Intersections: Technology, Mobility, and Geography

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INTRODUCTION

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This issue of *Technology and Culture* explores the intersections of technology, mobility, and geography by bringing together four articles, each individually submitted and developed, into an impromptu theme issue. While recent scholarly discussion of mobilities has foregrounded mobile objects, people, and ideas, these articles strikingly link mobility to geography, drawing our attention to the spaces that shape or are created by changing sociotechnical practices of movement. Our authors bring these geographies into view by telling stories in which the *where* of technology's social construction matters as much as its *who*. They approach geography on different scales—from national territory to urban, suburban, and rural spaces. Geoff Zylstra, Greet De Block, Els De Vos, and Hilde Heynen show how streetcars, railways, and automobiles influenced the social production of space, while Tiina Männistö-Funk shows how geography shaped the production of bicycles. All of the authors connect technologically enhanced mobility with modernity, and with the contentious social construction of race, gender, and national and regional identity. They show how the coproduction of technology and geography intersects the workings of power and inequality, via production of peripheral, segregated, and otherwise unequal spaces.

Geoff Zylstra narrates black and white struggles over streetcar ridership in Civil War–era Philadelphia, hitching the mid-century U.S. horsecar boom to the context of a destabilized racial order: "Blacks, whites, and Irish immigrants used the streetcar as a device for articulating racial boundaries and reshaping the mid-nineteenth-century racial hierarchy." Zylstra thus adds to the young but growing study of race in the history of technology by showing how streetcars were enrolled in producing racialized users, practices, and

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spaces. Unlike older versions of SCOT, which asked how "relevant social groups" shaped technologies, Zylstra reverses the analytic by asking how streetcars were deployed in struggles to define users and nonusers. While all pedestrians had previously enjoyed relatively free access to the city, the streetcar's arrival provided whites an opportunity to cut off African-American mobility by creating closed, white networks. This in turn could help create enclosed, white zones in the city, thereby protecting white power and privilege. Philadelphia's industrialization was as much a political process as it was a material and sociotechnical one; the streetcar became a tool for negotiating Philadelphia's intersecting industrial and racial transformations.

Zylstra connects race and geography by consistently casting access to technology and mobility as "segregation." An unequal distribution of transportation rights was expressed as spatial segregation of streetcars. African-American claims to access (like white claims to their nonaccess) were in effect citizenship claims, which negotiated membership in city, community, and polity. For blacks, streetcars meant freedom and equality; for whites, they meant power and privilege. In the end, African-American community organizers mobilized activists to protest streetcar segregation and, somewhat surprisingly, it worked. In 1867, the year before the iconic Fourteenth Amendment to the U.S. Constitution, Pennsylvania's state legislature outlawed streetcar discrimination based on race. A century before the civil rights movement fought for access to autobuses, drinking fountains, and other technical artifacts, Philadelphia African Americans were already struggling to define their own geographies of mobility, both physical and social.

Greet De Block also connects technology and geographies of power, by coupling railway planning with nation-building in the early years of Belgian independence (1830s). Her work resonates with Chandra Mukerji's recent call to analyze state power materially and territorially via the study of infrastructures and public works. Belgium's founding elite was hungry for mobility, economic development, and territorial mastery, and state engineers' Saint-Simonian ideology suggested railways as an appropriate national "frame" that could "safeguard the political revolution." De Block's article centers on an 1833 plan by engineers Pierre Simons and Gustave De Ridder, which projected a total, national railway network, a "coherent infrastructural frame" or "backbone" for the new nation, "a radical, top-down, territory-covering instrument." She thus redefines nation-building materially as "the organization of territory and society." Nations are not only *imagined* communities, but also *built* communities. Similarly to Michel Callon's engineer sociologists, De Block's engineers were nation-builders.[1]

1. Chandra Mukerji, *Impossible Engineering: Technology and Territoriality on the Canal du Midi* (Princeton, N.J., 2009); Michel Callon, "Society in the Making: The Study of Technology as a Tool for Sociological Analysis," in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, ed. Wiebe E. Bijker, Thomas Parke Hughes, and Trevor J. Pinch (Cambridge, Mass., 1987), 83–103.

De Block shows how minor and peripheral nations can be geographically central, continuing a thriving dialogue on technologies and transnational connections in Europe's smaller states.[2] Unlike large nations, whose railway histories tell of knitting together disparate regions, enclosing the nation, young Belgium's national ambitions had transnational means and effects.[3] The resulting "Belgian railway cross" made Belgium a crossroads connecting neighbors England, France, Germany, and Holland, prefiguring its contemporary role as a political and economic hub for the European Union. At the metaphorical intersection of nation- and railway-building, De Block also locates the literal intersection of rails from across Europe.

Els De Vos and Hilde Heynen's analysis of suburban garages in postwar Belgium shows how expanding automobility impacted domestic architecture. Like Zylstra and De Block, they implicate technology (automobiles) in the production of space (garages), but they also echo Peter Norton's recent study of how American automobiles affected the *use* of space.[4] Belgian houses had to be made to accommodate the family car, but cars (and garages) did not fit easily into domestic space. So the garage became an interface between public roads and private homes. It was liminal or marginal, what they call an "uncanny" space, a boundary object shuttling between masculine and feminine, public and private, house and street, indoor and outdoor, working space and living space.

This study of the Brussels suburb Grimbergen adds a significant European story to the currently American-dominated dialogue on suburbanization. For the authors, the garage's shifting designs and uses—as kitchen, laundry room, playroom, workshop, and so on—indicate the automobile's "gradual domestication." Punning on the word "domestic," they connect discussion of the *domestication* of technologies among historians of technology with discussion of *domesticity* in gender studies and architectural history. If automobility requires a complex system of roads, signage, maps, fueling stations, and vehicles, it also demands organization of the "complex

2. This work is associated with the Tensions of Europe Network, as well as the EUR-OCRIT, Eurocommons, and STEP projects. See Ana Simões, Ana Carneiro, and Maria Paula Diogo, eds., *Travels of Learning: A Geography of Science in Europe* (Dordrecht, 2003); Erik van der Vleuten and Arne Kaijser, eds., *Networking Europe: Transnational Infrastructures and the Shaping of Europe, 1850–2000* (Sagamore Beach, Mass., 2006); Faidra Papanelopoulou, Agustí Nieto-Galan, and Enrique Perdiguero, eds., *Popularizing Science and Technology in the European Periphery, 1800–2000* (Aldershot, UK, 2009); Alexander Badenoch and Andreas Fickers, eds., *Materializing Europe: Transnational Infrastructures and the Project of Europe* (Basingstoke, UK, 2010).

3. See, for example, Thomas Misa, *Leonardo to the Internet: Technology & Culture from the Renaissance to the Present* (Baltimore, 2004), 97–129; Rebecca Solnit, *River of Shadows: Eadweard Muybridge and the Technological Wild West* (New York, 2003); Eugen Weber, *Peasants into Frenchmen: The Modernization of Rural France, 1870–1914* (Stanford, Calif., 1976).

4. Peter D. Norton, *Fighting Traffic: The Dawn of the Motor Age in the American City* (Cambridge, Mass., 2008).

relationships among the car, garage, house, street, and users." In order to domesticate the automobile, postwar Belgians had to retrofit their houses, social roles, and uses of space, resulting in new identities and practices that reinforced Belgium's new suburban geography.

While the three aforementioned articles implicate transportation technologies in the production of space, Tiina Männistö-Funk's study of self-made ("vernacular") bicycles in rural Finland around the turn of the twentieth century implicates geography (rural Finland) in the production of technology (bicycles). Following Glen Norcliffe's work on Canadian bicycles, she employs not SCOT but G-COT (geographical construction of technology) to show how "technological objects have different meanings in different places, and these multiple meanings do not necessarily converge or stabilize." Mapping sites of vernacular bicycle production yields an "astonishingly uneven geographical distribution," concentrated in Finland's most agricultural regions along its western and southern coast. *Place* matters for both artifacts and practices, hence the ethnographic density and the thickness of description that sets Männistö-Funk's article apart.

Vernacular bicycles were DIY bicycles, made by and for oneself. Many vernacular producers also made their own tools, or practiced cottage industry handicraft; hence the users in her story are also the producers. Rather than tapping into the growing commercial bicycle industry outside of Finland—to "transfer" mass-produced bikes into their country—vernacular producers made their own versions of bicycles to showcase their technical skills. Inhabitants of major cities might be expected to consume mass-produced bicycles, but rural Finns were accustomed to making their own tools. For Männistö-Funk, this shows that peripheral regions can be innovative, rather than merely adopting and adapting new technologies produced in "advanced" core regions.[5]

Overall, she aims to rethink "the role of seemingly marginal places, inventions, and phenomena in the history of technology." She thus ends by stressing the connection, rather than isolation, of her peripheral research subjects: "they lived at the crossroads where global innovations conversed with local traditions." Vernacular bicycles were not substitutes for, or precursors to, mass-produced bicycles, but rather a local variant of an internationally known innovation. Inspired by the globally mobile idea of the bicycle, rural Finns crafted their own bicycles in ways that helped keep local geographies and traditions relatively fixed. In other words, a similar hunger for mobility that drove Philadelphia African Americans to the streetcar and Belgian elites to the railway inspired rural Finns to make their own bicycles. Philadelphia, Belgium, and Finland were caught up in the same global movement of industrialization. This movement increased the importance

5. A similar argument is central to Arnold Pacey's *Technology in World Civilization: A Thousand-Year History* (Cambridge, Mass., 1990).

of technologically enhanced mobilities across the nineteenth-century world, but Männistö-Funk insists that it also left room for significant local variation. Hence her Finns were more skeptical of modernity, industry, and consumerism than Western European and American contemporaries, while being no less interested in bicycles.

None of these authors consistently employs the new interdisciplinary jargon of mobility emerging mostly from sociology and geography, though many of its key concerns are already here—"gates" to access mobility systems, infrastructure's power to "splinter" as well as tie together, for example, or the double mobility of material artifacts (streetcars, garages) and their sociocultural meanings (whiteness, masculinity).[6] In seeing the garage as "uncanny," De Vos and Heynen come closest to recognizing its multifaceted *mobility*, but this analysis remains implicit.

The sociotechnical and technopolitical are prominent in these articles, but their geographic commonalities suggest that the envirotechnical is not far off. Many links with geography and environmental history could be suggested: How did Belgian railways and garages contribute to the production of landscapes? Did vernacular bicycles change Finnish relationships with nature in rural, agricultural settings? How did the distinction between natural and artificial play into white Philadelphians' attempts to equate industrialization with whiteness in an era when African Americans could be labeled "beasts of burden"?

These four articles suggest further research into the ways that technologies, practices, and geographies are coconstructed or coproduced. As we locate places where the history of technology intersects with architecture, urban and regional planning, and geography, we create mobile analytic tools that can cross disciplinary boundaries. In so doing, we learn that the segregated, peripheral, splintered, and uncanny spaces created out of technologically enhanced mobilities are as important as the moving objects themselves. Such stories of mobility and fixity thus show how technologies can contribute to producing uneven geographies of power.

6. This seems to be a trend in the history of technology more generally, as Colin Divall and Thomas Zeller have recently noted: see Divall, "Mobilizing the History of Technology," *Technology and Culture* 51 (2010): 938–60, esp. 943; and Zeller, review of Peter Merriman's *Driving Spaces*, *Technology and Culture* 52 (2011): 217–18, esp. 218.