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Commentary

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## Refracting Urbanism: The Multiple Histories (as well as Geographies) of the Networked City

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### ABSTRACT

This piece explores the role of history in the splintering urbanism thesis, and infrastructure studies more generally, to make the case for a more nuanced understanding of the multiple histories underpinning the networked city. I reflect on the use of history as an argumentative ploy in *Splintering Urbanism*, criticize common framings of the past in infrastructure studies, and map out an agenda for future scholarship on urban infrastructure histories based on this critique. In doing so, I argue that the messiness of infrastructure history gets obscured when told through evolutionary or retrospective narratives.

### KEYWORDS

Infrastructure; urban history;  
Modern Infrastructural Ideal;  
splintering urbanism

### Refracting the City through an Infrastructure Lens

When Steve Graham and Simon Marvin published their seminal book, back in 2001, they characterized infrastructure as the “Cinderella of urban studies” (Graham and Marvin, 2001: 18). The epithet was a fitting one. At that time infrastructure was treated by urban scholarship, if at all, as the menial servant of the city: essential for urban systems to operate, but best kept concealed from public view. Twenty years on, the tables have turned, and we are witnessing a veritable “infrastructural turn” in the academy (Amin, 2014; Anand et al., 2018). Infrastructure has become for many scholars a choice vantage point for studying the urban condition. After a long period of obscurity and neglect the “Cinderella of urban studies” is now reaping recognition and respect, as in the fairy tale. This dramatic role-change is due in no small measure to the pioneering scholarship of Graham and Marvin’s book and its wide critical acclaim. There is definitely something of the fairy godmother to their game-changing intervention, *Splintering Urbanism*.

The metaphor I prefer to use to guide my commentary, though, is refraction. The term refraction refers to how a ray of light is deflected, bent, or broken up when passing through a medium such as water or glass. The effects of refraction can be seen in a rainbow, through a kaleidoscope, but also in a mirage. In three significant ways the authors of *Splintering Urbanism* shone light through an infrastructure lens to produce a colorful and original take on the contemporary city. First, they refracted urbanism

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itself, demonstrating with numerous examples from across the globe how cities are produced socio-technically, involving complex processes of co-constitution between cities and their infrastructures. Second, they illustrated the value of refraction as a research method, using infrastructure as a medium to reveal unusual insights about a familiar object. Third, they advanced a perspective of the city as an object of refraction: always changing with a further turn of the kaleidoscope and continuously subject to reinterpretation by users, rulers, and observers alike.

Their scholarly acts of refraction, illuminating both the urban condition and urban studies, have inspired a generation of scholars to appreciate the significance of networked infrastructures for cities, but also to engage critically with key postulates of the splintering urbanism thesis. From this rich body of work, we now have a fine-grained understanding of the multiple geographies at play in city–infrastructure relations. By contrast, far less attention has been paid to the historical framing of the splintering urbanism narrative. This can be attributed largely to the prominence of human geographers and the dearth of urban historians in the debates inspired by the book. Historians certainly acknowledge the book’s contribution to urban and technology studies, but mostly in passing and without engaging with its historical postulates. In this piece, I call for this imbalance to be rectified and make the case for an equally nuanced understanding of the multiple histories underpinning the networked city. First, I reflect on the use of history in *Splintering Urbanism* and how it is enrolled as an argumentative ploy. Second, I consider common ways of framing the past in urban infrastructure studies and their limitations. Third, based on this critical analysis I map out an agenda for future scholarship on urban infrastructure histories.

## The Modern Infrastructural Ideal as a Historical Foil

I have always been struck by the importance of history in contextualizing and justifying the splintering urbanism thesis. It is astonishing, as well as revealing, that two geographers should dedicate 100 pages of their 420-page book to the pre-contemporary era. Although the thrust of the book is about ongoing processes of urban and infrastructural fragmentation, longer-term historical framing is critical to their line of argumentation. Describing the emergence, consolidation, and subsequent erosion of what they term the “modern infrastructural ideal” (MII) generates a powerful message about the transformation of the networked city since the 1970s.

This infrastructural ideal of the integrated, networked city—Graham and Marvin argue—held sway in developed countries, at least, from the 1850s to around 1970. Its durability across diverse political regimes and economic systems for over a century can be attributed to four compelling arguments (Graham and Marvin, 2001: 40–89):

- First, infrastructure was an icon of modernity, drawing on ideologies of science and technology to nurture ideas of progress through infrastructure.
- Second, infrastructure was a lynchpin of integrated urban planning, giving material expression to norms of universal connectivity and affordable access.
- Third, infrastructure was a medium of urban consumption, enabling Fordist social and economic life through technical networks.

- Fourth, infrastructure was an instrument of state-building, used by nation states and modern municipalities to exercise territorial control.

The infrastructural ideal engendered by these powerful modernist rationales came to be characterized by universal access to services, standardization of norms, technological centralization, and territorial monopolies. The MII was not restricted to industrialized countries but exported to others—regardless of suitability—as a key component of (neo-)colonialist expansionism and exploitation. Graham and Marvin point out significant tensions between this ideal and lived realities of the networked city during its heyday but argue that these were generally hidden by the material and discursive invisibility of infrastructures at this time. Only after the late 1960s was the MII fundamentally challenged by an infrastructure crisis produced by a combination of neoliberal ideology, state withdrawal, infrastructural consumerism, and the decline of comprehensive urban planning (Graham and Marvin, 2001).

This historical narrative of the MII as a universal phenomenon with a linear trajectory of advancement until recently challenged has come in for criticism, primarily by fellow geographers. Many commentators have pointed out that the modern infrastructural ideal was primarily just that: an ideal, and not a reality. Implementation of the MII was, in practice, heavily dependent on conditions of state support and relative wealth (Coutard, 2008). In low-income countries the MII—if aspired to at all—often failed to be realized (Silver, 2014; Graham and McFarlane, 2014). These societies suffered from an infrastructurally splintered urbanism long before the splintering tendencies described by Graham and Marvin exacerbated existing inequalities (Kooy and Bakker, 2008). Other critics have argued that universality of service did not always produce urban integration even in wealthier countries, where it often served the interests of elites in the early years (Coutard, 2008).

I share these concerns about the historical accuracy (as well as geographical applicability) of the MII presented by Graham and Marvin. Their broad-brush characterization of a dominant, universal trajectory is brilliant in its thought-provoking reduction of complex socio-technical interactions, but—perhaps inevitably—flawed in its ability to capture variance and context, whether temporal or spatial. So, while I am impressed by the significance of history to the book's rationale, I am dissatisfied with the simplicity and linearity of the historical narrative the authors weave. More than this, I am disturbed by the instrumental purpose underlying their enrolment of historical knowledge. The MII is used in the book essentially as a historical foil. By emphasizing the importance of standardization, urban integration, and public service in the past, the authors can portray contemporary processes of unbundling services and splintering urbanism in stark contrast. The principal purpose of the historical chapters in the book is to provide an argumentative springboard for seeing the present in a particular way. As a heuristic device, this is effective. As a representation of the past, it is tendentious. From a historian's perspective the MII thesis falls down, therefore, on two accounts. It lacks sufficient historical empiricism to substantiate its claimed universality, and it is founded on a reading of the past framed by contemporary developments. This goes some way to explaining why so few historians have engaged with the book's premise. "Instrumentalism" and "presentism" are two common criticisms they level at social scientists' treatment of history (Tosh, 2008).

## Dominant Framings of Urban Infrastructure Pasts: A Critique

In defense of Graham and Marvin, they based their historical portrayal of urban infrastructures on what was, at that time, the pre-eminent concept of historians of technology: Large Technical Systems (LTS). Rather than skimming over the past as a mere prelude to the present, they drew explicitly on a theory of socio-technical development ideally suited to substantiating infrastructural modernism. LTS explains the history of large infrastructure networks—such as an electricity or sanitation system—in evolutionary terms, from the early beginnings to a fully-fledged system. Once established, LTS becomes path dependent, with its various components bound together in a self-reinforcing system accommodating change but rarely challenged by it (Hughes, 1983; Coutard, 1999). The problem with the LTS concept is that it was developed to explain the emergence and consolidation of a socio-technical system, but not its subsequent adaptation, ossification, demise, or reincarnation. Almost all LTS-inspired research has targeted the period of time when infrastructures originally developed: in the case of industrialized countries the mid to late nineteenth century for water and the early twentieth century for electricity systems. What happened to these systems once they were established has attracted surprisingly little attention by historians of technology (an exception is Melosi, 2000). This has left us with a gap in empirical knowledge about the intervening period between then and now, but also in our ability to conceptualize the complexity, permeability, and dynamics of mature socio-technical configurations.

A second, more recent source of historical narrative for urban infrastructure scholarship has come, curiously, from non-historians. Research on socio-technical transitions, developed at the interface of innovation studies and science and technology studies, has attracted massive interest in the years since *Splintering Urbanism* was published (Geels, 2002; for critiques, see McFarlane and Rutherford, 2008; Lawhon and Murphy, 2011). It has generated a model of socio-technical change—the Multi-Level Perspective (MLP)—to explain the dynamic interaction between innovation niches, socio-technical regimes, and contextual “landscapes.” In contrast to LTS, which seeks to explain the emergent path dependence of socio-technical systems, transitions research—as the name implies—addresses how these path dependent systems can change or be made to change. The evidence amassed to develop and refine the MLP model is historical, based on case studies of past socio-technical transitions (Geels, 2011; Coenen and Truffer, 2012). Despite the historical focus to much of the empirical work, the epistemological thrust of transitions research is essentially “presentist.” The underlying interest is to use the past as a source of inspiration for modern-day challenges of societal transformation. This is not to criticize the use of history to inform the present. The problem lies rather in the selectivity and myopia involved in studying the past with an agenda designed to provide solutions for today. This orientation, while valuable in its own right, misses much of the full historical experience. As I argue in my recent book on Berlin, you cannot reduce a city’s infrastructure history to a series of socio-technical transitions, failed or successful (Moss, 2020).

## Future Urban Infrastructure Histories: A Call for Refracting Temporality

With these two influential schools of thought at their disposal, the urban studies community might be forgiven for thinking that the history of infrastructure has been done and

dusted. This, at least, is the impression given by some scholars arguing that greater attention should be paid to the spatial dimensions of networked infrastructures now that the temporal aspects are sufficiently well understood (Truffer and Coenen, 2012). However, as I have indicated above, the predominant frames of historical analysis—on large technical systems and socio-technical transitions—can explain only part of the story. There remain rich seams of urban infrastructure pasts yet to be mined.

I see the need to rethink the temporalities of urban infrastructures. Just as human geographers are today looking beyond universalist explanatory models, historians of technology should be paying greater attention to how urban infrastructure unfolds in messy ways. For too long, the focus of attention has been on “ideal types” and formative periods of modern urban systems (Gandy, 2014: 8). In pursuit of the overarching narrative, deviant or disruptive features have often been written out of the script. Yet, as many urban studies scholars are arguing, the popular vocabulary of lock-ins and regimes has blinded research to the rich and dynamic entanglements revealed in more inductive empirical work. They are describing socio-technical change today as contested, incremental, hybridized, and spatially grounded (Furlong, 2014; Bulkeley et al., 2014; Lawhon et al., 2018). Beyond urban studies, many disciplines are demonstrating the value to be gained in taking a closer look at infrastructure histories. These range from anthropological studies of infrastructures traversing political regime change (Collier, 2011; von Schnitzler, 2016) and geographers using infrastructures as a window on post-colonial transformation (Furlong, 2014; Silver, 2014) to historians portraying transnational technologies as agents of change across the twentieth century (Högselius et al., 2016).

Histories of urban infrastructure, these studies are telling us, are not just evolutionary or retrospective. In addition to the path dependencies and critical junctures that have always attracted attention, we need to consider the nonlinear trajectories, discarded alternatives, and legacies from the past that have also shaped city–infrastructure relations (on the following, Moss, 2020: 20–33). A time-sensitive analysis of technological urbanism needs to look beyond the monolithic and universal system to contemplate competing, complementary, and hybrid infrastructures. It should seek to reveal infrastructural palimpsests, in which old and new components are juxtaposed in continuous processes of realignment (Graham and Thrift, 2007). It should be attentive to the processes by which different components of a socio-technical configuration change, or do not change. Rather than conceiving of infrastructure systems as being in a state of either obduracy or transition, such a nuanced approach draws attention to forces pulling in both directions at any one time (von Schnitzler, 2016). How these dynamic configurations from the past continue to frame infrastructure practices and policies in the present—whether as objects of veneration or of censure—is clearly of critical importance. Finally, more work is needed on how infrastructures work across different timescales, mediating historical processes and connecting everyday lives to the material and symbolic legacies of the past (Anand et al., 2018).

This is what I mean by refracting the temporality of urban infrastructure. Just as Graham and Marvin refracted the spatiality of the networked city with their multiple conceptual approaches and empirical illustrations, so our knowledge of urban infrastructure histories needs revitalizing with fresh perspectives. A refracting lens can challenge the persistent assumption that socio-technical systems were, for most of the twentieth

century, monolithic, homogeneous, and universal, shedding new light into the proverbial “black-box” of infrastructure studies. While detailed historical analysis can refract this light into a myriad of realities and a plurality of perspectives, the call remains for overarching narratives capable of capturing this diversity. Higher order abstractions are not rendered redundant by nuance and contingency. They should remain an object of urban infrastructure history. The trick lies in ensuring that the compound image conjured up by the refracted beams of light does not turn out to be a mirage.

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