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**Infrastructures and Laws:
Publics and Publicness**

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Abstract

Infrastructures are technical-social assemblages infused in politics and power relations. They spur public action, prompting increased scholarly reference to the practices of infrastructural publics. This article explores the normative and conceptual meanings of infrastructures, publics, and infrastructural publics. It distills from political theory traditions of Hannah Arendt, Jürgen Habermas, and Nancy Fraser a normative ideal of publics composed of the persons subject to a particular configuration of power relations that may significantly affect their autonomy. Autonomy can be seriously affected not only by existing or planned infrastructures, with their existing or anticipating users and workers and objectors, but also by the lack of an infrastructure or by the terms of infrastructural exclusions, rationings, channelings, and fiscal impositions. Legal-institutional mechanisms provide some of the means for infrastructural publics to act and be heard, and for conflicts between or within different publics to be addressed, operationalizing legal ideas of publicness. These mechanisms are often underprovided or misaligned with infrastructure. One reason is the murkiness and insecurity of relations of infrastructural publics to legal publics constituted or framed as such by institutions and instruments of law and governance. We argue that thoughtful integration of infrastructural and legal scaling and design, accompanied by a normative aspiration to publicness, may have beneficial effects.

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1. INTRODUCTION

Infrastructure studies and legal studies have not been closely connected in the academy, even while infrastructure and law have much to do with each other in practice. An increasing number of topical works traverse both terrains (e.g., Hilgartner 2017), but more systematic investigations of how infrastructure and law come together or mutually illuminate are only recently expanding (e.g., Donaldson & Kingsbury 2013a, Eslava 2015, Kingsbury 2019, Mallard 2014, Valverde et al. 2018). This article connects a major strand of normative political and legal theory on publics and publicness, with recent work on infrastructural publics (Collier et al. 2016, Korn et al. 2019a). We argue that infrastructural publics and legal publics are already brought into relation in innumerable sociopolitical practices and institutions and that articulating this connection theoretically and assessing the scope and implications for publicness is a project with important conceptual, normative, and practical value.

Specifically, we make three claims. The first is conceptual: We argue that, because of their relational nature, infrastructures—like laws—always have publics. Infrastructures are substrates upon which, and in relation to which, social practices are developed (Carse 2017, p. 27; Jensen & Morita 2017, p. 615; Korn et al. 2019b, p. 14; Star & Ruhleder 1996, p. 112). Thus, people are connected in relationships of mutuality by these infrastructures. Infrastructures may also impede and proscribe the formation of certain publics and truncate or fracture others (Appel et al. 2018, p. 23). Laws have a parallel set of relations with publics, but these publics are often not identical with infrastructural publics. The result is a complex patchwork of some interrelated publics, and some disconnected publics, of different kinds.

Second, we argue that the relations between infrastructures and their publics, and the attributes of and relations among infrastructural and legal publics, are informed by practices of publicness and, at times, by an aspiration to an ideal of publicness. Publicness includes principles of accessibility, exposure, and consideration. Infrastructures, like laws, are “critical locations through which sociality, governance and politics, accumulation and dispossession, and institutions and aspirations are formed, reformed, and performed” (Appel et al. 2018, p. 3). The publics formed around infrastructures can and frequently do intervene in these critical struggles, using material and discursive as well as law-based means to demand that the infrastructures are structured, governed, and operated in a manner responsive to their claims and interests. This aspiration to publicness is, however, frequently counterweighted by other ideals—also relevant within the publics, and sometimes more prominently showcased—such as efficacy, efficiency, or security.

Our third and final claim is normative. We argue that legal regulation apposite to infrastructures should be designed to account for, first, the existence of these multiple publics, and second, the aspiration to publicness in their relations. Reciprocally, we argue that infrastructures should be designed and operated with attention to aspirations toward publicness for infrastructural and legal publics. These endeavors call for spatial and temporal imagination that may prove highly generative. None of this is simple. Identifying the various publics involved, understanding their interests and divergences, and conceiving ways in which they may speak or be truly represented all pose enormous challenges. These challenges include balancing the value of aspirations to publicness with the other promises and needs of infrastructures and of systems of laws. Nonetheless, many practical forays in such directions have been made.

The arguments are presented in four sections. In Section 2, we set forth our understanding of two basic concepts: infrastructure(s) and law(s). In Section 3, we explore the various kinds of publics associated with laws and infrastructures. In Section 4, we consider their publicness. In Section 5, we study the frequent divergences between these publics, and the emergent challenges for publicness. We end with a brief conclusion relating this scholarship to more critical traditions.

2. KEY CONCEPTS: INFRASTRUCTURES AND LAWS

Two key terms for this field require initial explication: infrastructure(s) and law(s). Neither of these has a straightforward ontology. Struggles over meaning (and over the meanings of their antonyms) contribute to the intellectual vibrancy and political salience of each of them.

2.1. Infrastructure(s)

Infrastructure poses particular challenges because it is a comet-like term arcing into the ascendant with particles of meaning and usage trailing through space and time. For the term to work as a concept, it must be cabined, at least for our purposes in this article, and not only so that a reasonable and recognizable statement can be made with regard to *X* that “*X* is not infrastructure.” One reason the term is open-ended is that it does not so often matter decisively in practice whether *X* is infrastructure, although the issue can arise in economic and legal-institutional determinations as to whether *X* falls within the infrastructure asset class or the terms of a contract for infrastructure or a government rule on critical infrastructure. A second reason is the trajectory of the infrastructure studies field. Having built momentum in the 1980s with a focus on large (physical) socio-technical systems (Hughes 1983), and on the historical evolution and eventual internetworking of such systems, the 1990s saw more ethnographic studies of labor and power relations (Star 1999) and the development of infrastructure-related scholarship on information and communication systems (Bowker 1994). By the end of the 2000s, a large group of scholars were also working on knowledge infrastructures, ranging from libraries and science cyber-infrastructures to classification and modeling, in parallel with an enormous growth in work on internet and digital-economy issues extending from standardization to open source to platforms (Edwards 2003, Edwards et al. 2009, Plantin et al. 2018). By the 2010s, a drift was apparent away from insistence on the core materiality of infrastructures, so as to encompass knowledge and algorithmic ecosystems and many aspects of media, communications, and information studies (e.g., Bellanova & de Goede 2020, Edwards 2018).

It is thus not easy to construct a bounded meaning of infrastructure—to distill it from either this range of scholarly uses or ordinary language usage. Our approach, then, is to construct the concept for our purposes, taking account of the infrastructure studies literature but not seeking to incorporate the full expanse of its purview. As infrastructures differ, and are experienced in radically different ways by different people, we adopt the plural infrastructures to aid differentiation.

We endorse the stipulations that infrastructures must have a significant material dimension and that they are built as opposed to simply natural (Larkin 2013). They are “extended material assemblages” (Harvey et al. 2017) that “mediate exchange over distance,” typically linking dispersed specific practices, people, objects, and spaces (Larkin 2013). They mediate not only space but also time. They are part of the configuring of time, whether social time or other kinds of temporalities (Appel et al. 2018, p. 15). Infrastructures are distributions of features or qualities along several axes. The axes include (a) materiality to intangibility; (b) significance of social elements (low to high); (c) peripherality to centrality of technical elements; (d) degrees of hierarchy and formality in organizational governance; (e) temporality, from evanescent to enduring; and (f) spatiality, from primarily localized to global or beyond (Bowker et al. 2009, Star & Ruhleder 1996). For each infrastructure, the distributions along these axes are dynamic and somewhat connected. With regard to all elements, characterization as infrastructure depends on observational or participatory standpoints: What is experienced by one group of day-wage workers as their labor is experienced by another group of far-off users as the infrastructural substrate on which they then build or run something else (Star 1999).

From our specification that infrastructures are material follows the observation that infrastructures typically have some spatial fixity. The degree of immobility varies. The first references to infrastructure in nineteenth-century French railroad terminology were to the immobile track bed (the rolling stock of the operating companies was not infrastructure) (Carse 2017). For a contemporary digital platform, most of the cost structure may be software engineers and marketing, but data centers and cables or wireless transmission and terminals and internet-of-things hardware, along with all the standard protocols, remain indispensable (Dourish 2017). Only rarely is material infrastructure fully mobile. Much infrastructure also has a temporal fixity, at least in retrospect, so that it is not easily reconstituted in a new moment. Spatial and temporal fixity may be indirect as well as direct. For example, long-distance fiber-optic cables in the United States commonly run along the routes of nineteenth-century railway lines or of major and minor roads and are enabled by that earlier built infrastructure (Hu 2015).

Infrastructures are relational. They bring into being or shape or exclude social relations, technical relations, and socio-technical relations. The effects of infrastructures on social relations are “either through engineered (i.e., planned and purposefully crafted) or nonengineered (i.e., unplanned and emergent) activities” (Harvey et al. 2017, p. 5). At the same time, infrastructures are effects—of institutions, other infrastructures, social relations, and continuing practices of maintenance, extension, workarounds, repurposing, neglect, decay. The connections are recursive, so that infrastructures are dynamic in the way a society or an ecosystem is. Infrastructure governance is part of this recursivity. Probably the most prevalent pattern in the infrastructure studies literature is to analyze infrastructures as heterarchical networks—or as networks of networks (Edwards 2003)—but in our view there is only a contingent and not a necessary relation between infrastructure and network governance models. Moreover, although analysis of power, agency, knowledge control, and social meaning in infrastructure studies has been influenced in an ancestral way by major schools of theory originating in France (including Foucault, Bourdieu, Latour, Rancière, and in information studies Thévenot and Desrosières), the extraordinary widening of the field, including a highly influential array of works by women scholars and a range of flourishing inquiries and agendas focused elsewhere in lives and in the world, has decentered this earlier style.

As to scale, early work in (what became) infrastructure studies had focused on spatially or socially large-scale socio-technical systems (and interconnected systems), such as the US government’s North American defense radar network (Edwards 1997), the DARPA (Defense Advanced Research Projects Agency)—net leading on to the internet, or NATO’s (North Atlantic Treaty Organization’s) use of the term to denote shared material resources that would be paid for collectively rather than by individual member states (NATO 2001). Logistics, honed in military then in dual-use and civilian organizations, demands and enables infrastructure with complex and intersecting systems and extended scale (Cowen 2014). Financial market innovations (e.g., in decentralization, dark-pool and high-frequency trading, asset securitization, and derivatives) were implemented through markets infrastructure and analogized to plumbing and utility networks, focusing attention on relations of infrastructure to nonlinear effects of changes of scale in both volume and velocity (Mattli 2019a,b; Pistor 2019). Analogous interests developed in communications and media studies, as well as in business strategy and valuation, as the rise of digital search/knowledge and platform businesses with infrastructure-type features brought scale and scalability to the discursive center of the digital economy and its governance (Cohen 2019, Wu 2018). The preoccupation with bigness as a quality or affordance of infrastructure has been challenged on several fronts. The infusion of studies of social and organizational dimensions of specific technologies, such as Vismann’s (2008) work on files, and a refocus on invisible or undervalued labor and on local sustainability and practices (Medina 2011, Shapin 1989, Star 1991, Tsing 2015) invited consideration of infrastructure at small scale as much as large. This receives normative support from

projects to minimize anthropogenic effects and live off the grid or prioritize the local in food supply or sustainable cities. Small infrastructures are designed to generate and interact with local publics, potentially more engaged and more empowered, as opposed to spatially and temporally large-scale infrastructures, although infrastructural autarky is relatively uncommon. In our view, it is possible and desirable for infrastructure to be conceptualized without any limiting conditions concerning spatial or social scale, as infrastructure is inherently relational and situational. A necessary timescale component arises, however, from the aspiration in the design of infrastructure that it attains eventual stability, with a duration long enough for people to make plans and develop social practices reliant on the infrastructure. Thus, infrastructure is not evanescent (absent calamitous failure or unanticipated external change).

To summarize, for our purposes, infrastructures are dynamic, systemic networks and assemblages, built at varying scales, with some spatial fixity and durability. They instantiate and precipitate changing social and technical relations, are embedded in and productive of specific legal-organizational forms and socio-technical practices, and are experienced differently by differently situated people. Viewed normatively, infrastructures are or should be oriented to publicness.

2.2. Law(s)

Law is a field of sociopolitical practice as much as it is a field of intellectual inquiry. Two meeting points in the mutual interrogation of practice and theory are the questions of what it means to be law and how to determine (if this is requisite) that *Y* is or is not law (law for me, or in this place, or for this activity). Thus, the meaning and bounds of law are central to legal studies in ways that must influence how we choose to use the term here. However, our argument does not depend on taking positions within these internecine debates. We take a legal pluralist approach. Multiple laws can exist for the same person (religious law and government law), and in the same space (indigenous tribal law and government law), and for the same activity (the self-organized rules of an association of sports clubs and the state law of market competition). We therefore refer in this article to laws rather than the law. Laws and legal institutions (like infrastructures) are characterized by some spatial and temporal fixity. This applies also to “the people,” who are replenished generation to generation, thereby transmitting public culture and maintaining a legally continuous identity, much as “the state” does [Grotius 2005 (1625), pp. 664–74].

The scale of laws is interestingly comparable to the scale of infrastructures. Micro-laws are possible, studied, for example, in work on social norms and practices of queuing (Reisman 1985), and a social practice may be one of laws even with only a few persons involved and very limited spatial reach (Grimmelmann 2012). Nonetheless, most of the laws relevant to infrastructures are spatially extensive. Laws also have timescale conditions. Laws are designed to stabilize expectations and allow planning, enabling a single agent to rely on expectations about the conduct of other agents over time. Laws can be thought of as enmeshed in social practice, as is inescapably the case with customary laws and other nonpromulgated laws (Perreau-Saussine & Murphy 2009). In some formal theories of laws, laws are an act of will and hence might come into being and cease to be at precise moments (cf Somek 2017), but in sociolegal analysis, intangible laws have durability and stickiness, as tangible infrastructures do.

3. INFRASTRUCTURAL, LEGAL, AND NORMATIVE PUBLICS

A common trait of laws and infrastructures is that each can create, shape, or prevent the emergence of social relations of particular kinds. Following classic work in legal and political theory, and recent work in infrastructure studies, we explore the development of such relations through the

conceptual, normative, and empirical lens provided by the notion of publics (Collier et al. 2016, Korn et al. 2019b, Le Dantec 2016, Marres 2012).

A public (used here as a noun) is a number of persons who were otherwise for the most part strangers to one another but stand connected in a relationship of mutuality vis-à-vis something external to them. This definition builds on a Kantian intuition about the nature of political relations: Even if people do not want to engage publicly with others, they may be bound to do so by the fact that they need to live in a relationship of proximity to one another, sharing the available resources [Kant 2017 (1797), sec. 6:307; Waldron 1999, 2011; see also Young 1990, p. 227ff]. This relation of proximity drives the engagement with common concerns and the necessity of public discussion on how to arrange such matters and solve those eventual conflicts (Waldron 1999, 2011; see also Habermas 1996, p. 310): “When you cannot avoid living side by side with all others,” Kant [2017 (1797), sec. 6:307] stated, “you ought to leave the state of nature and proceed with them into a rightful condition.”

This postulate of public right normatively prompts, then, the emergence of what Habermas (1991, p. 27) reconstructed as a “public sphere,” i.e., a discursive space in which private people come together to engage on matters of common concern. However, as Fraser (1990, p. 66) pointed out, in complex, stratified societies, “arrangements that accommodate contestation among a plurality of competing publics better promote the ideal of participatory parity than does a single, comprehensive, overarching public.” Thus, the public realm is now conceptualized in a pluralist manner, as an “open and inclusive network of overlapping, subcultural publics having fluid temporal, social, and substantive boundaries” (Habermas 1996, p. 307; see also Mansbridge et al. 2012; Young 1990, p. 241; Warner 2002). One account suggests that strong publics (legally bounded entities holding decision-making powers) coexist with weak, informal publics, whose deliberative practice consists only in opinion formation, and with subaltern counterpublics—parallel discursive arenas in which members of subordinate groups invent and circulate counter-discourses (Fraser 1990). These publics may be transnational: Publics need not coincide with national citizenries (Fraser 2010, pp. 87–89; see also Habermas 2001, pp. 58–112).

The scenarios of proximity and nonproximity that give way to the development of publics may be driven by history or necessity or be the result of human legal and infrastructural decisions. Laws bring people together (and apart, as international borders do), both spatially and temporally: They bind (past, current, and future) groups of persons into (or out of) a joint, collective fate. Infrastructures play a similar role (Larkin 2013, p. 328). The steamship revolution was characterized in the nineteenth century as a “rebellion against the tyranny of distance” (Baldwin 2016, p. 120), just as the near-instantaneity of Samuel Morse’s telegraph was thought to annihilate time and space (*The Baltimore Sun* 1844, cited in Rosen 2012). Infrastructures and laws, in sum, condition or shape the space and the time that people share—and through them, their social and political relations.

In this section, we distinguish three different kinds of publics prompted or shaped, or conversely obstructed or thwarted, by laws and infrastructures. First are what we call legal publics, i.e., people brought together by the fact of being subject to the same laws. Second are what we call infrastructural publics, i.e., people brought together by being affected by the same infrastructures. And third are what we call normative publics, i.e., people subject to power relations that may significantly affect their autonomy and who are therefore normatively deserving of certain public entitlements.

3.1. Legal Publics

All systems of laws, and many individual laws, create publics: They designate groups of individuals as subject to their commands. People in a state, a province, a company, or a club may be constituted

as a legal public by the relevant regulations. The Kantian relation of proximity (or nonproximity) is prompted by the laws themselves, which bring people together as collectivities (or exclude them from relevant collectives), independently of their will (see Kingsbury & Donaldson 2011, p. 84). These legal publics may overlap with, but may also diverge from, other collectivities, such as communities or nations, which involve a “sense of shared belonging and shared identity” (Kymlicka 2002, p. 257).

Beyond the creation of these legal publics, in the pluralist conception of the public realm, laws—broadly conceived—play two other, simultaneous roles. First, distinct legal regimes, specific to different publics, govern *intrapublic* relations according to varying logics, dynamics, and traditions. Each of these regimes defines its scope and its membership and attempts to regulate the actions of those within its purview. This gives shape to a pluralist legal order, one in which different legal regimes coexist, interact, and sometimes compete (Merry 1988). The public, i.e., the national public, is no longer the only legal public: Multiple laws define a network of overlapping publics.

Then, second, legal regimes also govern—through action or inaction—some *interpublic* relations, the relations among the publics themselves (Fraser 1990, p. 66; Kingsbury 2009a). This includes setting the rules for the discursive and coercive interactions between these publics but also the institutional recognition of the publics themselves, as such (international law, for example, has classically been concerned with recognition of states and distinguishing states from other entities; see, e.g., Anghie 2004, chapter 1; Eslava & Pahuja 2020).

3.2. Infrastructural Publics

Given their relational nature, infrastructures prompt, shape, and avert the development of publics, much as laws do. John Dewey and Walter Lippmann spotted this early in the twentieth century, when studying the role of publics in societies marked by technological innovations. Railways, mail, and telegraph wires, Dewey (1927, p. 107) argued, “influence more profoundly those living within the legal local units than do boundary lines” and determine “the most significant constituents of the public and the residence of power” (see also Marres 2012, pp. 45–46). As Lippmann [1993 (1927), p. 67] explained,

The public with respect to a railroad strike may be the farmers who the railroad serves; the public with respect to an agricultural tariff may include the very railroad men who were on strike. The public is not, as I see it, a fixed body of individuals. It is merely those persons who are interested in an affair and can affect it only by supporting or opposing the actors.

Despite these early indications of a pluralist conception of the (material) public realm, governments have classically been assumed to build, commission, manage, and regulate infrastructures “on behalf of a public, understood as a predefined collective” (Collier et al. 2016). Claims to statehood and sovereignty, including imperial and socialist state construction and post-decolonization ideals of the developmental state, have long been buttressed by infrastructures for territorial access, communication, and control. In modern times these were extended routinely to delivery of infrastructural services to the population, accompanied by unifying invocations of the public and the public interest in the singular. The public were invited to share collective pride in visible infrastructures and obliged to collective responsibility through public debt and contractual obligations incurred by governments and owed by future generations (Schwenkel 2018).

Neoliberal ideologies and the shift to private provision in some societies and technological sectors brought analytic focus on what had always been the practical reality of the simultaneous

existence of multiple infrastructural publics, emerging from different social interactions and relations with different infrastructures (for reviews, see Collier et al. 2016, Korn et al. 2019b, Latour & Weibel 2005, Marres & Lezaun 2011). Praxeological social science studies showed that assorted “practices of infrastructuring and making public have engendered heterogeneous publics,” with variation in “scaling and trajectory, degrees of participation, representation or institutional/organisational delegation, localisation and distribution of people, objects and issues, and the infrastructural and public media involved” (Korn et al. 2019b, pp. 27–28). Membership in these infrastructural publics is not necessarily stable and “is not determined a priori, but instead evolves and arises out of a complex set of relations” (Le Dantec 2016, p. 14; Marres 2012, p. 14). This flux interacts with dynamism in infrastructures, which despite the financial rhetoric of a singular infrastructure project are seldom designed and built through a single decision-making process; when viewed in whole, they are more often modular and incremental (Star & Ruhleder 1996, p. 113) and “are always constructed in many places (the local), combined and recombined (the modular), and they take on new meaning in both different times and spaces (the contextual)” (Edwards et al. 2007, p. 7; see also Larkin 2013, p. 330).

Collective self-awareness as an infrastructural public may be nascent or nonexistent. Where it develops it facilitates agency in a process of infrastructuring: “The most important thing is for the user [and the maintainer] of the infrastructure to first become aware of the social and political work that the infrastructure is doing and then seek ways to modify it (locally or globally) as need be” (Star & Bowker 2005, pp. 241–42; see also Pipek & Wulf 2009; Karasti et al. 2010, p. 386; Le Dantec & DiSalvo 2013). The separation between infrastructures and their publics is then merely analytical. In practice they are mutually enmeshed. Infrastructures make publics, which make infrastructures, which make publics (Marres 2012, p. 55, and generally Latour 1990). Five stylized drivers of infrastructural public formation offer a cursory glimpse of the causal and typological investigations opened by this work.

3.2.1. Infrastructure-user publics. Publics emerge as a result of the development of infrastructures. One set of such publics are users or would-be users. To be a user of infrastructure is both cultural and political. “Belonging to a culture means, in part, having fluency in its infrastructures” (Edwards 2003, p. 189). Actual and potential users of infrastructures may see their life choices directly affected and organize and intervene to alter the power relations embedded in these assemblages (see Siemiatycki et al. 2020). Anand (2011, 2017) characterizes the political and technological programs of underserved communities in Mumbai to access the water supply system as developing a discursive-material “hydraulic citizenship,” with mobilized people gathering “around pipes and councilors to solve their water problems” (Anand 2018, p. 169).

3.2.2. Infrastructure-worker publics. Another result of infrastructures are publics of infrastructure workers, often underappreciated and undervalued by elites and by other publics (Crawford & Joler 2018, D’Ignazio & Klein 2020, Raso 2017). In her pioneering ethnographies, Star (1999, p. 386) emphasized the important work of cleaners, janitors, maids, and parents and argued that in systems design, “leaving out what are locally perceived as ‘nonpeople’ can mean a nonworking system” (see also Graham & Thrift 2007). Cowen’s (2014, pp. 91–127) study of interstitial violence in global logistics focuses on the laborers who make the infrastructure work in the global shipping system, often facing daily safety risks and occasionally asserting considerable power. A growing intellectual–practitioner collaboration pushes to extend beyond innovation and design to celebrate “Maintainers”: “those individuals whose work keeps ordinary existence going rather than introducing novel things” (Russell & Vinsel 2016; see also Vinsel & Russell 2020).

3.2.3. Infrastructure-thwarted publics. Infrastructures may work to prevent the emergence of certain publics. Von Schnitzler's (2018, pp. 135, 139) study of apartheid infrastructures—from buses and benches to townships to toilets—shows how these assemblages worked to establish “a politics of nonpublics,” one that “had as one of [its] primary goals to prevent the emergence of a public of sorts.” This South African segregation was both established in law and materialized in infrastructures, minimizing spaces for civic interaction and thwarting large protest gatherings in townships. Infrastructures redirecting flows of communication and information lead to missing social connections (and to social media “echo chambers”) (Flaxman et al. 2016). Infrastructures may splinter the unity of a local urban fabric through “glocal bypasses,” i.e., networks “configured to support interaction between local valued users and spaces and global circuits of infrastructural exchange” (Graham & Marvin 2001, p. 167; see also Appel 2012, Latham & McCormack 2004).

3.2.4. Infrastructure-contesting publics. Publics may emerge to contest the development or operation of infrastructures. Social movements, indigenous peoples, unions, and a panoply of civil society organizations frequently coalesce to confront and contest the power relations embedded in infrastructures. This may result in a contesting public and an infrastructure-supporting counter-public, the latter often backed by the state and large financial and industrial interests. Some infrastructures are embraced by publics of workers and businesses whose livelihoods are at the site but opposed by more distant publics concerned about despoliation of a unique environment. Other infrastructures are popular with distant beneficiaries, such as city dwellers using hydroelectric power from a large dam, but opposed locally and by global activist coalitions, including the Belo Monte Dam on the Xingú River in Amazon Brazil (on contestation about large dams, see, e.g., Khagram 2004, Rodríguez Garavito & Baquero Díaz 2020).

3.2.5. Infrastructure-demanding publics. Publics may come into being to demand provision of certain infrastructures that are nonexistent or inadequate. Transnational and local publics have emerged to demand that the “human right to water” be vindicated by infrastructural provision (Gleick 1998). Other publics demand the various infrastructures required to ensure respect to the rights of persons with disabilities (de Búrca 2010). Groups of city dwellers around the world routinely organize to demand the construction of public parks, gardens, athletic facilities, libraries, schools, and other “palaces for the people” (Klinenberg 2018).

3.3. Normative Publics

In the Kantian–Habermasian tradition, the question of the definition of publics is centrally related to the determination of membership for democratic enfranchising (a question known as “the boundary problem”; see, e.g., Arrhenius 2005; Maisley 2019, pp. 275–99). Given the inevitable connection between the fate of some individuals and that of others—as a result of their (spatial or metaphorical) proximity—collective decisions must be made respecting the wills, opinions, and interests of all the members of the public. This requires granting members (and not nonmembers) a series of normative entitlements, broadly described by Habermas and Fraser as “public autonomy” (Fraser 2010, pp. 41–43; Habermas 1996, pp. 84–104).

Two positions have been predominant as to who should be normatively considered a member of the relevant public, and thus granted these entitlements. First, many have argued that publics are groups of people composed by all those affected by something external to them (see, e.g., Fung 2013, Goodin 2007, Macdonald 2008, Warren 2017). Yet if the idea of being affected is given full breadth, virtually everyone, everywhere, should have an entitlement over certain decisions (Martí 2006, p. 79; Valentini 2014, p. 793). Thus, a second group of scholars has argued that publics are

instead groupings of all those subjected to a certain policy or decision (Abizadeh 2012, Erman 2013, Nagel 2005, Owen 2012). In Nagel's (2005, pp. 128–29) influential formulation, subjection takes place when people are legally bound to certain conduct under the threat of coercion. This approach solves, indeed, the overinclusiveness, but it has, contrariwise, a problem of underinclusion: There seems to be no reason “why restrictions of freedom perpetrated through explicit threats should be any more *prima facie* problematic than restrictions perpetrated via other means” (Valentini 2011, p. 210).

Both camps have therefore turned to a middle ground, with one group now focusing on “problematic,” “profound,” or “significant” affectations (Macdonald 2008, p. 35; Fung 2013, p. 247; Warren 2017, p. 3) and others expanding the scope of “subjection” to include “interactive coercion” (Valentini 2011, pp. 209–10); exercises of “physical force, economic incentives, or the potential of reputational consequences” (Goldmann 2016, p. 62); and, broadly, “the coercive power of nonstate and trans-state forms of governmentality” (Fraser 2010, p. 65). These centripetal moves have given way to a sort of convergent definition, one that understands publics as groups of people subject to power relations that may significantly affect their autonomy (Maisley 2019, p. 237).

The convergent criterion for the constitution of a public from a normative angle is, ultimately, one that resonates with the republican tradition in political thought: The defining element is the potential existence of domination, i.e., of some form of power relation impinging upon people's chances of making decisions they should have been able to make (Pettit 1997). Those decisions that were previously left to each person, or to groups of persons, now become public: They must, unavoidably, be made by the public [Habermas 1996, p. 310; Kant 2017 (1797), sec. 44].

4. PUBLICNESS

Once people have been placed in these relations of proximity, once the public has emerged, the ensuing social relations are vested with some peculiar features. In the Kantian tradition, these features are approached normatively: Members of the public have an obligation to collectively proceed “into a rightful condition” [Kant 2017 (1797), sec. 6:307], a regulatory ideal later referred to under the rubric of publicity [Kant 2006 (1795), sec. 8:381; see also, e.g., Fraser 1990, p. 71; Habermas 1996, p. 171; Young 2000, pp. 168–73].

We shift from the broad terminology of publicity to focusing on the more nuanced and specific notion of publicness (see, generally, Kingsbury 2009a). Publicness is a quality. It is not preordained but emerges as an element of connection in the relations within the public and in relations between the public and the thing external to them (e.g., a nuclear power plant and its operating company) or in relations with other publics. It is a particular way of structuring power relations, one that ensures some responsiveness to the claims and interests developed within the relevant publics (Waldron 2009). It may thus ebb and flow, be made and remade. Several symbols or signs are indicative of the terms of the relations. These include value articulation, participation, representation, contestation (Kingsbury 2009b, Maisley 2017), and visibility or transparency (Donaldson & Kingsbury 2013b). Violence, domination, and subordination may coexist with publicness but are antagonistic to an ideal of publicness. The sharing of goods or benefits or of responsibilities of some kind, and governance of ways to do this, frequently undergirds publicness.

To explore the publicness of legal, infrastructural, and normative publics (and of interpublic relations), we draw on a classic metaphor—also with a Kantian lineage—that conceives publics as shared spaces (see Habermas 1996, p. 361; Ruppert 2006, p. 272; Young 2000, pp. 170–73). In this understanding, the relations of proximity are prompted by the emergence of an imaginary space, sphere, or realm in which people are together and interact [Arendt 1998 (1958), p. 50; Fraser 1990, p. 67; Habermas 1991, p. 27]. Following this shared-space metaphor, we draw attention to

three elements of publicness particularly pertinent to infrastructures, laws, and their relations: accessibility, exposure, and consideration (see Young 2000, pp. 168–73).

4.1. Accessibility

Relations in these spaces are public, in the sense that they are open and minimally accessible to all members of the public (see Young 2000, pp. 168–69). However, there may be formal, legal regulations on accessibility, resulting in different kinds of restrictions or unequal entitlements (see, e.g., Mitchell 1997 on regulations expulsive of homeless people). There may also be infrastructural obstacles to access, as in Winner's (1980) classic example of Robert Moses's low overpasses, which impeded public transportation access to suburban New York beaches. Even if baseline access is the same for all, "the greater resources of wealth, power, influence, and information make access easier for some than others" (Young 2000, p. 171; see, generally, Fraser 1990, pp. 63–65). Typically, "women, the poor, racial minorities, and marginalized communities have the worst access to critical infrastructure services, and disproportionately bear the negative consequences from noxious public works projects built in their communities" (Siemiatycki et al. 2020, p. 297).

The normative aspiration established by the Kantian ideal of publicity is that all actions that affect the autonomy of human beings should be accessible to them, and potentially subject to their scrutiny [Kant 2006 (1795), sec. 8:381]. With regard to laws, this means that they should be publicly promulgated (Fuller 1963, p. 51; Waldron 2008, p. 24) and that the decision-making process behind them should be open and inclusive (Gargarella 1998; Nino 1996, pp. 133–34). With regard to infrastructures, this means—on top of access to infrastructuring processes—an aspiration to public provision of services essential for leading an autonomous life. Ripstein (2009, p. 247) makes this Kantian argument in relation to roads: Even if all people were guaranteed a parcel of private land, the absence of public infrastructure would make them dependent on their neighbors' good will to leave their property and, thus, "systematically subject to the choice of others." "The solution to this problem is obvious: roads, understood as a system of public rights of way," i.e., understood in a Kantian fashion, as one that "can cross private property, but. . . must be public in the sense of being open to all as a matter of right, rather than available only to some specific person or group of persons" (Ripstein 2009, pp. 248–49). Similar arguments can be made in relation to other infrastructures essential for leading an autonomous life, from access to water to breaching the digital divide and ensuring internet connections (Gleick 1998, Tully 2014).

4.2. Exposure

Second, because these spaces are populated by and visible to actors with different interests, priorities, values, and experiences, "[e]vents and expression that occur within these sites and fora [will be] *exposed* to this plurality of points of view" (Young 2000, p. 169; see also Ruppert 2006, pp. 274–77). Indeed, as Arendt [1998 (1958), p. 50] explained, one of the features of something appearing in public is that it "can be seen and heard by everybody and has the widest possible publicity." A defining element of publics, Warner (2002, p. 63) notes, is that any form of expression "also address[es] onlookers, not just parties to the argument." This exposure structures the kind of interactions that take place in these spaces: "Because the number of witnesses in principle is so large and because many of them are strangers in this sense, one whose words or deeds are public has little control over how the public will take up, interpret, and act in relation to what they say and hear" (Young 2000, p. 169; see also, generally, Warner 2002). What characterizes the public, then, is not the commonalities but rather the visible encounter with the different, the "being together of strangers" (Young 1990, pp. 237–40).

Class, gender, race, (dis)ability, and religion may be translated into significant barriers for certain people to be seen and heard in these spaces (Fraser 1990, p. 61). Exposure may also lead to targeted expressions of hatred or diminution directed acutely on such grounds, including gendered trolling and racialized government violence at street protests. What is frequently said of lawmaking could equally be said of infrastructuring: The organizational structures, employment practices, aesthetic preferences, symbolic narratives, and systems of power behind infrastructures are systematically “gendered (and therefore also racialized and classed)” (Siemietycki et al. 2020, p. 298).

This element of exposure is normatively critical for the democratization of any kind of intra-, inter-, and extrapublic relations (Elster 1998, p. 111; Habermas 1996, pp. 303, 306). However, these dynamics take place only under certain material, discursive, and institutional circumstances, which are significantly shaped by laws—the right to assemble, freedom of speech, the right to protest—and also by infrastructures. Jacobs (1961) classically praised cities—and, specifically, sidewalks—as spaces that induce social and civic gathering, where people see and are seen, in all their diversity. But cities can also be built to prevent public engagement. Baron Haussmann’s nineteenth-century renovation of Paris, straightening streets to make them harder to barricade (see, e.g., Sennett 2018, p. 32; Therborn 2006, p. 520), has become a general placeholder for publicness-reducing regime security as a consideration in urban design over millennia.

4.3. Consideration

The third element of publicness concerns the form of the actions or expressions that are performed in public and the consideration that others then give to them (Young 2000, p. 169). What orients people in the public realm is the reciprocal expectation that others will see things not only from their own point of view but also in the perspective of the whole (Arendt 1968, p. 221; Fraser 1990, p. 66). In this public space, expression and reception are conditioned by the circumstance that “strangers need to be placed on a path to commonality” (Warner 2002, p. 57). This entails a form of judgement that Kant [2007 (1790), sec. 40] calls “a public sense, i.e., a faculty of judging which in its reflective act takes account (a priori) of the mode of representation of everyone else” (see also Arendt 1968, pp. 219–20). This element of consideration is a normative obligation bearing upon members of the public, but it can, to a certain degree, be a structural feature of these spaces, because the presence and proximity of others prompt actors to accommodate their actions to the fact that others are around (Waldron 2011, p. 10; see also Kingsbury 2009a, p. 174).

5. DIVERGENCES OF PUBLICS IN LAWS AND INFRASTRUCTURES: CHALLENGES FOR PUBLICNESS

Infrastructural publics and normative publics related to infrastructures are constituted as a consequence of the social relations of proximity prompted by the infrastructural assemblages affecting the lives of their members. These publics may be able to act directly in relation to the infrastructures, for example, in the tearing out of water meters by residents in Soweto under (and after) apartheid, the blockading of roads leading to a hazardous waste site in Mexico or a silver mine in Bolivia, or self-help tapping of water mains by residents of slums in metropolitan Manila [Chng 2013, *Tecmed v. Mexico* (2003), von Schnitzler 2008]. The infrastructure may itself be designed to allow some public participation, as with procedures set up by private urban water companies for consumers to complain or challenge disconnections. In many situations, however, processual and substantive elements of publicness are best introduced into the internal and external relations of an infrastructural public through legal mechanisms. For the infrastructural public to be able to act

within (or bear responsibility within) a legal system, it must have some proxy existence as a relevant legal public. This can be accomplished by numerous means, including formal organization of the infrastructural public; ad hoc recognition, for instance, in a legal class action; overlapped recognition, as when the right of an indigenous people to prior consultation or consent becomes a means of voice on infrastructure; or a kind of surrogate representation, where a court allows certain persons to speak for a nonpresent public (Gonzalez-Ricoy & Rey 2019, p. 4).

Only very rarely will infrastructural publics (or normative publics related to infrastructures) be formally constituted as, or practically identical to, legal publics. Sometimes infrastructural and legal publics overlap, but in extreme opposite cases, laws entirely fail to give any regard to an infrastructural public. In what follows, we explore some obvious examples of spatial divergences between these publics, and we consider the challenges posed by these divergences in terms of publicness. Another set of divergences between publics are temporal. To take one prominent example, future generations bear the environmental and the debt and clean-up consequences of contemporary infrastructural decisions and may be regarded as part of an infrastructural public but seldom have formal legal status or standing (Flyvbjerg 2014, Gonzalez-Ricoy & Rey 2019). However, we lack room here to address these temporal divergences and possible solutions.

5.1. Spatial Divergences Between Publics

Infrastructural and legal publics frequently have spatial divergences with regard to particular infrastructures. Three such situations are the following.

5.1.1. Splintering infrastructural publics through legal territorialization. A single infrastructural public may stretch across several legal jurisdictions and not be able to function as a single legal public—indeed, it may be so fragmented in legal form as to be unable to operate as an effective legal public anywhere. This can be a result of splintered legal jurisdictions vis-à-vis single infrastructures. Inability to form an effective public may be parallel to inability of regulators to regulate effectively. F.A. Hayek advocated this in his 1930s argument for interstate federalism as a way to ensure the deregulation of markets. If a single market is developed and shielded at the federation level, while the main power and capacity for economic regulation remains at the level of subnational units, the market will, in fact, be sheltered from any regulatory interference (Harmes 2014; see also Lafont 2018). This theory, later labeled market-preserving federalism, makes deregulation a self-enforcing, structural feature of the infrastructure system rather than a contingent political decision (Weingast 1995, p. 6). Moreover, decentralization “has the result that it territorializes claims of social justice” (Eslava 2015, p. 262; quoting Sack 1986). Territorialization displaces attention from the controller–controlled relationship to the physical territory instead. In a single federation, this may be overcome either by one member state simply asserting power with other states deferring and following or by superimposition of a unified federal regulator to which a legal public attaches, particularly where national security or international issues are involved; however, this is as likely to result in regulatory capture by the regulated entities as it is to result in a vibrant and locally rooted but interlinked public (Hayek 1948, p. 258; see also Van Parijs 2018). Movement toward interstate supranational institutions in the European Union could have empowered governance of entire infrastructures through organizations such as the European Atomic Energy Community or the European Space Agency, but this has been fitful, and deliberative supranationalism scarcely figures in such endeavors, notwithstanding urgings by some theorists (Joerges 2009, Joerges & Neyer 2006). In practice, organizations with truly supranational legal powers are only infrequently attempted as means to directly regulate transnational infrastructures (for canals, see Whittuck 1920), and their publicness tends not to extend beyond governmental and

commercial interests along with a cohort of experts. Private global organizations, such as FIFA (International Federation of Association Football), exercise considerable power over design and use of infrastructure, such as football stadiums, and “create securityscapes, i.e., globalized transnational forms of control of zones that surpass regulations of nation-states and temporarily suspend their sovereignty” with highly stratified and segregated publics (Rial 2019).

5.1.2. Fragmented infrastructure splintering publics. A splintered organization of infrastructure may have the effect of constituting many smaller infrastructural publics who have too little in common—or too large a collective action problem or competitive rivalry—to operate effectively within a single legal jurisdiction as a legal public. Graham & Marvin (2001) hypothesized that urban splintering of large cities was a result of the privatization and fragmentation of a city’s infrastructure into different corporations or state-private entities (for critique, see Coutard 2008). This effect is heightened if the legal system tracks this splintering by limiting class actions or limiting legal standing to those affected by one company or plant.

5.1.3. Local infrastructure affecting extrajurisdictional publics. The whole of an infrastructure may be located in a single legal jurisdiction, yet it may have effects over the lives of people located beyond it. An upstream state may dam an international river, affecting irrigation and soil replenishment for downstream publics (De Chazournes et al. 2013), as exemplified by Egyptian objections to the Grand Renaissance Dam in Ethiopia. New infrastructures in one state may emit transboundary air pollutants or lead to unplanned squatter settlements forming in a neighboring state. A few international treaties require some consideration of extrajurisdictional publics in environmental decisions, including for infrastructures (e.g., the 1991 Espoo Convention on Environmental Impact Assessment in a Transboundary Context or the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters).

5.2. Challenges for Publicness

Infrastructural publics and leaders routinely navigate the divergences from legal publics and at times make them into opportunities. This is illustrated in Eslava’s (2015, p. 289) observation that neighborhood community leaders seeking recognition and infrastructural services for their illegal shanty towns in Bogota

refrain most of the time from using direct legal argumentation in their actions because of the way it interferes with their conceptualization of a legitimate global political formation. Mindful of the tendency of legal concepts and official governmental structures to work against their interests, they prefer to engage law only insofar as it creates a jurisdictional formation of which they can claim to be a part.

Some of them have argued for community sovereignty as a political act but also as an appeal to laws.

Frequently, however, the gap between infrastructural publics and legal publics—the “irreducible pluralism of publics” (Kingsbury 2009a, p. 175)—has deleterious effects on substantive justice, economic efficiency, institutional legitimacy, and publicness (Kingsbury & Donaldson 2011, p. 85). Infrastructures create dependence (including interdependences) and may bring publics into interpublic relations—or governments into interpublic, inter-entity relations, as with Sri Lanka’s Hambantota port debt within the Belt and Road Initiative, or with Northern European dependence on pipelines bringing gas from Russia.

Legal scholarship has therefore focused attention on theoretical approaches toward bringing infrastructural and legal publics into closer alignment. An interest-substitution approach is represented in John Hart Ely's (1980) argument that inadequacies of explicit participation arrangements (e.g., voting) for outsiders affected by another polity may be offset where local participants in that polity have the same interests and act to vindicate them. Virtual representation is thus secured through interest alignment and an adequate legal facility for local action, rather than any formalization. Whereas this may be adequate for large banks [Ely referred to *McCulloch v. Maryland* (1819), pp. 428–29], this argument does not reach noninstrumentalist autonomy or dignitary values served through decisional participation or control rights. Holding existing legal jurisdictions constant, Benvenisti (2013) has focused on articulating sovereignty as a duty to take account of extrajurisdictional interests. Absent extreme disregard of minority or extrajurisdictional interests, a strong democratic argument is made for systematically maintaining legal separations among democratic polities as a means to maintain equality of democratic citizenship (Somek 2010a,b).

Whatever the method, divergences between legal, infrastructural, and normative publics create a need to increase the publicness of “interpublic relations” (Fraser 1990, p. 66; Kingsbury 2009a). Laws—including transnational and international law in particular—can function as “vessel[s] for normativity” (Kingsbury & Donaldson 2011, p. 84), bringing accessibility, exposure, and consideration to social relations that lack these features. Reciprocally, interpublic infrastructures may be deployed in a manner that performs similar functions. In both cases, this may entail the emergence of a new encompassing (legal, infrastructural, and/or normative) public, a public of publics—yet, again, only a thin one, characterized by relations not of affinity between the members of the various collectivities but of proximity between the fates of all those involved (Kingsbury 2009a, p. 175). The emergence of this thin interpublic public shifts the focus from the development of specific instances of representation to the emergence of a “representative system” (Mansbridge 2011, Rey 2020) that may accommodate “separate publics and their values but within the unity of a solidarism of public values” (Kingsbury 2009a, p. 197; see also Peters 2006; Maisley 2019, pp. 346–47), i.e., in which the relations between the publics are structured to enhance their publicness.

6. CONCLUSION

The by-now orthodox “image of a looping relation between society and infrastructure offers an alternative to conventional views of infrastructure as a distinct technological domain *external* to other bounded spheres, such as the social, the economical, or the political” (Harvey et al. 2017, p. 12). The concept of infrastructural publics takes a significant step toward operationalizing this image. For this concept to be useful beyond rich description, it requires further specification. The metaphor of shared space grounds the formation of infrastructural publics, whose involvement is normatively required when issues arising in the shared space may significantly affect autonomy. Involvement of publics is facilitated by designs of infrastructure and of law that enable accessibility, exposure, and consideration of different views and interests. Techniques are available to mitigate or overcome divergences between infrastructures and laws that tend to nullify or impair public formation and publicness. These extend from architectural deployment of devices such as active forms, multipliers, switches, and interplays to legal deployment of novel forms of action and representation, to political mobilization and empowered assertion (Easterling 2017).

In critical perspective, the concept of infrastructure might be thought to displace (purposefully or inadvertently) necessary critique of capitalist hegemonies and power relations and to be another iteration of an “onto-epistemological dance” in the same way as “hybrid and indeterminate assemblages, actor-networks, hyperobjects, atmospheres, emergent entities, deviant subjects, apparatuses, and dispositifs” (Shvartzberg Carrió 2017, p. 80). Substantively, it is often alleged that

infrastructures are “governed by capitalists, engineers, and technocrats, through the insipid protocols and barely masked will-to-power,” at times with “actually enforced violence,” and that they “will always necessarily privilege systems of power and transparency rather than justice and difference” (Shvartzberg Carrió 2017, p. 88). As has been true throughout the history of conceptual and normative espousal of publics and publicness, so now again the turn to public and publicness in infrastructure and law is a quest to both honor and transcend such critiques.

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