.sl.nsw.gov.au/public-library-services/services/indigenous-spaces/welcome-indigenous-peoples-your-library>. See the work of indigenous library and archive scholars Camille Callison, Marisa Elena Duarte, Sandy Littletree, and Nathan "Mudyi" Sentance. I'm grateful to all the folks who responded to my Twitter inquiry regarding indigenous library scholarship. Shannon Mattern, Twitter, July 3, 2020, <https://twitter.com/shannonmattern/status/1279154812861526016>.
24. Chancey Fleet, "Announcing Dimensions: Community Tools for Creating Tactile Graphics & Objects," *NYPL blog*, October 18, 2017, <https://www.nypl.org/blog/2017/10/18/dimensions-tactile-graphics-objects>.

25. Shannon Mattern, "Resonant Texts: Sounds of the Contemporary American Public Library," *Senses & Society* 2, no. 3 (Fall 2007): 277–302.
26. Christina Dunbar-Hester, *Hacking Diversity: The Politics of Inclusion in Open Technology Cultures* (Princeton, NJ: Princeton University Press, 2020); Christina Joseph, "Creating Makerspaces for All: Lessons from the Experts," *School Library Journal* (December 4, 2019), <https://www.slj.com/?detailStory=creating-makerspaces-for-all-lessons-from-the-experts-slj-iste-webcast-technology>; Alexandra Lakind, "Public Libraries as Sites of Collision for Arts Education, the Maker Movement, and Neoliberal Agendas in Education," *Journal for Learning through the Arts* 13, no. 1 (2017); Daniela Rosner, *Critical Fabulations: Reworking the Methods and Margins of Design* (Cambridge, MA: MIT Press, 2018).
27. Madison Bubbler, <http://madisonbubbler.org/>; "Making Justice," Madison Bubbler, <https://www.teenbubbler.org/programs/making-justice>.
28. Andrew Demasson, Helen Partridge, and Christine Bruce, "How Do Public Librarians Constitute Information Literacy?," *Journal of Librarianship and Information Science* 51, no. 2 (2019), <https://doi.org/10.1177/0961000617726126>; Rachel Hall, "Public Praxis: A Vision for Critical Information Literacy in Public Libraries," *Public Library Quarterly* 29, no. 2 (2010), <https://doi.org/10.1080/01616841003776383>; Eamon C. Tewell, "The Practice and Promise of Critical Information Literacy: Academic Librarians' Involvement in Critical Library Instruction," *College & Research Libraries* 79, no. 1 (2018), <https://crl.acrl.org/index.php/crl/article/view/16616/18453>.
29. See, for instance, Taina Bucher, *If... Then: Algorithmic Power and Politics* (New York: Oxford University Press, 2018); danah boyd, "Did Media Literacy Backfire?," *points: Data & Society*, January 5, 2017, <https://points.datasociety.net/did-media-literacy-backfire-7418c084d88d>; Detroit Digital Justice Coalition, "Principles to Guide Our Work," Allied Media Projects, <https://www.alliedmedia.org/ddjc/principles>; Shannon Mattern, "Scaffolding, Hard and Soft—Infrastructures as Critical and Generative Structures," *Spheres* 3, June 21, 2016, <https://spheres-journal.org/contribution/scaffolding-hard-and-soft-infrastructures-as-critical-and-generative-structures/>; Safiya Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018); Lisa Parks, "Around the Antenna Tree: The Politics of Infrastructural Invisibility," *Flow*, March 6, 2009, <http://www.flowjournal.org/2009/03/around-the-antenna-tree-the-politics-of-infrastructural-visibility>; Lisa Parks, *Antisocial Media: How Facebook Disconnects Us and Undermines Democracy* (New York: Oxford University Press, 2018).
30. Trevor Owens, personal communication, September 6, 2016. See Shannon Mattern, "Public In/Formation," *Places Journal*, November 2016, <https://placesjournal.org/article/public-information/>.
31. University of Pittsburgh, "Developing Public and Academic Libraries as Key Participants in Civic Open Data Ecosystems," IMLS Final Project Proposal (2017), <https://www.ims.gov/sites/default/files/grants/lg-70-17-0146-17/proposals/lg-70-17-0146-17-full-proposal-documents.pdf>, i. See Shannon Mattern, "Local Codes: Forms of Spatial Knowledge," Public Knowledge / San Francisco Museum of Modern Art, January 18, 2019, <https://publicknowledge.sfmoma.org/local-codes-forms-of-spatial-knowledge/>.
32. Library Freedom Project, <https://libraryfreedom.org/>.
33. "Data Privacy Project," <https://dataprivacyproject.org/>.
34. See "Privacy in Public: A Distributed Exhibition about Digital Privacy," 2018–19, Words in Space, <https://wordsin.space.net/shannon/privacy-in-public-a-distributed-exhibition/>; *Privacy in Public*, <https://privacyinpublic.org/>. I curated a similar exhibition with my colleague Jussi Parikka at Oodi, the new Helsinki Public Library, in early 2019. See *The Library's Other Intelligences*, Finnish Cultural Institute in New York, <https://fcny.org/projects/the-libraris-other-intelligences>.
35. The Glass Room, <https://theglassroom.org/>.
36. Christopher Ali, *Media Localism: The Policies of Place* (Urbana-Champaign: University of Illinois Press, 2017); David Beard, "The Libraries Bringing Small-Town News Back to Life," *Atlantic*, January 28, 2018, <https://www.theatlantic.com/technology/archive/2018/01/libraries-local-news/551594/>; David Beard, "Welcome to Your Local Library, Which Also Happens to Be a Newsroom," *Poynter*, November 20, 2017, <https://www.poynter.org/tech-tools/2017/welcome-to-your-local-library-which-also-happens-to-be-a-newsroom/>; Rasmus Kleis Nielsen, ed., *Local Journalism: The Decline of Newspapers and the Rise of Digital Media* (New York: I. B. Tauris and Reuters Institute for the Study of Journalism, University of Oxford, 2015).
37. DX Lab, <https://dxlab.sl.nsw.gov.au/>; LC Lab, <https://labs.loc.gov/>; Library Innovation Lab,

<https://lil.law.harvard.edu/>; NYPL Labs, <https://www.nypl.org/collections/labs>.

38. David Eaves, Ed Felten, Tara McGuinness, Deirdre K. Mulligan, and Jeremy Weinstein, "Defining Public Interest Technology," *New America* (blog), <https://www.newamerica.org/public-interest-technology/blog/defining-public-interest-technology/>; "About: Public Interest Technology," *New America* (website), <https://www.newamerica.org/public-interest-technology/about/>. See also "Public Interest Tech," Ford Foundation, <https://www.fordfoundation.org/campaigns/public-interest-tech/>; Bruce Schneider, "Public-Interest Technology Resources," February 24, 2020, <https://public-interest-tech.com/>. I'm grateful to Sean McDonald for speaking with me about the continual rebranding of such endeavors: yesterday's civic tech or ICT4D (information and communication technologies for development) is today's "public interest tech."

39. Mutale Nkonde, "A Case for Critical Public Interest Technologies," *Points: Data & Society*, April 19, 2019, <https://points.datasociety.net/a-case-for-critical-public-interest-technologists-111d7ea3d384>.

40. Laura Kurgan, personal communication, July 10, 2020.

41. Quoted in Mike Jansen, "The Public Media Stack: Imagining a Better Tech Ecosystem for Today's PubMedia," *Current*, June 3, 2019, <https://current.org/2019/06/the-public-media-stack-imagining-a-better-tech-ecosystem-for-todays-pubmedia/>. See also Matt Locke, "The Public Media Stack," *Medium*, January 8, 2019, <https://medium.com/storythings-ltd/the-public-media-stack-4c6c2accdbb>; "The Public Media Stack Summit, May 14–15, Metro 599, NYC," Storythings, <https://publicmediastack.pubpub.org/pub/21v09mp4/release/1>.

42. Greta Byrum, email, July 10, 2020; Greta Byrum and Ever Bussey, "Community Networking for Healing and Power in Central Appalachia," *Global Media Technologies & Cultures Lab*, November 11, 2019, http://globalmedia.mit.edu/2019/11/11/community-networking-for-healing-and-power-in-central-appalachia/?fbclid=IwAR10wJ_0ew9xQNxKr7Gp3JAaUhp-lc4PGouZywrivM5Mo8l50Qf0E3uyQ. The slow, complicated process of building "the People's internet," Byrum writes, gives communities the opportunity to "choose what future [they] want: one in which things break and are sometimes slow" (as is the case with a modest, solar-powered system) yet that allows them to "come together as neighbors and allies to fix and maintain and govern; or

one in which speed and efficiency trump all other values" (which is what we get from monopolistic telecommunications and internet service providers). Greta Byrum, "Building the People's Internet," *Urban Omnibus*, October 2, 2019, <https://urbanomnibus.net/2019/10/building-the-peoples-internet/>. See also Rachel Coldicutt and Gill Wildman, "Glimmers," 2020, <https://glimmersreport.net/>.

43. "Detroit Digital Justice Coalition," Allied Media Projects, <https://alliedmedia.org/ddjc/principles>. The "Principles of Working Together" affirm the values of diversity, antiracism, local self-determination, indigenous knowledge, participation, and accountability. People of Color Environmental Justice, "Principles of Working Together," People of Color Leadership Summit, Washington, DC, October 27, 1991, https://ace-ej.org/ej_resources. For more on communities choosing what values their telecommunications infrastructure should embody, see Shannon Mattern, "Networked Dream Worlds," *Real Life* magazine, July 8, 2019, <https://reallifemag.com/networked-dream-worlds/>; and Seeta Peña Gangadharan, "Digital Exclusion: A Politics of Refusal," in *Digital Technology and Democratic Theory*, ed. Rob Reich, Lucy Bernholz, and Hélène Landemore (Chicago: University of Chicago Press, 2021).

44. See Ben Goldman, "14th Blackbird: Digital Preservation as an Environmentally Sustainable Activity," Preservation and Archiving Special Interest Group Meeting, Museum of Modern Art, October 28, 2016, <https://scholarsphere.psu.edu/resources/66bdc5d3-58e9-479f-b17c-67463e53b702>; Shannon Mattern, "Data Ecologies: A Green New Deal for Climate and Tech Reform," University of Pennsylvania, January 23, 2020; Bethany Nowviskie, "Digital Humanities in the Anthropocene," July 10, 2014, <http://nowviskie.org/2014/anthropocene/>; Rick Prelinger, "Collecting Strategies for the Anthropocene," at Libraries and Archives in the Anthropocene Colloquium, New York University, May 13–14, 2017; Eira Tansey, "When the Unbearable Becomes Inevitable: Archives and Climate Change," presentation to "Fierce Urgencies: The Social Responsibility of Collecting and Protecting Data," Yale University, New Haven (May 4, 2017), <http://eiratansey.com/2017/05/16/fierce-urgencies-2017/>; Eira Tansey and Robert Montoya, "Libraries and Archives in the Anthropocene," special issue, *Journal of Critical Library and Information Studies* 3, no. 1 (2020), <https://journals.litwinbooks.com/index.php/jclis/issue/view/8>.

45. For more on "infrastructural ecologies," see Reyner Banham, *Los Angeles: The Architecture*

- of *Four Ecologies* (Berkeley: University of California Press, 2009 [1971]); Alan Latham, Derek McCormack, Kim McNamara, and Donald McNeil, *Key Concepts in Urban Geography* (Thousand Oaks, CA: Sage, 2009), 32; Ming Xu and Josh P. Newell, "Infrastructure Ecology: A Conceptual Mode for Understanding Urban Sustainability," Sixth International Conference of the International Society for Industrial Ecology (ISIE) Proceedings, Berkeley, California, June 7–10, 2011, <http://css.umich.edu/publication/infrastructure-ecology-conceptual-model-understanding-urban-sustainability/>; Anu Ramaswami, Christopher Weible, Deborah Main, Tanya Heikkilä, Saba Siddiki, Andrew Duval, Andrew Pattison, and Meghan Bernard, "A Social-Ecological-Infrastructural Systems Framework for Interdisciplinary Study of Sustainable City Systems," *Journal of Industrial Ecology* 16, no. 6 (December 2012): 801–13. Most references to infrastructural ecologies—and there are few—pertain to systems at the urban scale, but I believe a library is a sufficiently complicated institution, residing at nexus of myriad networks, that it constitutes an infrastructural ecology in its own right.
46. The material in this three-paragraph section is drawn from Callan Bignoli, "Don't Leave Workers Out of the Library Narrative," *Library Journal*, May 19, 2020, <https://www.libraryjournal.com/?detailStory=Dont-Leave-Workers-Out-of-the-Library-Narrative-Opinion>; Meg Brown, "Libraries and the Census in the Time of COVID-19," *Library Journal*, April 10, 2020, <https://www.libraryjournal.com/?detailStory=Libraries-and-Census-in-Time-of-COVID-19>; "Curb Side, Baby," Nashville Public Library, YouTube, June 1, 2020, <https://www.youtube.com/watch?v=rnk4qeu9WZY>; Deborah Fallows, "The Post-Pandemic Future of Libraries," *Atlantic*, May 12, 2020, <https://www.theatlantic.com/notes/2020/05/post-pandemic-future-libraries/611458/>; Deborah Fallows, "Public Libraries' Novel Response to a Novel Virus," *Atlantic*, March, 31, 2020, <https://www.theatlantic.com/notes/2020/03/public-libraries-novel-response-to-a-novel-virus/609058/>; Michelle J. Fernandez, "Bookmobiles Navigate New Terrain," *Public Libraries Online*, June 22, 2020, <http://publiclibrariesonline.org/2020/06/bookmobiles-navigate-new-terrain/>; Chris Freeland, "Internet Archive Responds: Why We Released the National Emergency Library," *Internet Archive*, March 30, 2020, <http://blog.archive.org/2020/03/30/internet-archive-responds-why-we-released-the-national-emergency-library/>; Jake Goldenfein, Ben Green, and Salomé Viljoen, "Privacy versus Health Is a False Trade-off," *Jacobin*, April 17, 2020, <https://jacobinmag.com/2020/04/privacy-health-surveillance-coronavirus-pandemic-technology/>; Elizabeth A. Harris, "Libraries Strive to Stay 'Community Living Rooms' as They Reopen," *New York Times*, June 11, 2020, <https://www.nytimes.com/2020/06/11/books/coronavirus-library-reopening.html>; IFLA, "Now and Next: What a Post-COVID World May Bring for Libraries," *Library Policy and Advocacy Blog*, April, 6, 2020, <https://blogs.ifla.org/lpa/2020/04/06/now-and-next-what-a-post-covid-world-may-bring-for-libraries/>; "Imagine a Library Service with No Buildings ...," *Public Libraries News*, May 20, 2020, <https://www.publiclibrariesnews.com/about-public-libraries-news/coronavirus-public-library-ideas-and-responses/imagine-a-library-service-with-no-buildings-were-living-there-now-an-interview-with-matt-finch-in-the-time-of-coronavirus>; Linda Poon, "Coronavirus Tests the Limits of America's Public Libraries," *CityLab*, June 24, 2020, <https://www.bloomberg.com/news/articles/2020-06-24/how-coronavirus-is-changing-public-libraries>; Zack Quaintance, "Social Distancing Inspires New Digital Literacy Strategies," *Government Technology*, June 23, 2020, <https://www.govtech.com/network/Social-Distancing-Inspires-New-Digital-Literacy-Strategies.html>; Sabrina Roach, "NDIA Announces Digital Navigator Concept," *NDIA*, April, 20, 2020, <https://www.digitalinclusion.org/blog/2020/04/20/ndia-announces-digital-navigator-concept/>.
47. John Overholt, Twitter, May 19, 2020, https://twitter.com/john_overholt/status/1262901920231981057.
48. Quoted in Lauren Kirchner, "Millions of Americans Depend on Libraries for Internet. Now They're Closed," *Markup*, June 24, 2020, <https://themarkup.org/coronavirus/2020/06/25/millions-of-americans-depend-on-libraries-for-internet-now-theyre-closed>.
49. Quoted in Linda Poon, "Coronavirus Tests the Limits of America's Public Libraries," *CityLab*, June 24, 2020, <https://www.bloomberg.com/news/articles/2020-06-24/how-coronavirus-is-changing-public-libraries>.
50. Center for an Urban Future, "Opportunity Institutions" Conference (March 11, 2013), <https://nycfuture.org/events/opportunity-institutions>. See also Jesse Hicks and Julie Dressner, "Libraries Now: A Day in the Life of NYC's Branches," *Intelligencer*, May 16, 2014, <https://nymag.com/intelligencer/2014/05/libraries-now-new-york-video.html>.

51. Giles, Bowles, and Robinson, eds., "Branches of Opportunity," 3. In 2014 I published a piece on the "library as infrastructure," where I quoted Ruth Faklis, then director of the Prairie Trail Public Library district in suburban Chicago: "It never ceases to amaze me just what libraries are looked upon to provide," she wrote. "This includes, but is not limited to, [serving as] keepers of the homeless . . . while simultaneously offering latch-key children a safe and activity-filled haven. We have been asked to be voter-registration sites, warming stations, notaries, technology-terrorism watchdogs, senior social-gathering centers, election sites, substitute sitters during teacher strikes, and the latest—postmasters. These requests of society are ever evolving. Funding is not generally attached to these magnanimous suggestions, and when it is, it does not cover actual costs of the additional burden, thus stretching the library's budget even further. I know of no other government entity that is asked to take on additional responsibilities not necessarily aligned with its mission." Ruth Faklis, *Library 2020: Today's Leading Visionaries Describe Tomorrow's Library*, ed. Joseph Janes (Lanham, MD: Scarecrow Press, 2013), 96–97.
52. Jessica Leigh Hester, "Helping Homeless New Yorkers by the Books," *CityLab*, June 28, 2017, <https://www.bloomberg.com/news/articles/2017-06-28/a-day-with-brooklyn-library-s-social-worker>; Alanna Kelley, Kara Riggelman, Ingrid Clara, and Adria E. Navarro, "Determining the Need for Social Work Practice in a Public Library," *Journal of Community Practice* 25, no. 1 (2017), <https://doi.org/10.1080/10705422.2016.1269380>; "Library Social Worker Helps Homeless Seeking Quiet Refuge," *PBS News Hour*, January 28, 2015, <https://www.pbs.org/newshour/show/library-social-worker-helps-homeless-seeking-quiet-refuge>; Patrick Lloyd, "The Public Library as a Protective Factor: An Introduction to Library Social Work," *Public Library Quarterly* 39, no. 1 (2020), <https://doi.org/10.1080/01616846.2019.1581872>; Megan Martenyi, "Promoting Dignity, Compassion and a Community Living Room," *Public Knowledge*, June 9, 2018, <https://publicknowledge.sfmoma.org/promoting-dignity-compassion-and-a-community-living-room-leah-esguerra-on-the-role-of-libraries-in-a-changing-city/>; Emily Nonko, "Library Systems Embracing Their New Roles as Social Service Hubs," *Next City*, January 22, 2019, <https://nextcity.org/daily/entry/library-systems-embracing-their-new-roles-as-social-service-hubs>; Rachel D. Williams, "Performing Boundary Work: An Exploration of Public Library Workers' Provision of Health and Social Services Information to People Experiencing Homelessness," Dissertation, University of Wisconsin–Madison, 2017.
53. Wayne A. Wiegand, *Part of Our Lives: A People's History of the American Public Library* (New York: Oxford University Press, 2015).
54. Cailin Crowe, "The Library Is a Smart City's 'Hub for Digital Intelligence,'" *Smart Cities Dive*, January 27, 2020, <https://www.smartcitiesdive.com/news/library-smart-city-hub-digital-intelligence-inclusion/569012/>.
55. See, for instance, National Planning Association, *Development Digest* 3, no. 2 (July 1965): 110–11.
56. Eric Klinenberg, *Heat Wave: A Social Autopsy of Disaster in Chicago* (Chicago: University of Chicago Press, 2002); *Palaces for the People: How Social Infrastructure Can Help Fight Inequality, Polarization, and the Decline of Civic Life* (New York: Crown, 2018).
57. Anne Helen Petersen, "Vocational Awe," *Culture Study*, September 6, 2020, <https://annehelen.substack.com/p/vocational-awe/>. For more on librarianship as an undercompensated "calling," see Fobazi Ettarh, "Vocational Awe and Librarianship: The Lies We Tell Ourselves," *In the Library with the Lead Pipe*, January 10, 2018, <http://www.inthelibrarywiththeleadpipe.org/2018/vocational-awe/>.
58. Davis writes, "Rather, positing decarceration as our overarching strategy, we would try to envision a continuum of alternatives to imprisonment—demilitarization of schools, revitalization of education at all levels, a health system that provides free physical and mental care to all, and a justice system based on reparation and reconciliation rather than retribution and vengeance" (Angela Y. Davis, *Are Prisons Obsolete?* [New York: Seven Stories Press, 2003], 107–8).
59. Amanda Oliver, "Racism, Violence, and Police in Our Public Libraries," *Medium*, June 8, 2020, <https://medium.com/@aelaineo/racism-violence-and-police-in-our-public-libraries-cd3983ac6044>. Several groups of librarians organized in summer 2020 to advocate for divestment from police. Alison Macrina, Twitter, July 17, 2020, <https://twitter.com/flexlibris/status/1284171110150479872>; "Police Out of NYC Libraries," Twitter, <https://twitter.com/CopFreeLibrary>.
60. Klinenberg, *Palaces for the People*, 34.
61. Anthony W. Marx, "Libraries Must Change," *New York Times*, May 28, 2020, <https://www.nytimes.com/2020/05/28/opinion/libraries-coronavirus.html>.
62. Nate Hill, email, July 22 and 23, 2020.

63. Quoted in Jocelyn Dawson and Rebecca McLeon, "Guest Post: Safiya Umoja Noble and the Ethics of Social Justice in Information (Part 1)," *Scholarly Kitchen*, July 19, 2018, <https://scholarlykitchen.sspnet.org/2018/07/19/guest-post-safiya-umoja-noble-ethics-social-justice-information-part-1/>.

64. Safiya Noble, "The Loss of Public Goods to Big Tech," *Noëma*, July 1, 2020, <https://www.noemamag.com/the-loss-of-public-goods-to-big-tech/>.

65. Ruha Benjamin, *Race after Technology: Abolitionist Tools for the New Jim Code* (Medford, MA: Polity, 2019), 168.

66. Ethan Zuckerman, "The Case for Digital Public Infrastructure," Knight First Amendment Institute at Columbia University, January 17, 2020, <https://knightcolumbia.org/content/the-case-for-digital-public-infrastructure>.

67. Barbara Fister, "Some Assumptions about Libraries," *Inside Higher Ed*, January 2, 2014, <https://www.insidehighered.org/blogs/library-babel-fish/some-assumptions-about-libraries>.

68. I borrowed the title "Public Knowledge" from a fantastic two-year collaboration between the San Francisco Museum of Modern Art and the San Francisco Public Library, who wanted to consider what constituted "public knowledge" in a city that had been profoundly changed through the rapid growth of the technology industry. This project raised many of the same questions I addressed in this chapter. I was honored to serve as a contributing scholar, to participate in an event about mapping, and to contribute an article to the project's publication, *The Stacks*. I'm greatly indebted to Deena Chalabi and Tomoko Kanamitsu for including me. Public Knowledge, SFMoMA, <https://www.sfmoma.org/artists-artworks/public-knowledge/> and <https://publicknowledge.sfmoma.org/>; *The Stacks*, Public Knowledge, <https://publicknowledge.sfmoma.org/the-stacks/>.

Chapter 4: Maintenance Codes

1. Emily Badger, "Pave Over the Subway? Cities Face Tough Bets on Driverless Cars," *New York Times*, July 20, 2018, <https://www.nytimes.com/2018/07/20/upshot/driverless-cars-vs-transit-spending-cities.html>; Tom McKay, "Behold This Disastrously Bad Op-Ed Calling for Amazon to Replace Libraries," *Gizmodo*, July 22, 2018, <https://gizmodo.com/behold-this-disastrously-bad-op-ed-calling-for-amazon-t-1827789820>.

2. Marc Andreessen, "It's Time to Build," *Andreessen Horowitz*, April 18, 2020, <https://a16z.com/2020/04/18/its-time-to-build/>.

3. Steven J. Jackson, "Rethinking Repair," in *Media Technologies: Essays on Communication, Materiality and Society*, ed. Tarleton Gillespie, Pablo Boczkowski, and Kirsten Foot (Cambridge, MA: MIT Press, 2014), 221.

4. The Maintainers, <http://themaintainers.org/>.

5. Lee Vinsel and Andrew L. Russell, *The Innovation Delusion: How Our Obsession with the New Has Disrupted Work that Matters Most* (New York: Penguin Random House, 2020).

6. Andrew Russell and Lee Vinsel, "Hail the Maintainers," *Aeon*, April 7, 2016, <https://aeon.co/essays/innovation-is-overvalued-maintenance-often-matters-more>; and "Let's Get Excited about Maintenance!," *New York Times*, July 22, 2017, <https://www.nytimes.com/2017/07/22/opinion/sunday/lets-get-excited-about-maintenance.html>; Festival of Maintenance, <https://festivalofmaintenance.org.uk/>; Storefront for Art and Architecture, "StorefrontTV, Season 3: On Maintenance," 2020, <http://storefrontnews.org/programming/storefronttv-season-3-on-maintenance/>; Urban Design Forum, "Maintaining (2017)," <https://urbandesignforum.org/programs/next-new-york/maintaining/>; Urban Design Forum, *Maintaining: Public Works in the Next New York* (2019).

7. Karl Marx, *Capital*, vol. 1 (1867), chapter 23, <https://www.marxists.org/archive/marx/works/1867-c1/ch23.htm>.

8. Andrew Russell and Lee Vinsel, "After Innovation, Turn to Maintenance," *Technology and Culture* 59, no. 1 (2018): 11, <http://doi.org/cwrw>.

9. Andrew L. Russell and Lee Vinsel, "Making Maintainers: Engineering Education and an Ethics of Care," in *Does America Need More Innovators?*, ed. Matthew Wisnioski, Eric Hintz, and Marie Stettler Klein (Cambridge, MA: MIT Press, 2019), 249–72; and Russell and Vinsel, "Hail the Maintainers."

10. Consider, for instance, the profiles of discussants at *the Agility Effect*, where "VIPs, researchers, and business and opinion leaders share their take on the news." Read Andrew Russell and Reinhard Schlemmer's "Is Innovation the Enemy of Maintenance?" (<https://www.theagilityeffect.com/en/about/innovation-enemy-maintenance/>), then scroll down to see the related links. Panel lineups like the Information Technology & Innovation Foundation's "Innovation vs. Maintenance in the Drive toward 'Hybrid' Infrastructure" (Washington, DC, November 9, 2017, <https://itif.org/events/2017/11/09/innovation-vs-maintenance-drive-toward-hybrid-infrastructure>) are very common.

11. Jackson, "Rethinking Repair," 229–30. See also Ta-Nehisi Coates, "The Case for