Book Reviews

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A Billion Little Pieces

A Billion Little Pieces: RFID and Infrastructures of Identification
By Jordan Frith. Cambridge, MA: The M.I.T. Press, 2019, 304 pp. Part of the Infrastructures Series,
Geoffrey C. Bowker and Paul N. Edwards, Eds.

Radio Frequency Identification (RFID) is a key part of the infrastructure underlying the burgeoning Internet of Things. RFID tags, which can be attached to objects and then scanned with readers to give these objects a digital signature, can be as small as a grain of rice. To take just a few examples, RFID tags can be embedded in subway cards, articles of clothing in retail shops, and living beings like livestock or even humans. Infrastructure is, often by design, difficult to notice. We tend to take even large, visible infrastructure like roads and bridges for granted unless we encounter a pothole or a traffic jam. RFID, even though it underlies electronic toll collection and other systems we interact with every day and is poised to become practically ubiquitous, is far less conspicuous. Jordan Firth's *A Billion Little Pieces* aims to bring RFID into the foreground, giving readers a sense of what the technology is, how it is being and could be used, and how concerned we should be about its implications, especially those regarding privacy.

This book is not aimed at people well-acquainted with RFID. A good portion is devoted to explaining what RFID is, tracing its development, and giving a general overview of its uses. Those seeking an in-depth treatment of the physics of RFID or detailed technical specifications of RFID tags are explicitly enjoined to look elsewhere. Already knowledgeable readers might find later chapters discussing the social implications of RFID more interesting, but the contents of these chapters will also likely not come as news to people who have thought about these issues.

While the book does not presume any special knowledge of RFID or technical background on the part of its readers, if you are unfamiliar with the style of writing favored by continental theorists like Foucault, some of Frith's prose can be jarring. For example, rather than write about RFID being used to track the movements of "people," he prefers the term "bodies." Perhaps this jargon is warranted since, as he explains, one important use of RFID is in managing livestock. Still, even in contexts like access to subways or toll roads where it's clear no non-humans are involved, Frith favors phrases like "the mobility of bodies." However, writing in this stilted fashion can remind us that, from the point of view of an RFID tag, human beings are just another object.

Locutions of this sort appear throughout the book but are thickest in the introduction, which invokes theoretical jargon from fields like sociology, philosophy, and communications studies. But the book as a whole is not as abstruse as the introduction might suggest. A few of the more jargon-y terms Frith employs show up throughout the book, e.g., "spimes," coined by futurist Bruce Stirling, which refers to objects that are able to relate their own histories. However, in most cases Frith will introduce a concept, briefly describe how RFID is a good example of it, and then move on without returning to it again. In the more descriptive chapters about the history and details of RFID technology, the writing is notably less abstract with fewer recondite citations.

The main argument of *A Billion Little Pieces* is that RFID is best understood as an "infrastructure of identification." The key function of RFID tags is to allow individual objects (which can be shipping pallets, toll transponders in cars, articles of clothing in retail stores, livestock, etc.) to be identified in a way that can be read and then processed digitally. To function, RFID tags must be part of a system that includes readers to scan the tags and software that adds the scanned information to a database or manipulates it in some way. The bulk of the book is devoted to filling in the details about these systems and the various things they can be used to do.

In Frith's telling, the most important ancestor of RFID is barcodes. Barcodes revolutionized retail by allowing products to be quickly and easily identified by manufacturer and item class. This yields a wealth of information that allows stores to keep much more accurate track of inventories and, of course, streamline checkout. Still, as far as barcodes are concerned one 22 oz box of Kellogg's Froot Loops is indistinguishable from another. What makes RFID such a step forward as an infrastructure of identification is

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that it allows us to differentiate *this* carton of milk from *that* one. With RFID, products are no longer anonymous instances of a type, but are instead identifiable individuals. Should we find out that milk from one particular dairy is tainted with *E. coli*, being able to trace where and when each carton was produced can be life-saving.

RFID tags, and hence their corresponding readers, come in different types, which are outlined in the book. Passive tags do not contain an internal power source and only activate when read, as opposed to self-powered active tags. Tags can be low-frequency (LF), high-frequency (HF), or ultra-high-frequency (UHF). This affects the range at which they can be read and their sensitivity to environmental interference. HF subway cards have to be waved close to a reader to register,

while UHF toll transponders can be scanned from dozens of meters away while moving at high speed., The most common and plentiful RFID tags are cheap, small, long-lasting passive tags that allow an item to be identified by a reader, but more complex, specialized tags might include data storage, sensors of various sorts, and/or a processor. Frith contends that having a basic understanding of the different kinds of tags and their capabilities should forestall some of the more alarmist worries about the technology, which come from vastly overestimating the complexity and power of tags one is likely to encounter in daily life.

After laying out RFID capabilities, Frith moves on to discussing the Internet of Things (IoT). In more starry-eyed imaginings, the IoT involves various "smart" devices merrily chatting away with one another: refrigerators detecting that the last carton of milk has been used up and adding milk to the shopping list or even ordering a replacement carton. But in many ways the IoT is already here, in systems (electronic tolls, etc.) already so commonplace we scarcely remark on them. Frith does introduce some additional cases, most provocatively "biohackers," who implant subcutaneous RFID chips that they can then, if cooperating readers exist, use to unlock doors, make payments, etc. As Frith astutely notes, the qualification about readers is crucial. How big a deal implanted RFID tags would be (should mass implantation ever come to pass at all) has less to do with the tags themselves than with the larger systems that would take data from these tags and what they would do with it.

Collecting data is not a new phenomenon. What makes RIFD technology suggest a "Big Data" revolution is not the fact that it produces data, but that it produces so much of it with ease and speed. Frith cautions that all of this data does not speak for itself. Data does not simply appear, but must be collected by systems we design. Even the cheapest RFID chips are not so cheap that we can just tag things willy-nilly without some purpose in mind. No matter how much of it we have, data does not give a complete, neutral representation of the world.

What Frith calls a "control crisis" is often an impetus that spurs deploying RFID to collect data. For example, the problem of counterfeit pharmaceuticals makes it attractive to use RFID tagging to authenticate a bottle of pills and be able to trace it back to its original manufacturer and forward through the supply chain. For products like strawberries that will be ruined if they are not kept within a certain temperature range, sensor-equipped RFID tags allow shippers to monitor their temperature continually in real time, rather than just at certain checkpoints. Fine-grained real-time information allows Delta Airlines passengers to track their luggage via a smartphone app.

Talk of control also suggests a darker, more Orwellian side of Big Data. Frith would disagree with this framing; he argues that Kafka's *The Trial* offers a better metaphor for thinking through these potential dangers than does Orwell's *1984*. Rather than one centralized Big Brother conducting surveillance on our every move, data collected about us, while voluminous, is fragmented and collected by many different entities. We rarely know exactly who has what data, what they might be doing with it, and

in many cases are unaware data is being collected at all. Frith describes a case where the New York State government set up readers throughout the state to scan E-ZPass transponders without notifying drivers what they were doing so, let alone explaining why. There were no laws or policies requiring otherwise.

The author works hard to avoid hysteria and overstatement, but is no Pollyanna either. He suggests that some fears about RFID technology in particular might be overblown, but only for the none-too-reassuring reason that since the heyday of backlashes against RFID in the early 2000s, most people now routinely carry smartphones that track practically everything they do. He sees little prospect for laws and regulations governing data collection via RFID any time soon. With collective action ruled out, the best Frith has to offer is that we, as individuals, cultivate an "infrastructural imagination." He admonishes us to try and be aware of the RFID tags and tag readers we encounter and to think critically about what kinds of data should and should not be collected.

In the Introduction, Frith describes a senior scholar at a conference asking why location-based smartphone apps like Foursquare with relatively small user bases get a great deal of scholarly attention while a pervasive and important technology like RFID is ignored. Frith has dutifully taken up this challenge, and one gets the sense that *A Billion Little Things* is a workmanlike attempt to do justice to a worthy subject. The book may not fire the imagination about the promises and pitfalls of RFID technology, but it provides a clear and well-organized overview.

Reviewer Information

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Charlette Caldwell

The Black Skyscraper

The Black Skyscraper: Architecture and the Perception of Race
By Adrienne Brown. Johns Hopkins University Press, 277 pages, 2017.

A definition of *perception* as used in the above subtitle might be, "an awareness of the environment through physical sensation." One becomes aware of something through all five senses. Yet it is "seeing" that is the most compelling when analyzing the relationship between architecture and race, especially, for example, when reexamined in literary works such as F. Scott Fitzgerald's *The Great Gatsby*. Adrienne Brown, a professor who specializes in American and African American cultural production at the University of Chicago, takes her readers on a journey that recounts seeing racial characteristics in the early period of American skyscraper construction. Beginning at the end of the nineteenth century, and essentially ending with the erection of the Empire State Building, circa 1931, the plots of literary novels and short stories, architectural treatises, and magazine covers retell the aesthetic history of skyscrapers, endeavoring, as Brown argues, to "recover (the skyscraper's) influence not only on the shape of the city but also on the racial sensorium of its residents and readers."

Beginning with two "weird," or fantastic, stories, the anxiety white