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UNIVERSITY OF CALIFORNIA
SANTA CRUZ

AUTONOMOUS MOTIVES:
TECH, SHARED MOBILITY, PRIVATIZATION, AND THE UTOPIAN IMAGINARY IN
THE BAY AREA

A dissertation submitted in partial satisfaction
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

In

SOCIOLOGY

with an emphasis in FILM & DIGITAL MEDIA

by

Kristin Morgan Miller

September 2022

The Dissertation of Kristin Morgan Miller
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Contents

List of Figures	v
Abstract	viii
Acknowledgements	x
Introduction: Urbanism, Technology, Place, and Non-place	2
Methodologies	12
Literatures	
1. The Bay Area as Place	18
2. Silicon Valley as Ideology	29
3. Utopianism, Urban Space, and the Urban Imaginary	35
4. Silicon Valley as Virtual Geography	40
5. Tech and Transportation	44
6. Mobilities and Critical Mobilities	47
Chapter Descriptions	58
I. BART: Mass Transit for the Elite	63
Transportation History, Information, Space, and Separation	70
The BART Idea and the Growth Machines	79
Selling BART, Science Fiction	97
BART and the Public	109
BART not as Planned, but as Produced	119
2. “Warning: Two-Tier System”: The Google Bus and the Implications of Privatized Urban Transportation	
The Battle of the Buses	125
The City and the Valley: The Tech Shuttle	129
Problem as Bellwether	
The Valley and the Region	156

3. Speculative Transport: Ride-Hailing and Autonomous Vehicles	
Bay Area Transit at the Seams	164
Ridesharing to Ride-hailing	173
The Impacts of Ride-hailing	182
Fantasies of Automation and Automobility	198
Autonomous Vehicles and Algorithms	213
Cruising the Future	227
4. Coda: Cities, Commoning, and Transit Post-COVID	
The Case of the Bay Area Revisited	233
Transportation and Quarantine	235
Disaster Commoning and the Possible Impossible	248
5. Bibliography	258

List of Figures

0.0 Tweet from Mar Hicks (2018)	xiii
0.1 Frontispiece	xiv
1.1 An image of a proposed BART train circa (1960, BART)	63
1.2: Richard Nixon boards the brand-new BART (SF Chronicle, 1972)	63
1.3 Southern Pacific Railroad's Oakland Terminus, c. 1870 (Library of Congress)	70
1.4 Land Use and Circulation Plan: 1970 (<i>Regional Rapid Transit</i> , Parsons, Brinckerhoff, Hall & MacDonald, 1956)	82
1.5 Comprehensive Plan for Regional Rapid Transit (<i>Regional Rapid Transit</i> , Parsons, Brinckerhoff, Hall & MacDonald, 1956)	84
1.6 BART system map, (BARTD Composite Report, Parsons, Brinckerhoff, Tudor, Bechtel, 1962)	87
1.7 Rendering of rapid transit trains on the Golden Gate Bridge (America Moves Ahead with Rapid Transit, General Electric, 1961)	92
1.8: Illustration of commuters from the Composite Report (Parsons, Brinckerhoff, Tudor, Bechtel, 1962)	99
1.9: An early rendering of a BART train (<i>Regional Rapid Transit</i> , Parsons, Brinckerhoff, Hall & MacDonald, 1956)	100
1.10: Interior of the first BART cars (BART, c. 1970)	102
1.11–12: Images from <i>America Moves Ahead with Rapid Transit</i> (GE, 1961)	102–3
1.13: The Computer and the Commuter (BART, 1972)	104
1.14: Still showing BART in George Lucas's <i>THX1138</i> (Warner Bros. 1971)	105

1.15: Atari games installed at the Powell Street Station (Gary Fong, <i>San Francisco Chronicle</i> , 1976)	105
1.16: BART employees in the early 1970s (BART)	108
1.17: The Fremont Flyer (Lonnie Wilson, <i>Oakland Tribune</i> , 1972)	109
1.18: Anti-BART manifesto (<i>iBasta Ya!</i> , 1970)	112
1.19: Mission Anti-BART Protest, April 1970 (Found SF)	113
1.20: Composite Report Vision for Mission and 24th (Parsons, Brinckerhoff, Tudor, Bechtel, 1962)	114
1.21: Promotional campaign for the “Fleet of the Future” (BART, 2018)	123
1.22: Train rendering from a 1960 BARTD news release (Berkeley ITS Library, Arnold C. Anderson collection)	124
2.1: Anti-Google Bus stickers in the streets of the Mission (2104)	125
2.2: Map of tech bus lines (<i>The City from the Valley</i> , Stamen Design, 2012)	130
2.3: Documentation of commuters waiting for the Facebook bus (2013)	133
2.4–5: Documentation from an anti-Google Bus protest in the Mission (2014)	136–7
2.6: Meme about tech company perks (Reddit, 2014)	138
2.7: Map correlating evictions, shuttle stops, (Anti-Eviction Mapping Project, 2014)	142
2.8: Google Green website (Google, 2014)	146
2.9: Map of the Google Bus network in 2013–4 (Kristin Miller, 2014)	162
2.10: Speculative BART map based on the original RTC plan (Jake Coolidge, 2013)	163
3.1: Lyft promotional Image (Lyft, 2019)	164
3.2: Cruise Taxi promotional image (Cruise, 2022)	164

3.3: Networked autonomous cars (Stanford Research Institute, 1967)	164
3.4: Map showing the Bay Area's 27 transit systems (SPUR, 2015)	165
3.5: Image of bars separating Muni and BART tracks (<i>Streetsblog</i> , 2022)	166
3.6: BART twitter announcing "high" rider numbers (BART, 2022)	169
3.7: Typical Lyft pricing and ride options (2022)	180
3.8: Uber and Lyft app screenshots from the Prop 22 campaign (CNN, 2020)	187
3.9: Lyft ad on a Muni stop shelter (Lyft, 2015)	194
3.10: SAE Levels of Driving Automation (SAE International, 2021)	200
3.11–2: Autonomous vehicles (Stanford Research Institute, 1967)	203
3.13: Twitter meme image (2018)	208
3.14: Gif from Commuter Toolkit (International Sustainability Institute, 2012)	211
3.15 Uber's Autonomous Visualization System (AVS) (Uber, 2019)	217
3.16–7: Cruise's promotional video on Webviz, (Cruise, 2022)	230–1
3.18: Promotional image of the Cruise Origin (Cruise, 2022)	232
4.1–2: Monthly urban rail ridership and highway travel statistics (US Department of Transportation, Bureau of Transportation Statistics, 2022)	237
4.3: Daily hailed ride counts in New York City 2019–21 (Chang and Miranda-Moreno, 2022)	239
4.4: Public transit ridership data for all systems 2019–20 from San Francisco-Oakland (Medlock, Temelzides, and Hung, 2021)	242

Abstract

Autonomous Motives: Tech, Shared Mobility, Privatization, And The Utopian Imaginary In The Bay Area

Kristin M. Miller

As the “solutionism” of the San Francisco Bay Area tech industry infiltrates ever more of the spaces of social life and shapes when and how people interact, from remote work to app dating, it is important to question what the fates of Silicon Valley and the Bay illustrate about the transformations wrought on place and society by the cultural logics of information technology. Using the region’s transportation history since the 1950s as a lens, this research focuses on the material impacts of the tech industry’s anti-material ideology on its home region. The chapters chart a chronology of increasingly privatized and tech-influenced transportation, from the development of Bay Area Rapid Transit (BART), to contestation over the “Google Bus,” to the rise of ride-hailing platforms and now autonomous vehicles. This dissertation interweaves methods, including archival research; ethnographic interviews; content analysis of visual, news, and social media; and participant observation and documentation. It employs the ethnographic practices of “studying up” and “thick description” as methodologies suited to analyzing the social effects of data-driven industries, and poses several questions: 1) How do the means of moving people through urban space reveal assumptions about who the city is “for”? Who is served by these regimes/logics: whose lives do they facilitate or exclude? 2) How does transportation materialize the prevailing political-economic logics of an era? And 3) What role does the social history and imagining of

Silicon Valley, with its predilections for speculative futurisms, play in the sweeping techno-cultural transformation of the Bay, and what does it portend for regions buying into the Silicon Valley franchise? The pursuit of these questions links two principal literatures—critical urban geography and the “new mobilities” paradigm—that have different approaches to political-economic and network analyses and are not frequently read together. Both offer advantages to the topics addressed in this project, and help expand the definition of urban space and its boundaries, as well as clarify the right to the city and the meaning of mobility justice.

Land Acknowledgement

This research is concerned with movement through and over land, and the communities that settle and are sustained by this movement; it must therefore begin with an acknowledgement of my status as a visitor in the regions that are now called the San Francisco Bay Area and Santa Cruz, where it was primarily researched. These lands are the ancestral home and unceded territories of the Ohlone (Costanoan) peoples, now under the care of the Muwekma Ohlone Tribe of the San Francisco Bay Area, and of the Amah Mutsun Tribal Band of Santa Cruz. The writing took place on the ancestral and unceded territory of the Gabrielino/Tongva peoples, caretakers of the lands widely known as Los Angeles, where I was fortunate to have shelter and solace during the terrible years of the COVID-19 pandemic.

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opportunities she provided over my time at UC Santa Cruz to work on fascinating multidisciplinary endeavors and to collaborate with engaged researchers. This project owes its form to her rooted, critical, and expansive understanding of all facets of urban life, and to our many conversations ranging from street art and social movements, to housing justice, urban infrastructure, and competing visions of sustainability and utopian futures. Rick Prelinger's generosity with his encyclopedic knowledge of and deep history with media, technology, and the Bay Area, as well as his rich understanding of the archive, helped me to navigate such a wide-ranging project with a significant historical component. Hillary Angelo's astute attention to structure and fine-tuned read of the links between urban geography, political economy, and the environment has given me an excellent model of dedicated and disciplined scholarship to aspire to. I am also endlessly appreciative of the writing retreats she made possible, sharing housing (and support cats) at critical junctures in both my qualifying and dissertation processes.

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Mar Hicks  @histoftech · Jul 11, 2018

Technologies
are regressive
not "revolutionary"
if the same people
remain in control

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Autonomous Motives:
Tech, Shared Mobility, Privatization, and the Utopian Imaginary in the Bay Area



Introduction

Urbanism, Technology, Place and Non-place

It is paradoxical to be writing in the interest of cities, shared space, and common systems of transportation during a moment when the world, and cities in particular, have been so transformed by the COVID-19 pandemic that all of the above have effectively disappeared from view for much of the past two-plus years since March 2020. But this is the task that is before me, and before all of us, even as vaccination and lesser caseloads shift our lives back in the direction of collective life, while new variants constantly loom. During this time, the overwhelming majority of human lives have been both fixed in geographic place, and, for those with digital access, dematerialized into channels created by companies based in the San Francisco Bay Area. This region is imagined worldwide as a forward-thinking, science-fictional ecotopia, with foggy green hills dressed in redwoods, cheerful and peaceful social diversity, and technological wizardry that has freed information and leveled global hierarchies through networked data. The Bay Area of the popular imagination fulfills futurist, midcentury dreams of autonomous transport and artificial intelligence, if not the jetpacks we were promised. As the “solutionism” of the tech industry infiltrates ever more of the spaces of social life and shapes when and how people are able to interact, from Zoom classrooms and remote work, to contactless payments, ride-hailing, and app dating, it feels increasingly important to question whether this futurist imaginary actually corresponds to the lived experience of the region that gave rise to it. What can the fate of San Francisco, Silicon Valley, and their surrounding region tell the rest of us about the transformations

wrought on place and society by the cultural logics of information technology and the industry that produces it?

I am particularly interested in the places where the networks of information technology cross into the distinctly material space of highly interconnected urban regions like the Bay Area, and impact how people are able to circulate and interact in three dimensions. Over the past 80 years, as the industry that is now Silicon Valley has taken form, it has repeatedly attempted to design “better,” more efficient means of transporting people through its surrounding region, but who has access to that movement, and how, are very revealing of the underlying ideology and motives of tech’s engineering elite. Beginning with efforts to expand public transportation in the mid-twentieth century, mass mobility in the Bay Area has interfaced with information technology and technocracy, giving form to the regional rapid transit system, BART, and resulting in a profusion of data-saturated alternatives to “outmoded” buses, street cars, and taxis since the 2000s. The terrain of mobility in the Bay area from 2010 to the present has been crowded with corporate shuttles for tech employees; networked “micromobility” offerings such as e-scooters, bikes, and e-bikes, and mopeds; and throngs of app-dispatched “ride-hailing” cars, some of which (as of late June 2022) are now fully autonomous and driverless. If the tech industry’s futurists have their way, flying cars may be added to this confusion before too long. This is all in addition to 27 existing systems of more traditional public transportation—trains and subways, buses, streetcars, ferries, and taxis, most of which were underfunded and struggling, even before pandemic anxieties and travel restrictions plunged public transit ridership to near

zero. It also has taken place against a background of ever increasing automobility, in the nation and the state that gave the world car culture and freeway-centered planning. The central role of the San Francisco region in the investment of nearly all parts of our lives with data, as well as in the imagination of near term futures, is worthy of substantial analysis. For reasons I will delve into, however, this region has been under-theorized in critical urban research, as have the mobile components of life in cities more generally. My hope is that this project will add dimension, history, and focus to both.

As a new resident of the Bay Area during the 2010s, partially drawn to the region by its tech-utopian and ecological allure, I was immediately struck by the surprising blandness of its physical reality. Beyond the dramatic topography, microclimates and community gardens, it seemed the built environment of the San Francisco Peninsula between San Jose and San Mateo was haphazardly clustered around the largely invisible interiors of the Googleplex, Apple's Infinite Loop, and endless tinted-glass bunkers in industrial parks. Its shopping plazas, subdivisions, and cul-de-sacs radiated out from these nodal points in a ceaseless, undifferentiated sprawl that I was initially hard-pressed to identify as "urban." San Jose fused into Cupertino into Mountain View into Menlo Park all the way to the margins of San Francisco. If there was any "there there"—to borrow from Gertrude's Stein's lament over her radically altered hometown of Oakland—it was only partially visible to the likes of me, if at all. But underlying this blank surface, the Peninsula, like Stein's East Bay restructured by the transcontinental railroad and the fortunes of the robber barons, was in the midst of sweeping economic

upheaval—erasing regional histories, disrupting landscapes, and remaking local communities at the behest of capital. I quickly learned that the Bay Area’s new user interface was, indeed, not designed for me, from the exorbitant rents keyed to the salaries of developers and engineers, to the snarls of traffic—the worst in the US—that stretched travel times throughout the Bay into multiple hours. Over the years that I resided in Santa Cruz, public outcry grew ever louder that Silicon Valley’s anodyne venture-corporate culture was encroaching on iconoclastic, diverse, canonically queer San Francisco, as well as surrounding communities in the East and South Bay, and even undermining Santa Cruz’s insular, “keep it weird” sensibility. Young tech workers—overwhelmingly cis-male, white, college-educated, and straight—moved to the region in droves, threatening to complete what the first tech boom of the late 1990s had started, and subsume the place whole.¹

As early as 1992, Langdon Winner wrote of Silicon Valley’s transformation from fruit orchards to corporate office parks and server farms:

Perhaps the most significant, enduring accomplishment of Silicon Valley is to have transcended itself, and fostered the creation of an ethereal reality, which exercises increasing influence over embodied, spatially bound varieties of social life. Here decisions are made and actions taken in ways that eliminate the need for physical presence in any particular place. Knowing where a person, building, neighborhood, town, or city is located no longer provides a reliable guide to understanding human relationships and institutions.²

¹“Stack Overflow Developer Survey 2021.” *Stack Overflow*, August 2, 2021. <https://insights.stackoverflow.com/survey/2021#developer-profile-demographics>; Nick Kolakowski, “How Safe Do LGBTQ+ Individuals Feel in Tech?,” Dice Insights, June 29, 2020, <https://insights.dice.com/2020/06/29/how-safe-do-lgbtq-individuals-feel-tech>.

² Langdon Winner, “Silicon Valley Mystery House” in *Variations on a Theme Park: The New American City and the End of Public Space*, ed. Michael Sorkin (Hill and Wang, New York, 2011), 59.

Winner compared Silicon Valley's amorphous built environment to the infamous Winchester Mystery house, a barn of a mansion constructed without a plan or end goal, as a monument to the wealth and guilt of the widow who was heir to the fortune generated by the Winchester Repeating Rifle—the “gun that won the West.” In the region's lack of public spaces and parks, civic infrastructure, and affordable housing for the jobs it fostered, Winner discerned a disdain for physical location in preference of a geography of decentralized networks.

30 years later this tepid tidal wave had only intensified, but Silicon Valley's “ethereal reality,” is stubbornly, intransigently material when it comes to the practicalities of moving through the place where our data lives are coded. In good traffic it was possible for me to drive between my campus community in Santa Cruz and San Francisco or the East Bay in an hour and change, a trip that stretched to two or three hours if I wasn't lucky, and which was stuck at that speed when traveled by public transit, necessitating no less than three modal transfers in most directions.³ Data engineering might have made it possible to teleconference around the world in seconds, but had done nothing to address the hours it took to move around its home turf. At least that's how it seemed as I transferred from bus to Caltrain to Bay Area Rapid Transit (BART). I quickly became aware, however, that there was another route through the maze-like congestion of Bay Area transit for those fortunate enough to be tech-employed: private coach buses that ferried workers from around the region to

³ The language of modality in transportation planning is used to summarize the different means by which people can move from place to place: e.g. rail, streetcar, bus, bike, ferry, or private car. A modal transfer is a change of mode of transportation, such as from bus to train, and modal share is the percent of trips that occur using any one particular mode.

corporate campuses in express-stop, air-conditioned, wi-fi-equipped comfort. Moreover, these buses were free and could be used to travel anywhere on their extensive networks, provided you were among a chosen ridership carrying the right corporate ID.

The success of the corporate bus programs would have been very pleasing to Melvin Webber, an urban planner and director of the Institute of Urban and Regional Development at UC Berkeley in the 1960s and '70s who was a strident advocate for automobility and decentralization, and who wrote epitaphs for BART before it had been in operation five years. From his vantage point in the Berkeley hills, Webber theorized against what he saw as the antiquated logic of centralized cities and towards "the enlarged freedom to communicate outside one's place-community that the emerging technological and institutional changes promise." "It is interaction, not place, that is the essence of the city and of city life," Webber argued in 1964, calling this dispersed community of interaction a "non-place urban realm." Webber was optimistic that "an ever-increasing mobility and ever-greater degrees of specialization, will certainly mean that urbanites will deal with each other over greater and greater distances." By mobility, Webber meant automobility, with the libertarian freedom granted by the car serving to disperse dense urban cores for the betterment of society.

To him, the deconcentration of urban space was inherently good, and the physical proximity of citizens and communities a coercive limit to public participation and community health. "The spatial patterns of their interactions with others will undoubtedly be increasingly disparate, less and less tied to the place in which they

reside or work, less and less marked by the unifocal patterns that marked cities in an earlier day.”⁴ Webber’s non-place took the decentralized, modernist logic of Howard and Mumford’s garden city, with all its racial and class coding of escape from unsanitary and chaotic overcrowding, and channeled it into the synaptic logic of computing. Responding to the growth of networked technologies developed on the other side of the San Francisco Bay, Webber forecast a reasoned, rational future of the “post-city,” in which communications technologies, computers, and real-time data sharing, would make “community without propinquity” a reality.⁵ As long as there has been an information technology industry centered in what is now Silicon Valley, there has been a simultaneous push to dematerialize it, to live more distant, encapsulated, and technologically facilitated lives, if only in the speculative cybernetic fantasies of engineers and planners, arguably resulting in the “non-place” of its current state.

According to geographer Susan Hanson: “transportation—in all its forms—is woven into the fabrics of our lives and the places we live, from the dwelling-unit scale to the scales of the neighborhood, region, and globe.” She argues, that because transportation weaves together places and lives, “it is far more than just a means of reaching a destination,” and that research into the many facets of transportation as a structural phenomenon provides perspective on the social, economic, and political lives of regions. “It can also,” she writes, be “the basis of a sense of entitlement or exclusion;

⁴ Melvin M. Webber, “The urban place and the non-place urban realm,” in *Explorations into Urban Structure* (Philadelphia: University of Pennsylvania Press, 1964), 146–7.

⁵ Melvin M. Webber, “The Post-City Age,” *Daedalus* 97, no. 4 (1968): 1098.

it can be enabling and simultaneously constraining.”⁶ It is precisely the tension between ability (or mobility) and constraint produced by the regimes of mobility in the Bay Area that is a motivating factor for my research.

According to David Prytherch and Julie Cidell, writing within the framework of the Mobilities paradigm: an urban region is “both space and circulatory system” and transportation, “the most explicitly motive force in urban life;” the movement of people through cities shapes those spaces as surely as the people are shaped by the patterns and practices of that movement.⁷ Prytherch and Cidell link this idea with a call for more engaged and critical scholarship on urban transportation, to which I hope to respond, by examining the underlying ideas of who has access to movement, and why and how, using transportation in the Bay Area as a focusing lens. I ally with Jason Henderson’s claim in *Street Fight*, that mobility cannot be decoupled from ideology.⁸ The difference between private bussing and public transit is not simply a case of moving bodies between points A and B by the best vector determined through “common sense” or feats of engineering—a region’s chosen modes of transportation have politics, finance, and extensive legal and political frameworks hardcoded into them, as well as competing imaginaries of what a region and its future should be like. In the Bay Area, since the mid-twentieth century, that ideology has been increasingly determined by the

⁶ Susan Hanson, “Foreword 1: Transportation Geographies and Mobilities Studies: Toward Collaboration,” in *Transport, Mobility, and the Production of Urban Space*, ed. Julie Cidell and David Prytherch (New York: Routledge, 2015), 3.

⁷ David Prytherch and Julie Cidell, “Transportation, Mobilities, and Rethinking Urban Geographies of Flow,” in *Transport, Mobility, and the Production of Urban Space*, ed. Julie Cidell and David Prytherch (New York: Routledge, 2015), 19–20.

⁸ Jason Henderson, *Street Fight: The Politics of Mobility in San Francisco* (Amherst: University of Massachusetts Press, 2013), 18.

circulatory system that is Silicon Valley's regional and global tech economy. Investment in public transit networks, as opposed to private, profit-generating technologies is both, as Henderson says, a "progressive ideology of mobility" and one that builds the notion of space as commonly held into its material structure—creating spaces where people from all communities, districts, and income brackets intermingle, limited, of course, by the cost of ridership, and other barriers to access.

That Bay Area transportation development over the last 70 years has moved towards ever greater privatization and individuation, sped along by technologies developed in Silicon Valley, was something I felt merited closer scrutiny, as it appeared to me to be linked to a broader movement towards the enclosure of the common life of cities. By focusing on several historical phases of this shift, I hope to illustrate the growing influence of private industry and tech ideology that has yielded the present conjuncture. This continuum links the BART campaign in the 1950s and '60s; the advent of private tech company shuttles—the so-called “Google buses”—in the early 2000–2010s; car-based ride-hailing platforms such as Uber and Lyft; and their relentless quest to develop networked autonomous vehicles. I argue that each of these interchanges of infrastructure, finance, and technology is an iteration of a pre-pandemic quarantine logic that separates, stratifies, and distances more than it simplifies or connects. All of these innovations were to be promised to be world-changing, democratizing, and congestion-solving, but instead they have privatized and stratified transportation, and done little to nothing to decenter the use of private automobiles. These three phases of transit development are also three inflection points in the shift towards neoliberal governance

that has shaped major urban regions in the US and worldwide since the 1970s.⁹¹⁰

This work is both a discursive and a material analysis: I will use case studies to engage with the historical balance of power between the San Francisco and Silicon Valley, and shifting regimes of mobility. Each phase of the region's modern transportation history responds to the growth of a futurist science- and science fiction-influenced urban imaginary, as well as social, political, and economic agglomerations in the urban region of San Francisco. Each section that follows explores how interrelated mobilities interact with the built and social environments of the Bay Area, produced by and producing of its urban space, populations, and contestations. To achieve this aim, my research interweaves literatures from critical urban and transportation studies, critical mobilities and mobility justice, histories of the Bay Area and Silicon Valley Tech

⁹ See: Miriam Greenberg, *Branding New York: How a City in Crisis Was Sold to the World*, (New York: Routledge, 2008); Benjamin Shepard and Gregory Smithsmon. *The Beach Beneath the Streets: Contesting New York City's Public Spaces* (Albany, NY: Excelsior Editions/State University of New York Press, 2011).

¹⁰ By "neoliberal," I mean the political agenda of privatization, which, as Davis and Monk write, "finds its most dramatic expression in the massive privatization of public assets, the subcontracting of public employment (which now includes even the waging of war), and the deregulation of financial markets. Economic textbooks can drone on forever about profit-driven technological innovation and the invisible hand of trade, but, as David Harvey has rightly insisted, the "main achievements of neoliberalism have been redistributive rather than generative." Davis and Monk also point to Bourdieu's framing of neoliberalism as an "authoritarian utopia that is nothing less than 'a program of the methodical destruction of collectives,' from trade unions and mill towns to families and small nations." Bell and Pahl caution, however, that "despite the importance of state power, neoliberalism should not simply be seen as an imposition from the top-down. Much of its 'common sense' rhetoric can be understood as a captured bottom-up utopianism, which is distorted and incorporated to the benefit of capital and the state and to the detriment of the subjects who originally produced it." This can be seen, for example, in the gentrification of cities by creative classes who are then ultimately displaced by the same processes of real-estate development and speculation for which they were the vanguard, perpetuating cycles of inequality and profit extraction. See: Mike Davis and Daniel Bertrand Monk, "Introduction," in *Evil Paradises: Dreamworlds of Neoliberalism*, ed. Mike Davis and Daniel Bertrand Monk (New York: The New Press, 2007), 7–8; David Harvey, *Spaces of Global Capitalism* (New York: Verso, 2006), 43. Pierre Bourdieu, "The Essence of Neoliberalism," *Le Monde Diplomatique*, December 1998, <https://mondediplo.com/1998/12/08bourdieu>; David Bell and Kate Pahl, "Co-production: Towards a Utopian Approach," *International Journal of Social Research Methodology* 21, no. 1 (2018): 105–117, <https://doi.org/10.1080/13645579.2017.1348581>.

Industry, media archaeology, and research on the tech-utopianism that has shaped the region's form, self-concept, and public perception. To orient and situate these case studies, I will first attempt to map the various geographies of the region—physical, ideological, virtual—as well as the literatures I draw on in pursuit of these questions.

Methodologies

In addition to the relevant literatures and peer-reviewed statistical research, each case that follows involves interrelated but distinct methods, including archival research into planning documents and historical discourse; mapping; ethnographic interviews; media analysis; and observation of meetings, community discussions, and protests. Content analysis of visual, news, and popular and social media will be woven throughout, along with my own documentation as a photographer and short-subject filmmaker in the second and third chapters. Because of the inherent hierarchies, non-disclosure agreements, and extreme corporate secrecy encountered by any insufficiently ranking outsider asking questions about the tech industry, I have situated my work within the ethnographic practice of “studying up,” first proposed by sociocultural anthropologist Laura Nader in the early 1970s. While working with students at UC Berkeley (fittingly), Nader roughly mapped the idea of a new research methodology that did not rely, as so much classic social science did, on power discrepancies between researcher and subject—“studying down” hierarchies of class, education, nationality, etc. “Instead of asking why some people are poor,” she suggested, “we would ask why other people are so affluent?” “Maybe these are

attempts to get behind the facelessness of a bureaucratic society...to get at the mechanisms whereby faraway corporations and large-scale industries are directing everyday aspects of our lives." Nader notes that difficulty of access and resistance of subjects in positions of social power to being studied have long prompted researchers to "study down." Therefore, she recommended a multi-faceted approach involving network analysis, library research, and participant observation, which I have endeavored to follow.¹¹

Science and Technology Studies scholar Nick Seaver, who studies algorithmic data generation, also recommends "studying up" and the practice of Clifford Geertz's "thick description" as methodologies that are well suited to engagement with the social effects of data-driven industries.¹² As STEM fields broadly, and the tech industry specifically are overly invested in the "truth" of data and in the ability of "better" design and networks to resolve problems that most sociologists would argue are socio-political in origin, it is vital that social research on these fields not replicate those biases, which obscure the subjective cultural and ideological factors that shape industries and, consequently, the products of those industries. Studying only "users" of technological worlds, Seaver argues, disempowers them just as surely as generations of social scientists disempowered the marginalized/"primitive" communities they studied by reinforcing capitalist and colonialist racial and class hierarchies. Eschewing a "rigorous"

¹¹ Laura Nader, "Up the Anthropologist: Perspectives from Studying Up," in *Reinventing Anthropology*, ed. Dell Hymes (New York: Pantheon Books, 1972), 288–290.

¹² Nick Seaver, "Studying Up: The Ethnography of Technologists," *Ethnography Matters*, March 10, 2014, <http://ethnographymatters.net/blog/2014/03/10/studying-up/>; "Algorithms as Culture: Some Tactics for the Ethnography of Algorithmic Systems," *Big Data & Society*, July–December 2017: 1–12, <https://doi.org/10.1177/2053951717738104>.

social-scientific method is perhaps necessary to be able to access the ways in which transit plans, network thinking, and the regional culture of Silicon Valley engineering are not as rational, efficient, or cleanly quantifiable as they pretend; it creates space to illustrate the ways that they are science fiction, not science fact.

While I attempted to include as many interviews with likely subjects and as much participant observation possible, corporate firewalls and resistance to public scrutiny meant that I needed to make lateral moves and rely on archival materials, press releases, and popular media discourse to help discern the shape of my topic. Subjects at both ends of the Silicon Valley power hierarchy were largely reluctant speak with me, on or off the record, lest they leave any of trace of criticism of their affiliated corporations that could be sniffed out by algorithmic data gathering. There was, however, information to be gleaned by studying online forums, including Twitter, Quora, and Reddit, where presumptive user anonymity, and a sense of in-group conversation specific to a subreddit yielded, in some cases, more clarifying information than I was likely to get by asking interviewees direct questions. Similarly, the 140-character posturing of tweets might tell me far more, in (ostensibly) someone's own words, directed at an audience of relevant peers, influencers, and "thought leaders," than any answer to a survey.

For the chapters on the private tech shuttles, and on ride-hailing platforms and autonomous vehicles, I spent significant time photographing and filming public planning meetings and street protests, interviewing city officials, activist organizers, tenants affected by gentrification, and commuters in neighborhoods under transit pressure. I

interviewed tech employees for Facebook, Apple, and Google who were bus riders, some of them with experience working for more than one of these companies. I also spoke with hourly-wage kitchen staff of tech campuses, and gig drivers for Uber and Lyft at one end of the tech-work spectrum, and developers, designers, and marketing leads for special projects at the other, all of whom must remain anonymous due to the stipulations of their contracts, and for reasons of corporate culture that I will elaborate in chapters 2 and 3. I visited the headquarters of Facebook, Yahoo!, and Google anonymously as a product tester to gain interior access to campuses and buildings without the scrutiny or shaping of my experience I might have encountered as an academic observer, and tracked and tailed the buses I saw stopping in my neighborhood and on the highways I frequently traveled. Some of this research was done in person, and some of it was done using the systems developed by the big tech companies, using well-crafted search strings and Google Maps data to reveal information—bus routes, stops, and parking lots—hiding in plain sight. This represents an intersection where studying up verges into a sousveillance practice, specifically the use of technology to “surveil the surveillers.”¹³ These chapters also include a component of autoethnography, as my research was largely motivated by my experiences as a resident in the region at the time. I witnessed the upheaval of mobilities and communities in the Bay Area during these years firsthand: as a person with advanced degrees and also a low-income transit rider; as a ridesharing driver and

¹³ Steve, Mann, Jason Nolan, and Barry Wellman, “Sousveillance: Inventing and Using Wearable Computing Devices for Data Collection in Surveillance Environments.” *Surveillance & Society* 1, no. 3 (2002): 332.

passenger; a reluctant user of ride-hailing platforms from their earliest days; and tenant under rental-market pressure from the increasing numbers of tech workers relocating to Santa Cruz. In that the corporations of the platform economy render us all data, I have leveraged that status to become my own data point for this research.

To gather a history of the development of the BART system, the motivations of the various agents involved, and decisions made about its routing, targeted ridership, and aesthetics, I visited and worked with a number of Bay Area archives. Because this era of Bay Area transit development is so far in the past—the first regional rapid transit plan was approved in 1956, and the conversations leading to it began in the 1940s—primary sources such as planning reports, institutional records, meeting notes, and research and media discussion from the time are what is most available. I drew from the urban planning and transportation archives at UC Berkeley, the Buckminster Fuller collection and the Stanford Research Institute Records at Stanford, and the Prelinger library and archives, which includes ephemeral media—photos, pamphlets, newsreels, and the like—related to Bay Area transportation history. The papers of BART president Arnold C. Anderson held by the Institute of Transportation Studies at UC Berkeley were of particular use, containing internal memoranda, significant system reports, press releases, meeting notes, and ephemera related to the development of Bay Area rapid transit that he deemed particularly important. Many of these items contained his notations from the time in question, or later addenda indicating documents that he felt were particularly significant—another form of studying up. I use these materials to

establish the historical details of the successes and failures of the BART plan that set the stage for increasing privatization of transportation over the next 50 years.

Among the questions I hope to address through this topic and approach: 1) How do the means of moving people through urban space reveal assumptions about who the city is “for”? Who is served by these regimes/logics: whose lives do they facilitate and whose exclude? 2) How does transportation materialize the prevailing political-economic logics of particular eras? And 3) What role does the social history and imagining of Silicon Valley, with its predilections for speculative futurisms, play in the sweeping techno-cultural transformation of the Bay, and what does it portend for regions buying into the Silicon Valley franchise? In pursuing answers to these questions, I will be linking two principal literatures—critical urban geography and the “new mobilities” paradigm—that have different approaches and relationships to political economic and network analyses, and are not frequently read together. Both offer advantages to the topics I will address in this project, and each helps to expand the definition of urban space and its boundaries. Critical Urban Geography provides an articulation of the political basis for the rights of urban residents, as well as frameworks for differentiating regimes of urban governance from the lived experiences of city inhabitants. The mobilities literature provides a means to assess movement through urban space, and transportation in particular, and it often does so using network logics that are not so far removed from the governing ideologies of the tech industry. In pursuit of these aims, I will explore whether the literatures I engage with help to make sense of the past, present, and future of transportation in the Bay Area in ways that

may be extensible to other regions. I am particularly interested in theoretical interventions that provide better purchase on the social dimensions of transit systems, their relation to urban form, and how they shape urban belonging and a belief in the right to the city. Do these texts help surface for critique, or do they reify or reconstitute network ideologies or neoliberal-utopian modes of thinking?

Literatures

The Bay Area as Place

For reasons that are not clear, the San Francisco Bay Area is an infrequent subject of critical urban social research. While popular-press attention to the shifts and contractions of the Bay's cities and suburbs can be measured in column miles, not inches, its particular dynamics are curiously absent from much of last few decades of urban theory, whether in critical urban geography, or urban political ecology (UPE). Since 2010, prominent theorists, primarily those with ties to the region, have applied the lenses of critical urban studies to San Francisco and its surrounds with more frequency, but the SF Bay has long appeared primarily as a ground for community-specific ethnographic, demographic, and ecological research. In the broader urban literature, the particular configuration trouble and space (to paraphrase Rebecca Solnit) that exists here earns only passing mention, as one global city among the many experiencing crises driven by neoliberal urban policy and rampant property capitalization and speculation.

Geographers Richard Walker and Alex Schafran contend that these particularities of the Bay should make it an exemplary site for critical urban research, not an afterthought. “[The Bay Area’s] local contradictions parallel deeply disturbing elements of American society: growing class inequality, racial injustice, a bloated financial system, and a failure of environmental controls. The modern metropolis is not just a fascinating geographical study but an object lesson in what has gone wrong across the continent.”¹⁴ To this I would add the ways that Silicon Valley ideology and its dispersed technologies extend the region’s footprint across not just the nation, but the globe—what Bay Area activist and theorist Erin McElroy calls “Silicon Valley imperialism.”¹⁵ Yet even theories that deal directly with the interventions of media into urban space, such as John Urry and Mimi Sheller’s new mobilities paradigm with its reading of networked flows of people, modes of transport, and information, have not sharply focused on San Francisco.

On the one hand, the Bay Area has the highest percentage of transit ridership for intra-city trips of any US urban region except for the New York Metro Area, and also has well-developed bike infrastructure. On the other, it has the highest national percentage of “mega commuters”—those who commute more than an hour and a half to work, almost all originating in lower-income communities to the east and south of the stratospherically high net-worth San Francisco and Silicon Valley. This can be read as a sign of the number of service, blue-collar, and civil workers who now have to live

¹⁴ Richard Walker and Alex Schafran, “The Strange Case of the Bay Area,” *Environment and Planning A: Economy and Space*, 47, no. 1 (2015), 23.

¹⁵ Erin McElroy, “Unbecoming Silicon Valley: Techno Imaginaries and Materialities in Postsocialist Romania,” (Doctoral dissertation, University of California, Santa Cruz, 2019), 19.

outside the city proper and outside of the range of transit systems and are commuting back in by car. In the early 1960s, there was strong support for the creation of Bay Area Rapid Transit (BART), in part from protest against the construction and expansion of freeways through the heart of the San Francisco—the "freeway revolt."¹⁶ But, as I will discuss in the following chapter, BART was primarily designed to appeal to a wealthy, white-collar ridership in an attempt to maintain their financial investment in the downtown core during suburban expansion, and never to facilitate movement of the citizenry of the Bay Area broadly, or to challenge use of private cars.

Going on 60 years from the approval of the BART plan, the massive financial outlays and world-historic cluster of engineers and systems thinkers in Silicon Valley are not being tapped to address the issue of regional mobility, except in the form of individualized, privatized, neoliberal "solutions" such as private shuttle buses, platform-driven ride-hailing services, autonomous cars, and hyperloops. Because of the historical relationship of the Bay Area with the information technology industries that produce much of the world's data infrastructure, I argue that this region merits specific consideration as a generator of technologies and forms of planning that will exert increasing pressure on regions worldwide in the decades ahead. The SF Bay is the first testing ground for network-driven innovations that directly impact collective life, including the movement of urban dwellers through their regions.

Similarly, Silicon Valley's intense clustering of wealth is widely understood to be a major factor in its skyrocketing evictions and rental-market speculation, as well as a

¹⁶ Henderson, *Street Fight*, 40–46.

driver of business-oriented governance. The Bay Area is not alone in the current crisis of urban belonging that is also frequently discussed in relation to New York, Los Angeles, London, Paris, and large cities across the Global North, but it is arguable that, among these regions, San Francisco often holds the distinction of being the first and the worst. Out of US urban regions pre-pandemic, it had the highest percentage of commuters traveling two or more hours per day; among the highest market rents; an ever-widening gulf between the local median income and that required to afford a market-rate apartment; and the nation's highest percentage of unsheltered homeless residents.¹⁷ San Francisco's satellite cities include deeply racially segregated and environmentally burdened communities with high rates of poverty, violence, and incarceration, as well as some of the nation's wealthiest census tracts and several of its most unaffordable small cities—all within a 100-mile radius of the historic downtown core.¹⁸ The Bay Area also includes two of the most densely-populated urban areas in the US—San Francisco and Oakland, but neither is its largest city, a superlative claimed by the primarily suburban San Jose. The regional nature of the complex issues facing the San Francisco Bay provides a useful example for thinking through recent critical

¹⁷ Melanie Rapino and Alison K. Fields, "Mega Commuters in the U.S.," (Washington D.C.: U.S. Census Bureau, 2013); Annie Sciacca, "In Costly Bay Area, Even Six-Figure Salaries are Considered Low-Income," San Jose Mercury News, April 04, 2017, <http://www.mercurynews.com/2017/04/22/in-costly-bay-area-even-six-figure-salaries-are-considered-low-income/>; Joaquin Palomino, "How Many Homeless Live on Our Streets?," *San Francisco Chronicle*, June 28, 2016, <http://projects.sfchronicle.com/sf-homeless/numbers/>

¹⁸ Andrew Aurand, Matthew Clarke, Dan Emmanuel, Emma Foley, Ikra Rafi, and Diane Yentel. "Out of Reach: The High Cost of Housing," National Low Income Housing Coalition, 2022. https://nlihc.org/sites/default/files/2022_OOR.pdf; Jane Kay and Cheryl Katz. "Pollution, Poverty, and People of Color: Living With Industry." *Scientific American*, June 4, 2012, <https://www.scientificamerican.com/article/pollution-poverty-people-color-living-industry/>; Tony Roshan Samara and Amy Martin, "Race, Inequality, and the Resegregation of the Bay Area," *Urban Habitat*, November, 2016. <https://urbanhabitat.org/sites/default/files/UH%20Policy%20Brief2016.pdf>

literatures in geography and mobility studies on what constitutes urban space, where it begins and ends, and who belongs within its limits.

To begin to address these questions, I ground this work first in critical Urban Geography's ability to simultaneously theorize the spatial and social. This facilitates discussion of the formative role of political-economic forces in the lived experiences of urban inhabitants, as well as the boundaries of the urban. Urban geography in this vein is often traced back to the work of the French Marxist theorist Henri Lefebvre who, writing in the 1960s and '70s, argued for an understanding of the city as a productive unit, one in which residents play a shaping role. According to Stuart Elden, for Lefebvre, urban social marginalization was a central concern. "Segregation and discrimination should not remove people from the urban. Nor is space and the politics of space confined to the city," Elden writes.¹⁹ Lefebvre argues that "social space is a social product," a statement that seems simple on its surface, but is radically inclusive on closer examination. By "social space" he does not mean only abstract and intangible relationships, and "product" is not meant to suggest merely collections of things.²⁰ He argues that "social relations, which are concrete abstractions, have no real existence save in and through space;" here space is seen as a matrix that is both shaped by and shaping of social relations, not merely the terrain where they occur. All of this gives the inhabitants of urban space as direct a role in the production of the city they live in as any urban planner, government official, or CEO.

¹⁹ Stuart Elden, "There Is a Politics of Space because Space is Political," *Radical Philosophy Review* 10, no. 2 (2007), 106.

²⁰ Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Cambridge, MA: Basil Blackwell, 1991), 26, 404.

Lefebvre's project was in many ways a response to the planned, rationalized, modernist Western/Northern city of the mid-twentieth century, which often saw the urban as a problem in need of expert technological intervention. This makes Lefebvre's theory an apt fit to address the concerns of San Francisco's cybernetic, technocratic city region. His call to reshape the sense of urban space into something that is not only produced by prevailing economic conditions, but also contributes to their production is profound. Understanding the city as the mode of production rewrites urban space as a social relation, and opens the possibility for those who live within it to produce substantial change by exerting pressure on the conditions of their communities, not simply to accept the top-down shaping of technocrats and planners. The field of Critical Geography takes this injunction, as well as the political-economic and spatial analysis of urban forms and populations, as its starting ground.

David Harvey, like Lefebvre, advocates for a more complex and process-driven understanding of the city, calling for a replacement of C. Wright Mills's "sociological imagination" with a "spatial consciousness" or "geographical imagination."²¹ Harvey writes of Lefebvre's theory of spatiality that it enables a kind of "imaginative spatial play to achieve specific social and moral goals." Harvey views this ludic zone as yielding "potentially [endless] open experimentation with the possibilities of spatial forms. And, of course, within this formulation, new spatial forms are also socio-economic and cultural forms, such as "different modes of collective living, of gender relations, of production-consumption styles, [relations] to nature, etc."²² Harvey proposes a dialectic

²¹ David Harvey, *Social Justice and the City* (Athens, GA: University of Georgia Press, 2009) 21–4.

²² David Harvey, *Spaces of Hope* (Edinburgh: Edinburgh University Press) 182–3.

understanding of the physical and social within urban space, in which any part of the broader environment is constituted out of processes, and each part of this system becomes a “permanence” sustained by the flow of resources and information into and out of it.²³ His notion of long procedural chains supporting or, in their absence, dissolving cities supports Lefebvre’s concept of planetary urbanization—in which remote sites of resource extraction are linked to city cores on a vast urban network. This aspect of Lefebvre’s and Harvey’s formative work is often used to position critical urban geography in opposition to alternate frameworks for theorizing the city in the world, including World Systems theory, Global Cities theory, Actor-Network theory, and the Network Society analysis of Manuel Castells. The latter two fields are often employed to address technologically enabled mobilities and “smart city” planning, but are perhaps insufficient, or even acritical, for reasons I will detail below.

Manuel Castells’s best-known work, *Rise of the Network Society* (1996), focuses on “mega cities” that are highly interdependent and multiply linked.²⁴ Such cities are the spatial distillation of an “informational society” where “core processes of knowledge generation, economic productivity, political/military power, and media communication are already deeply transformed by the informational paradigm, and are connected to global networks of wealth, power, and symbols working under such a logic.”²⁵ The specific footprint of the network or informational society, on the one hand, matches the dispersed, rhizomatic structure of global information technologies, which, according to

²³ David Harvey, *Justice, Nature, and the Geography of Difference* (Cambridge, MA: Blackwell, 1996), 48–50.

²⁴ Manuel Castells, *The Rise of the Network Society*, (Cambridge, MA: Blackwell, 2010).

²⁵ *Ibid.*, 20

Castells, links all parts of the globe through access to information, and is equally dependent on finance in New York, design in the San Francisco Bay Area, and construction in Shenzhen to produce the physical components of this network. On the other hand, Castells finds that this placeless “space of flows” is paradoxically coupled to processes of “re-regionalization and intense urbanization.”²⁶ This is linked to Saskia Sassen’s notion that global economics relies on/produces large cities such as Paris, Tokyo, Frankfurt, or Abu Dhabi as “command centers” or nodal points where multiple networks intersect and can interface with each other more directly. Castells and Sassen’s arguments place any consideration of community in a subordinate position to the mechanisms of global finance and the information economy and are largely silent on the social lives of cities and their effect on the spaces they move through. This may actually serve to reify the global capitalist world system through so much attention to its functions, even by way of criticism. Indeed, Sassen and Castells have both been rather beloved of the sorts of global planning, technology, and branding enterprises that their theories might be presumed to critique.

Peter Marcuse takes a critical approach to the direction of this field, writing that Castells’s analysis depoliticizes globalization, removes human agency on the part of city dwellers, and renders those behind processes of exclusion a vaguely defined “collective capitalist.”²⁷ Critical scholars in media and science and technology studies argue against this acritical and ahistorical reading of networks, instead surfacing deep structures of

²⁶ Ibid, 440–1

²⁷ Peter Marcuse, “Depoliticizing Globalization: From Neo-Marxism to the Network Society of Manuel Castells,” in *Understanding the City: Contemporary and Future Perspectives*, ed. John Eade and Christopher Mele (Cambridge, MA: Blackwell, 2002), 139.

information technology, and the ways that electrical grids, oil pipelines, and undersea cables double as maps of power structures. The fastest data connections between the Global North and South still link former colonies to their colonizers. As James Bridle writes: "Empire has mostly rescinded territory, only to continue its operation at the level of infrastructure, maintaining its power in the form of the network. Data-driven regimes repeat the racist, sexist, and oppressive policies of their antecedents because these biases and attitudes have been encoded into them at the root."²⁸ To ignore this reality is to ignore the historical valences of data gathering and classification structures dating back to the Enlightenment, which have been used to segregate, stratify, and oppress in tandem with their use to clarify or liberate.

Neil Brenner, too, deliberately challenges the essentialism of global city theorizing and argues instead for an understanding of the urban that is "explicitly processual," productive, and emergent.²⁹ Brenner calls into question urban theories that concretize and divide "the city" from that which is not. "[In] urban theory and research during the last century, a basic consensus has persisted: the urban *problematique* is thought to be embodied, at core, in cities—conceived as settlement types characterized by certain indicative features (such as largeness, density and social diversity) that make them qualitatively distinct from a non-city social world (suburban, rural and/or "natural") located 'beyond' or 'outside' them."³⁰ Rather than instantiating an unproductive divide, Brenner calls for a theory of the urban "without an outside" where

²⁸ James Bridle, *The New Dark Age: Technology and the End of the Future* (Brooklyn, NY: Verso, 2018), 182.

²⁹ Ibid, 396.

³⁰ Neil Brenner, *Implosions/Explosions: Towards a Study of Planetary Urbanization* (Berlin: Jovis, 2014), 6.

“urban practices, institutions, infrastructures and built environments are projected aggressively into and across the erstwhile non-urban realm, annihilating any transparent differentiation between city and countryside, and linking local and regional economies more directly to transnational flows of raw material, commodities, labor and capital.”³¹ Here, the problematics of urban space are not specifically local issues, but merely concentrated manifestations of processes that encompass much larger terrains and populations.³² In its way, Brenner’s theory also insists on visualizing the links between more and less socially concentrated areas along the lines of power relations.

Another idea closely linked with both Critical Geography and a Lefebvrian analysis is “the right to the city,” which takes on added importance within a planet-wide urban sphere. Lefebvre loosely defines the right to the city as “a transformed and renewed right to urban life.” This right is set in tension with the midcentury “right to nature,” born of the idea that urban density was necessarily unsanitary and harmful to human social, psychological, and physical health, which helped to drive the development of suburban peripheries. Lefebvre’s right to the city is not based in use of the city, or grounded in a binary notion of city versus country. Rather, it “gathers the interests of the whole society and firstly those who inhabit.”³³ With its focus on habitation and community rather than on capital, the right to the city has been a rallying cry for generations of urban community activists, especially in resistance to the incursions of

³¹ Ibid, 18–19

³² Ibid, 29; quote in Henri Lefebvre, “The Worldwide and The Planetary,” in *State, Space, World: Selected Essays*, ed. Neil Brenner and Stuart Elden (Minneapolis: University of Minnesota Press, 2009) 206.

³³ Henri Lefebvre, “The Right to the City,” in *Henri Lefebvre: Writings on Cities*, trans. Eleonore Kofman and Elizabeth Lebas (Cambridge, MA: Blackwell, 1996), 158.

colonial, national, and global economic interests. However, geographers interpreting Lefebvre, in particular Mark Purcell, argue that his *droit à la ville* is vaguely defined.

Purcell suggests that “Lefebvre’s right to the city is more radical, more problematic, and more indeterminate than the current literature makes it seem.”³⁴

Purcell argues that the strongest aspects of the theory are, first, that it reconstitutes the basis for “liberal-democratic citizenship,” which is traditionally the province of national or regional state government that locates the center of enfranchisement and legislative power far from the spaces of daily urban life. Second, he argues that this reconstitution is achieved through a complete reordering of one’s relation to place and space. As he writes, “In Lefebvre’s conception...enfranchisement is for those who inhabit the city.” To this end, Lefebvre replaces the basic unit of the liberal democratic state, the citizen, with the dweller in and creator of urban space, the *citadin*. Since the early 2000s, David Harvey has published a number of works dealing with the right to the city, and his interpretation takes a more holistic, hands-on approach than Lefebvre’s ontologically abstract reckoning of the *citadin*.

What kind of city we want cannot be divorced from the question of what kind of people we want to be, what kinds of social relations we seek...the right to the city is, therefore, far more than a right of individual access to the resources that the city embodies: it is a right to change ourselves by changing the city more after our heart’s desire. It is moreover a collective rather than an individual right.³⁵

If the inhabitants make the city, Harvey suggests, then they can remake it, collectively

³⁴ Mark Purcell, “Excavating Lefebvre: The right to the city and its urban politics of the inhabitant,” *GeoJournal* 58 (2002): 99.

³⁵ David Harvey, “The Right to the City,” *International Journal of Urban and Regional Research* 27, no. 4 (December, 2003): 940.

and according to their own design. Lefebvre was right, he concludes, that the “revolution of our times has to be urban—or nothing,” because if the urban is the site of production of globalized/ neoliberal capital, then the urban is where it must be contested.³⁶

Silicon Valley as Ideology

“Silicon Valley is a mindset, not a location.”³⁷ This truism from internet entrepreneur and venture capitalist Reid Hoffman is frequently quoted to summon up the ethos of Silicon Valley as both place and industry, and in doing so, neatly illustrates the tech community’s disregard for the material and geographic substrate that has enabled its meteoric rise. In the influential 1996 “Declaration of the Independence of Cyberspace,” John Perry Barlow—a onetime Grateful Dead lyricist, member of the Whole Earth Network, and co-founder of the Electronic Frontier Foundation (EFF)—lays out the cyberlibertarian manifesto: “Your legal concepts of property, expression, identity, movement, and context do not apply to us. They are all based on matter, and there is no matter here.”³⁸ Nearly thirty years on, this root-level disparaging of the material in favor of dispersed networks is widespread in the tech community. Its omnipresence plays a significant role in tech-cultural resistance to understanding the effects of its wealth, its workforce, and its practices on its home region. Richard

³⁶ David Harvey, *Rebel Cities: From the Right to the City to the Urban Revolution* (London: Verso, 2012), 25.

³⁷ Azeem Azhar, “The Challenging Political Economy of Silicon Valley: Reid Hoffman & Azeem Azhar in Conversation,” *Exponential View*, October 24, 2018, <https://soundcloud.com/exponentialview/the-challenging-political>.

³⁸ John Perry Barlow, “A Declaration of the Independence of Cyberspace,” Electronic Frontier Foundation, 1996, <https://www.eff.org/cyberspace-independence>.

Barbrook and Andy Cameron coined the label the Californian Ideology in order to write against its bizarre fusion of “market economics and the freedoms of hippie artisanship, and a nearly universal belief in technological determinism” that is arguably the prevailing social imaginary of the Bay Area.³⁹ This cloud-storage ethos can be linked with California, however, because the tech industry extracts tremendous social and economic value from being located here. If there were so little value in place, why pile on the Bay Area to the detriment of all other existing local communities, if the Googleplex, Meta HQ, Salesforce Tower, and Infinite Loop could be located anywhere, or indeed nowhere? Why brand “Designed by Apple in California” on the back of every Apple product?

As media scholar Richard Rogers points out, “geography was built into cyberspace from the beginning.”⁴⁰ Long before there was a Silicon Valley tech industry with server farms, sprawling corporate campuses, and fleets of private buses, there were 13 root servers in fixed locations, endless miles of cable, varying speeds of data transmission based on national location, and an unequal distribution of the first IP addresses—the coordinates by which data is located—based on the same. There has always been a structural link between virtual networks and the social values and political economy of particular places; these networks are also places that require a critical geographic analysis. Moreover, as Shannon Mattern writes about data-driven planning and so-called “smart cities,” big tech is, in fact, very interested in the command and control systems of cities, and in remapping urban spaces according to its veneer of

³⁹ Richard Barbrook and Andy Cameron, “The Californian Ideology,” *Science as Culture* 6, no.1 (1996): 50.

⁴⁰ Richard Rogers, *Digital Methods* (Cambridge, MA: The MIT Press, 2013), 34.

rationality and order. She cautions that the surfacing of tech infrastructures should not normalize their presence around us, as just one more fascinatingly unseen stratum of urban life. Dreams of automation and algorithmic efficiency, and the physical systems that support their diffusion “ultimately impose their own encoded inequities and restrictive logics” on the populations they interface with, reprogramming citizens as “consumers” or “users,” a process that should not pass uncontested.⁴¹ Social issues and spaces are not engineering problems that can be quickly “solved” by the application of the right technology, in the pursuit of profit—what critic Evgeny Morozov calls “technological solutionism.”⁴²

Tech capital absolutely wants the urban for its own: it wants the streets for ride-hailing apps and autonomous vehicles, it wants the substrata for the tunnels of the Hyperloop, and the air for delivery drones. As Sarah Barns writes, “quaint distinctions between the ‘built’ and the ‘digital’ are collapsing, just as software makers are literally becoming ‘city builders.’”⁴³ Google has not only sent its employee shuttles into the streets and highways of the Bay Area, changing its circuitry in the process, it has also launched a variety of initiatives including Sidewalk Labs, an urban innovation project aiming to fuse information technology with the design and planning of cities. From 2015-20, Sidewalk’s marquee project was “Sidewalk Toronto,” an attempt to build a city “from the Internet up” on a former port area of the Toronto waterfront that is one

⁴¹ Shannon Mattern, *A City is Not a Computer: Other Urban Intelligences* (Princeton, NJ: Princeton University Press, 2021), 3-4.

⁴² Evgeny Morozov, *To Save Everything Click Here: The Folly of Technological Solutionism* (New York: Public Affairs, 2013).

⁴³ Sarah Barns, *Platform Urbanism: Negotiating Platform Ecosystems in Connected Cities* (Palgrave MacMillan, 2020), <https://doi.org/10.1007/978-981-32-9725-8>, 15.

of the largest underdeveloped tracts of urban land in North America. Sidewalk Toronto was ultimately scrapped due to the COVID-19 pandemic, but as the head of Sidewalk and former deputy mayor of New York City Dan Doctoroff said of the project's work "cities are hard. You have people with vested interest, politics, physical space...But the technology ultimately cannot be stopped."⁴⁴ In writing about a similarly failed endeavor between Amazon and the New York City government, Sharon Zukin labeled this confluence of information technology, capital, and urban space, the "innovation complex," a political-economic reality that is as much material as it is symbolic or ideological.⁴⁵

Extensive accounts of the development of both the tech hardware and software industries and their governing ethos are also detailed by Fred Turner in *From Counterculture to Cyberculture*. Turner questions the universal belief in the benefits of computing being integrated into all facets of life, noting that a short few decades ago, the calculating super computers of business giants were seen as deeply bureaucratic parts of the state apparatus—primarily responsible for punching holes in the cards that rendered people numbers in a system, for the census, the draft, incarceration, and/or extermination. Since the advent of personal computing and later the mobile web, however, a far wider-reaching aggregation of information and rendering of the self as a

⁴⁴ Mattem, 54; Sidewalk Labs, "Toronto" <https://www.sidewalklabs.com/toronto>; Daniel L. Doctoroff, "Why We're No Longer Pursuing the Quayside Project—and What's Next for Sidewalk Labs," *Medium*, May 7, 2020, <https://medium.com/sidewalk-talk/why-were-no-longer-pursuing-the-quayside-project-and-what-s-next-for-sidewalk-labs-9a61de3fee3a>; Matt Novak, "Google's Parent Company (Probably) Wants to Build a City from Scratch," *Gizmodo*, April 5, 2016, <https://gizmodo.com/google-s-parent-company-probably-wants-to-build-a-city-1769181473>.

⁴⁵ Sharon Zukin, *The Innovation Complex: Cities, Tech, and the New Economy* (New York: Oxford University Press, 2020).

collection of data points is now hailed as liberatory. Paradoxically, this belief is most frequently espoused by tech libertarians who would be the first to protest the intrusion of any aspect of the state into their private lives, but are content to turn their data lives over to Amazon, Google, Meta, 23andMe, Tinder, and countless other profit-driven data collecting entities of the web and the Internet of Things (IoT). Turner tackles the pervasive belief that the rhizomatic structure of internet communications, as an ideal type, is a great equalizer of social, economic, and political hierarchies. To this claim, he responds “there is nothing about a computer or a computer network that necessarily requires that it level organizational structures, render the individual more psychologically whole, or drive the establishment of intimate, though geographically distributed, communities.”⁴⁶

In later work examining arts programming on the Facebook campus in Menlo Park, Turner argues that the enclosed confines of Silicon Valley’s corporate parks mirror the information architecture of the platforms and devices they produce, becoming physical user interfaces. “These environments carefully and deliberately shape the behavioral options of those who enter them. They have become what other scholars have called ‘choice architectures’—conglomerations of algorithm, text and image designed not to tell a user what to do, but to subtly solicit a desired behavior.”⁴⁷ As he describes it, the interface of the Facebook campus is designed to replicate the imagined public sphere of an urban world that employees may ostensibly live in after their 60–

⁴⁶ Fred Turner, *Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: University of Chicago Press, 2006), 3.

⁴⁷ Fred Turner, “The Arts at Facebook: an aesthetic structure for surveillance capitalism,” *Poetics* (2018), <https://doi.org/10.1016/j.poetic.2018.03.003>, 5.

80-hour workweeks and lengthy commutes, but are effectively barred from participating in, both by the demands of Facebook's "move fast and break things" work culture, and by the confines of the campus itself.

Facebook's headquarters, like those of many of the largest tech companies, is an island in the midst of parking lots, circular drives, and low-rise office and industrial complexes. Stranded on the shores on the SF Bay on former marsh land, it is physically divided from surrounding communities by the multi-lane Bayfront Expressway. It is far from a town center and hardly any commercial storefronts are within walking distance, though the company has provided blue-painted bikes for navigating the sprawl of its campus, which can theoretically be used to travel farther afield. It would be a bit of a workout to reach downtown Menlo Park or Palo Alto, however, at distances of 4–6 miles through uninspiring residential enclaves. To filter employee's awareness of these facts, perhaps, endless amenities are available on site, including an open-air food court that replicates the feel of a food truck pop-up event, and murals and installations by artists whose stencil, wheat-paste, and graffiti practices are usually done in public streets, in the service of protest movements, at risk of criminalization, and without commission. These interior spaces, Turner writes, reflect the ways that platform architecture reshapes popular discourse, creating a highly filtered, pseudo-public environment where the terms and conditions and available options are all geared towards maximizing corporate profit. It is arguable that what is true of Facebook HQ is true of Silicon Valley as a region, as Langdon Winner described it in 1992.

Utopianism, Urban Space, and the Urban Imaginary

In both its examination of the politics of urban space and mobility, and the prevailing ideologies of the Silicon Valley tech industry, my project operates on the terrain of utopian thought and utopian projects. This aspect of the analysis again points back to critical urban geography. As Lefebvre wrote: "Nevertheless, there is today, especially in the domain that concerns us, no theory without utopia. The architects, like the urban planners, know this perfectly well."⁴⁸ For Lefebvre, utopia was not something to be actively sought, but he felt that the idea of it could steer social action towards positive change. As Ole B. Jensen and Malene Freudendal-Pedersen point out, Lefebvre saw his utopianism as a partisanship of possibility.⁴⁹ "In order to extend the possible, it is necessary to proclaim and desire the impossible. Action and strategy consists in making possible tomorrow what is impossible today," he wrote.⁵⁰ David Madden's analysis of Lefebvre's utopianism provides some specifics that aide in contrasting a critical utopianism against vague notions of utopian "freedom" and "the future."

Lefebvre's position here raises a number of problems, many of which stem from the fact that his critical utopianism can be easily misunderstood, misconstrued, or forgotten. Without an insistence upon political economic transformation, the affirmation of urbanism can easily degrade into cheerleading for conspicuous neighborhood consumption, smart technocracy, or renewal-as-gentrification the sort of policies that a segment of planners, politicians, and real-estate developers pursue everywhere in the name of livability and the creative city. Today, precisely when older critical perspectives have been abandoned, discourses about dwelling, inhabitation, the right to the city, indeed

⁴⁸ Henri Lefebvre, "Reflections on the Politics of Space," in *State, Space, World: Selected Essays*, ed. Neil Brenner and Stuart Elden (Minneapolis, MN: University of Minnesota Press, 2009), 179.

⁴⁹ Ole B. Jensen and Malene Freudendal-Pedersen, "Utopias of Mobilities" in *Utopia: Social Theory and the Future*, ed. Keith Tester and Michael Hviid Jacobsen (Burlington, VT: Ashgate, 2012), 198–99.

⁵⁰ Henri Lefebvre, *The Survival of Capitalism*, (New York: St. Martin's Press, 1973), 36; cited in Jensen and Freudendal-Pedersen, 199.

urbanism itself, always threaten, as if by radioactive decay, to lose their critical content and sink back into a neoliberal lifestyle politics. Lefebvre's critical urban theory clearly provides the conceptual resources with which to resist such a reading.⁵¹

Coupled with political economic analysis, Lefebvre's call for the "possible impossible" resists notions of technology-as-savior and creates grounds to imagine social and political worlds beyond the current order. Jensen and Freudendal-Pedersen write that, within the critical mobilities paradigm, one such outcome might be the ability to envision an urban planning not defined by the private car. Drawing on the work of Kingsley Dennis and John Urry, they find that a critical utopian approach is necessary to face challenges related to mobilities that seem as if they are "'locked in' to certain ways of designing, organising and practicing [sic]." While Dennis and Urry, in keeping with the lateral, networked conception of much mobilities literature, argue for practical and pragmatic solutions that lie within current political-economic configurations, critical utopian thought drawing on Lefebvre, Harvey, Jameson and others, makes it possible to imagine placemaking beyond these arbitrary limits.⁵²

In the view of social philosopher Charles Taylor the modern social imaginary is a concept that encapsulates and allows for the study of "the ways people imagine their social existence, how they fit together with others, how things go on between them and their fellows, the expectations that are normally met, and the deeper normative notions and images that underlie these expectations." Taylor positions this concept in

⁵¹ David J. Madden, "City becoming world: Nancy, Lefebvre, and the global-urban imagination," *Environment and Planning D: Society and Space* 30 (2012): 783.

⁵² Jensen and Freudendal-Pedersen, "Utopias of Mobilities," 198-9; Kingsley Dennis and John Urry, *After the Car*, (Malden, MA: Polity, 2009).

tension with social theory, as “theory is often the possession of a small minority,” whereas a social imaginary “is shared by large groups of people, if not the whole society.”⁵³ In the hands of social theorists in urban sociology, critical geography, environmental studies, media studies, and many other fields, the idea of a diffuse and circulating social imaginary has been a useful tool to encompass the built, social, and representational aspects of human societies, a configuration that is not well accounted for by more purely Marxist theories of political economy or the (re)production of ideology. Taylor’s contribution is focused on practice: he defines the concept as “the ensemble of imaginings that enable our practices by making sense of them.” The theory of the social imaginary distributes the agency for the creation and maintenance of the imaginary—in which members of a society are mutually present “codeterminers of the meaning of our action.”

Taylor’s theory presumes a prototypically Modern Western/Northern environment—one that is urban, complex, diverse, and full of disjunctures such as “the everyday rush to the metro.” This environment includes public spaces of discussion and signification such as politics, fashion, and economics, developed as a means of processing a collective “being with.” He acknowledges, though, that in many ways, this corresponds to the 19th-century European city of the *flâneur* or the bourgeois dandy—the urban that fascinated Baudelaire, the Impressionists, and Benjamin; a city that involved masses of people being physically present with each other, united in observation, and display, and suffused with the wealth of colonial extraction. Taylor

⁵³ Charles Taylor, *Modern Social Imaginaries* (Durham, NC: Duke University Press, 2004), 24.

argues that in the Twentieth Century, these spaces that “hover between solitude and togetherness” increasingly existed within the dispersed spaces of information and communication.⁵⁴ This statement only seems more and more true, particularly within the confines of the COVID-19 pandemic.

For Lynne Pearce, one of many contemporary theorists to take up the social imaginary in the form of the “urban imaginary,” Taylor’s approach favors a “cartographical and panoptic, as opposed to an ocular-centric or embodied, representation of the social landscape,” a blind spot that risks reinforcing hierarchical power structures by privileging a “view from above” or from a remove only available to those with the resources to allow for leisure and contemplation. This poses problems for researchers concerned with movement through urban spaces, as it conceptualizes and represents cities as “static, boundaried, and panoramic” and lacks purchase on the “mass mobilization of contemporary society that many...will deem its defining characteristic.”⁵⁵ The type of vision that Taylor presupposes becomes particularly problematic when applied to the uneven development and privatization of transportation, as “panoramic vision” is one of the defining experiences of transit ridership.⁵⁶ This is particularly so for those able to travel by express train, private bus, an Uber, or a Cruise robotaxi accessible only to the few while the many walk, wait, and transfer. It summons the hierarchical optics of Google buses, described evocatively by

⁵⁴ Ibid, 165–8.

⁵⁵ Lynne Pearce, “The Urban Imaginary: Writing, Migration, Place,” *Mobilities* 7, no. 1 (2012), 2–4.

⁵⁶ Wolfgang Schivelbusch, *The Railway Journey, The Industrialization of Time and Space in the Nineteenth Century* (Oakland, CA: University of California Press, 2014).

Rebecca Solnit in 2013:

Most of [the buses] are gleaming white, with dark-tinted windows, like limousines, and some days I think of them as the spaceships on which our alien overlords have landed to rule over us... Other days I think of them as the company buses by which the coal miners get deposited at the pithead, and the work schedule involved would make a pit owner feel at home... My brother says that the first time he saw one unload its riders, he thought they were German tourists—neatly dressed, uncool, a little out of place, blinking in the light as they emerged from their pod.⁵⁷

The social imaginary can also be too concerned with the collective and normative, according to archival scholar Ann Laura Stoler, who discusses the need for attention to the “unruly” and plural social imaginaries of any society, and the discrepancies between them. Applied without care, the idea of the social imaginary (and its descendants in various fields of social inquiry) can fall into the trap of representing social beliefs and norms as “effortlessly and equally shared.”⁵⁸ To adequately explore the intersectional, plural, and contested space of transportation, other theories that account for the functioning of power and the production of racial, gender, class, and other social hierarchies and inequalities must be included. Used in conjunction with critical urban geography or UPE, however, the social/urban imaginary is a useful concept that creates space for the discussion of information that is not easily quantified, such as the content of media discourse, the social power of subcultures, and pervasive but implicit ideologies—such as the tech industry’s utopian-futurist leanings and love of speculative fictions.

⁵⁷ Rebecca Solnit, *The Encyclopedia of Trouble and Spaciousness* (San Antonio, TX: Trinity University Press, 2014), 248.

⁵⁸ Ann Laura Stoler, *Along the Archival Grain: Epistemic Anxieties and Colonial Commonsense* (Princeton, NJ: Princeton University Press, 2009), 246.

In the hands of urban sociologists such as Sharon Zukin, or critical geographers such as Mike Davis, the urban imaginary can reveal how “images are interrelated with architecture and political and economic capital in constructing cities as ‘landscapes of power’.”⁵⁹ Zukin et al identify, in the work of Rob Shields, two key elements of a critical urban imaginary: “the relational—often hierarchical—meanings places hold in the popular imagination” and “the connections between hierarchies of place meaning and hierarchies of social class and race.” In a project locating the capitalist “American Dream” within the urban imaginaries of Coney Island and Las Vegas, Zukin et al document how such imaginaries shift and recombine over time, attaching themselves to new sites and new discursive practices, and fusing material and symbolic landscapes.

Silicon Valley as Virtual Geography

Theories of media archaeology and critical data studies also bridge the various domains I consider, mapping linkages between the material and the immaterial, urban space and technologies of communication. These fields provide a necessary basis on which to question the assumptions of Silicon Valley’s ideology and self-promotion, as resisting technological determinism requires theories fluent in both the history of technology and its claims to ever be doing anything truly new. I align with Bolter and Grusin’s argument, channeling Carolyn Marvin before them, that “what is new about new media is therefore also old and familiar: that they promise the new by remediating

⁵⁹ Sharon Zukin, Robert Baskerville, Miriam Greenberg, Courtney Guthreau et al., “From Coney Island to Las Vegas in the Urban Imaginary: Discursive Practices of Growth and Decline,” *Urban Affairs Review* 33, no. 5 (1998): 629.; Davis, *City of Quartz*.

what has gone before.”⁶⁰ By focusing on transportation technologies that have developed around and through Silicon Valley and the SF Bay Area, I hope to illustrate this kind of persistence of form, and undercut the industry’s claims of world changing and disruption. As Shannon Mattern writes: “History shows us that time and again, whenever a new ‘game-changing’ technology—television, radio, the car, the steam engine, the printing press, even writing—emerges, latter-day ‘futurists’ have offered up breathless predictions regarding its capacity to radically reshape our brains, families, homes, neighborhoods, cities, nations, and world...and we’re hearing it again in the latest Silicon Valley boom, whose start-ups seem obligated to practice willful historical inattention in order to make their claims of innovation.”⁶¹

Melvin Webber’s theories of the decentralized non-place urban realm do not exist without the cybernetic thinking of Norbert Wiener and his colleagues, or Marshall McLuhan’s writings on spatial forms as media, and how media simultaneously “abolish the spatial dimension.”⁶² McLuhan in particular made room in broader public discourse for a close understanding of media forms as at once informational and material—as ephemeral as electric light, messages carried by telegraph, or the impulses of computer circuitry, and as solid as the form of a city shaped by architecture and transportation technologies. “The medium shapes and controls the scale and form of human association and action,” he wrote in *Understanding Media: the Extensions of Man* (1964),

⁶⁰ Jay David Bolter and Richard Grusin, *(Re)mediation: Understanding New Media* (Cambridge, MA: The MIT Press, 2000), 270.; Carolyn Marvin, *When Old Technologies Were New: Thinking About Electric Communication in the Late Nineteenth Century* (New York: Oxford University Press, 1988).

⁶¹ Shannon Mattern, *Code and Clay, Data and Dirt: Five Thousand Years of Urban Media* (Minneapolis, MN: University of Minnesota Press, 2017), xii-iii.

⁶² Marshall McLuhan, *Understanding Media: the Extensions of Man* (New York: McGraw-Hill, 1964), 255.

in which he addressed roads, the wheel, the car, and the airplane as forms of media alongside print, radio, and television.⁶³ As with the later theories of Castells and Sassen, however, McLuhan's writings are agnostic on the development of these technologies as histories of power relations.

In addition, the study of urban populations, movement, and change over time assesses shifts registered on a scale not accessible to an individual observer without mediation through graphs, maps, and algorithms and other technologies of encoding. As this project can truly only study laterally or upwards, use of these mediated forms should not be confused with an attempt at panopticism. Instead, I hope to layer the data I have gathered from multiple sources to create a virtual geography. McKenzie Wark describes a virtual geography that is "no more or less real than the empirically verifiable" terrain with which most urban geography is concerned.

We live every day in a familiar terrain: the place where we sleep, the place where we work, the place where we hang out when not working or sleeping. From these places we acquire a geography of experience. We live every day also in another terrain, equally familiar: the terrain created by the television, the telephone, the telecommunications networks crisscrossing the globe. These "vectors" produce in us a new kind of experience, the experience of telesthesia—perception at a distance. This is our "virtual geography," the experience of which doubles, troubles, and generally permeates our experience of the space we experience firsthand. This virtual geography is no more or less "real." It is a different kind of perception, of things not bounded by rules of proximity, of "being there."⁶⁴

⁶³ Ibid, 24.

⁶⁴ McKenzie Wark, *Virtual Geography: Living with Global Media Events* (Indianapolis, IN: Indiana University Press, 1994), 7.

Wark is primarily concerned with a phenomenological exploration of shared experiences of globalized media events such as the fall of the Berlin Wall or the Tiananmen Square Massacre, but where her argument concerns the history of the vector—of the “intricate tracteries” left by information technologies traversing “the terrain” of social world—it perhaps points to a different reading of the idea of a virtual geography. This is particularly so as she connects her reading to a Lefebvrian understanding of the lived and material. A “virtual geography,” much like Williams’s “structure of feeling,” seems to be a contradiction in terms, but I feel it perfectly captures what I hope to illustrate about the urban space of the San Francisco Bay and its relationship to the tech industry and the growth machines that predated and created it. There are multiple “Bay Areas” that occupy the space of regional imaginary, which permeate not only the experiences of people moving through it, but also the ways that this area is planned and built. As the transportation developments I will discuss in the following chapters are shaped by these overlapping imaginaries, and heavily intermediated by information technologies produced in Silicon Valley, Wark’s “media vectors” take on new valences. Matthew Wilson suggests that geography must expand to “conceptualize data beyond merely storage devices and instead as pathways for urban-political imaginations.” This is necessary to “destabilize notions of the material defined against the immaterial.” The material environment of cities is not a “dead, immutable substrate,” and neither is the space of data completely untethered from the

material realm.⁶⁵ As Mattern writes, cities have long been considered “knowledge repositories and data processors,” however “the city is not a computer.”⁶⁶

Tech and Transportation

Urban Geography, in its focus on the political economy and structure of cities, incorporates more quantitative and less speculative research that contributes to the ability to theorize the more abstract aspects of the urban experience of regions such as San Francisco. The empirical methods of this field determine the development of more focused subfields, such as transportation geography. These subfields’ results, though, are often in the service of civil engineering, development, and capital campaign projects, and can be guided by a problematically mid-century modernist ethos of “betterment” and spatial rationalization. According to urban geographer Susan Hanson, transportation design was central to the economic geography of the 1950s and 1960s, part of the push for planning and rationalization of space—a “‘systematic’ science, one focused on illuminating general principles of spatial organization.” Modern urban transportation planning, she writes, developed with a focus on automobility and suburbanization: “Congestion is the enemy and more infrastructure, known in the planning realm as more ‘capacity,’ is the solution.” Transportation planning requires at least some understanding of the social and behavioral aspects of transit riders, so transportation geography developed as a twin profession, though it was not until the critical

⁶⁵ Matthew W. Wilson, “Data matter(s): legitimacy, coding, and qualifications-of-life,” *Environment and Planning D: Society and Space* 29, no. 5 (2011), <https://doi.org/10.1068/d7910>: 858–9.

⁶⁶ Mattern, *A City is Not a Computer*, 62–3.

revolutions of the 1970s that there was “explicit recognition that transportation was not just about infrastructure but also about *people*” [emphasis Hanson’s].⁶⁷

Hanson implicates this disciplinary blindness to the social dimension of transportation in the protest that met infrastructure projects such as urban highway construction, in the form of the “freeway revolts.”⁶⁸ Since the mid 1970s, a more comprehensive, critical, and activist research practice, incorporating the social, political, and ethical aspects of transportation, has come to predominate in the field. Prytherch and Cidell note that transportation geography “remains defined by a particular set of key themes and related concepts including an emphasis on the materiality of transportation practices and infrastructure, their role in the urban process, and how policies shape them.”⁶⁹ However, as Kafui Attoh has argued in writing about transit activism in the Bay Area, “transportation is both a right and a public good central to securing other rights—especially the right to the city.”⁷⁰

Researchers of urban planning and transportation geography, operating within a critical and cultural framework, like Attoh, have produced studies that relate to this project. Cameron Yee’s account of the San Francisco freeway revolt details the rise of automobile commuting and the role that planning-centric management of regional public transit, geared towards peak suburban commuter hours, played in the steady decline of regional transit ridership since 1970. Yee also distills a number of principles for

⁶⁷ Hanson, “Foreword I: Transportation Geographies and Mobilities Studies: Toward Collaboration,” 4–6.

⁶⁸ *Ibid.*, 7.

⁶⁹ Prytherch and Cidell, “Transportation, Mobilities, and Rethinking Urban Geographies of Flow,” 23.

⁷⁰ Kafui Ablode Attoh, *Rights In Transit: Public Transportation And The Right To The City In California’s East Bay* (Athens, GA: University of Georgia Press, 2019), 103.

more sustainable and effective public transportation from this research, primarily that “communities must steer policy.” Environmental justice, and the needs of low-income communities, communities of color, and those who otherwise depend most heavily on transit networks, especially the disabled and the elderly, Yee argues, must be central to the frameworks structuring transportation.⁷¹

More recent quantitative analyses, like Alexandra Goldman's 2013 study on the relationship between the Google Buses and displacement, put data around the shifts being protested. Goldman demonstrated that rents on apartments within walking distance of private tech shuttle stops (as opposed to other transit options) were increasing at a faster clip than similar apartments in the same neighborhoods. Karen Chapple's “Early-Warning Toolkit for Gentrification” also identifies access to transit as a major driver of which neighborhoods gentrify first and undergo higher rates of displacement. In their report on gentrification and displacement in transit-rich neighborhoods, Pollack, Bluestone, and Billingham identify a number of patterns that are typical of areas undergoing gentrification, such as the Mission in San Francisco: they are typically lower-income, largely of color, and serve communities that lack car ownership. Pollack et al. indicate, however, that gentrification of this kind need not occur, and may be preventable through a recalibration in priorities for transit-system management [perhaps in keeping with Yee's suggestions] and the application of housing policy designed to prevent market speculation in advance of transit developments.

⁷¹ Cameron Yee, “Towards Sustainable Transportation Policy in the United States: A Grassroots Perspective,” in *Making Transport Sustainable*, ed. Nicholas Low and Brendan Gleeson (New York: Palgrave Macmillan, 2003), 113.

Mobilities and Critical Mobilities

Beginning in the early 2000s, a new theoretical paradigm developed that was more explicitly concerned with movement through urban space in its many forms, including movements of policy, capital, and transportation. Coined by Urry and Sheller, the “new mobilities paradigm” seeks “to bring into vision how social life presupposes many issues of movement and non-movement, of forced movement and chosen fixity, of people, images, ideas, and objects” and presupposes that it is “likely that contemporary societies demonstrate more movement for more people across longer distances.”⁷² Urry and Sheller argue for a system of social analysis that incorporates the vast scale of contemporary mobility, as well as its multitude modes, including virtual mobility, the circulation of ideas, and emotional geographies. They place this in opposition to previously existing “sedentarist” social-scientific theories that normalize space and population as relatively static, and which failed to be able to account, by example, for the impact of the automobile on city development in the modern era.⁷³

Beyond this, theorists working within the mobilities paradigm, such as Prytherch and Cidell, argue that motion is the constitutive element of contemporary life, and should be the basic unit of scholarly research on the urban. “Our urban imaginary has often neglected to capture a most essential element of this same urban scene: motion. Urban places, despite their apparent solidity in space and our imaginations, pulse with flows of people, objects, energy, and ideas. Stand at the corner of a busy intersection,

⁷² John Urry, *Mobilities* (Malden, MA: Polity, 2007), 17.

⁷³ Mimi Sheller and John Urry, “The New Mobilities Paradigm,” *Environment and Planning A* 38, no. 2 (2006).

and one is reminded how the built environment is but conduit and channel for circulating matter and energy, owing in networks from the molecular to the global scale.”⁷⁴ In a transformation of Janet Abu-Lughod’s theory of city formation as place-linked and driven by centuries of political-economic change, Sheller argues that “cities are formed by mobilities: Often located at the confluence of rivers, roadways, ports, rail termini, and airports, they orchestrate flows of people, goods, information, and ideas.”⁷⁵ From the perspective of mobilities literature, urban geography’s emphasis on the social and cultural dimensions of urban experience “came to marginalize transportation as a concern,” in favor of questions of place and population.⁷⁶

Prytherch and Cidell point out that considerations of network and flow have long been part of urban studies and urban geography, dating back to “the Chicago School’s dynamic systems metaphor of urban ecology,” and these were also key to the midcentury wave of quantitative and expert modernist urban planning. But it was unclear at its outset whether mobilities literature engaged in a substantial critique of the ways that these understandings rendered the city a natural terrain, subject to evolutionary forces, not a site of production whose space was both actively produced by political economy and power and in turn produced both itself and its inhabitants.⁷⁷ There is also a potentially problematic use of metaphor in the base literature of mobilities. Urry, Sheller, and other theorists often refer to points of fixity within mobile

⁷⁴ Prytherch and Cidell, “Transportation, Mobilities, and Rethinking Urban Geographies of Flow,” 19.

⁷⁵ Mimi Sheller, “Foreword 2: Mobilizing Transportation, Transporting Mobilities,” in *Transport, Mobility, and the Production of Urban Space*, ed. Julie Cidell and David Prytherch (New York: Routledge, 2015), 13; Sheller does not cite Abu-Lughod, see Janet Abu-Lughod *New York, Chicago, Los Angeles: America’s Global Cities* (Minneapolis, MN: University of Minnesota Press, 1999).

⁷⁶ Prytherch and Cidell, 22.

⁷⁷ *Ibid*, 37

flows as “moorings.” Though the paradigmatic rhetoric claims to address the mobilities and immobilities, inclusions and exclusions produced by contemporary forms of urbanism, this language privileges a sense of movement perhaps to the detriment of the communities rendered less or im-mobile by access, economics, and/or ability. Things that are moored—boats and ships—are easily unmoored, and the moorings themselves are often shifting, temporary, or easily dislodged. This seems to suggest a flowing and unfettered movement far from the built infrastructures of land that have a multi-generational shaping force, though these are, of course, not permanent, only permanences, per Harvey.

Prytherch and Cidell suggest that “One potential point of intersection may perhaps be found in Castells, who approached ‘the emergence of a new social structure’ of cities in the information age through a social theory of space and time...he called a space of flows.” They see Castells’s theory of flows as a mirror of the mobilities paradigm, in which “flows are not just one element of social organization” but the dominant element. These flows are “purposeful, repetitive, programmable sequences of exchange and interaction” which are embedded in and constitutive of the mobile social fabric, “including the circuits, nodes and hubs, and socio-spatial organizations constituting the ‘material supports for dominant societal processes and functions.’” They see “transportation as that most material form of communication” and credit Castells’s vocabulary with enabling the discussion of “a more fully networked urbanism.”⁷⁸

⁷⁸ Prytherch and Cidell, 28

While it is absolutely true that urban theory has been inattentive to motion and transportation as shaping and shaped forces constitutive of urban regions, overemphasis on motion as a state of flow, as I have previously discussed, risks decoupling that motion from its material origin in and connection to particular places and power structures. Similarly, the language of cybernetics— flow, node, circuit, pattern, process, and function—can indicate an acritical relationship to the network ideology driving the rapid gentrification and skyrocketing inequality of the San Francisco Bay Area, and other urban regions that choose to recast themselves from its mold. Tech industry libertarianism, with its disdain for “meat space” and local and regional governance that curtails flows of information, exerts significant pressure on mobilities and consequently urban space. To naturalize its structures in the language used to discuss the global urban is to limit the terms of discussion available for necessary political-economic critique. The frequent call in mobilities literature for “relational thinking” on cities carries positives—as in Jennifer Robinson’s inclusion of relationships between “ordinary cities” in studies of global urbanism, e.g. the connections between points on the map that have nothing to do with global control and command centers. In Robinson’s research, though, relationality is situated within a postcolonial critique of the way that World Systems/Global city discourses overemphasize so-called “alpha”-level cities, reinforcing histories of Northern/Western exceptionalism and colonial exploitation. Sheller and Urry, on the other hand, link the ability to identify “thin connections” between disparate and marginal places to the social-networking theory of weak and strong ties.⁷⁹

⁷⁹ Jennifer Robinson, *Ordinary Cities: Between Modernity and Development* (New York: Routledge, 2006); Sheller and Urry, “The New Mobilities Paradigm,” 216.

Post-colonial perspective is not absent from Sheller and Urry's discussions of mobilities, however. Sheller is a historian of the Black Caribbean, which is reflected in her theorizing on all forms of movement, from voluntary tourism to forced displacement and chattel slavery, and their position paper for the new mobilities paradigm cites Sarah Ahmed's caution that the "idealisation [sic] of movement, or transformation of movement into a fetish, depends upon the exclusion of others who are already positioned as *not free in the same way*."⁸⁰ Sheller and Urry's call for relationality in mobilities research, though, often privileges the fluidity of contemporary "liquid modernity" in such a way that it can, perhaps unintentionally, flatten the decidedly uneven topology of global urban experiences of movement.⁸¹

The mobilities literature, though, has many advantages in its focus on the confluence of the cultural, social, and spatial, especially its theory-making around specific modes of transport. Urry's work on automobility, which addresses the intersection of policy, social imaginary, and social movement, is particularly useful. "America," he writes, is almost "inconceivable without the culture of the car...the unending movement of men in their cars conspicuously consuming the planet's carbon resources...[and the resulting invisibility of the 'other' to this all-conquering car, of women, children, the elderly, pedestrians, cyclists, and so on...]"⁸² The power of this imaginary, he argues, is such that automobility will almost certainly exert influence on any subsequent forms of

⁸⁰ Sarah Ahmed, *The Cultural Politics of Emotion* (New York: Routledge, 2004), 152; cited in Sheller and Urry, 211.

⁸¹ Sheller and Urry, 210.

⁸² John Urry, *Sociology Beyond Societies: Mobilities for the Twenty-First Century* (New York: Routledge, 2000), 62.

mobility. As Sheller points out, because the field takes a historical-cultural perspective on mobilities and “suggest[s] that we cannot look at transportation in isolation, but must also consider how systems such as mobility and communication interact,” it can contribute to the analysis of phenomena such as autonomous vehicles.⁸³

Neil Brenner, David Madden, and David Wachsmuth cast a critical eye on the absence of political economy in urban theory drawn from the assemblage model linked to Deleuze and Guattari, who are often cited in mobilities literature. Their critique also targets the “ontological assemblage theory” stemming from Bruno Latour’s Actor-Network Theory (ANT), which is equally prevalent. “ANT has had, at best, a lukewarm relationship with critical theory, particularly in its Marxian forms; this generalization applies to significant strands of assemblage analysis as well. Perhaps for this reason, those branches of critical urban studies that have incorporated assemblage thinking into their intellectual apparatus have tended to marry it to more explicitly political-economic approaches which supply a strong dose of critical energies.”⁸⁴ Indeed, a thread of mobilities literature has developed which attempts to combine critical theory and geography with more comprehensive study of movement and urban space.

Stephen Graham and Simon Marvin’s project *Splintering Urbanisms* was developed at roughly the same time as Sheller and Urry’s “new mobilities” and addresses many of the same concerns. Their formulation occupies a different place within Brenner, Madden, and Wachsmuth’s analysis, however, as a “methodological

⁸³ Sheller, ““Foreword 2: Mobilizing Transportation, Transporting Mobilities,”” 13–4.

⁸⁴ Neil Brenner, David J. Madden, and David Wachsmuth, “Assemblage urbanism and the Challenges of Critical Urban Theory,” *City* 15, no. 2 (2011): 235.

assemblage theory," which retains core aspects of political economic analysis and extends them to "previously neglected aspects of capitalist urbanization." As Tim Cresswell notes, their theory of the "tunneling effect" produced by transit through urban areas shows "how the routing of infrastructural elements ranging from roads to high-speed computer links warps the time space of cities."⁸⁵ Graham and Marvin argue that these networks expand or contract urban time space depending on the proximity of a traveler to power and capital, creating a useful means to talk about the political economy of cities and often static-seeming questions of infrastructure alongside an understanding of movement through them. Though the authors are protégés of Castells, their account seems to offer a more critical rendering of networks as produced by power relations.⁸⁶

In *Critical Mobilities*, Söderström et al. call for a research practice that addresses "the interplay of mobility and power" including inequality and domination. In mobilities literature, they argue, "inequality has primarily been conceptualized as a differential social distribution of mobility as a resource and as capital... Access to transportation and information and communication technologies (ICT), to passports and visas, to name just a few prerequisites, as well as the difference competences to travel long distances or to use complex software are part of a "mobility capital... Considering mobility as a competence leads us also to understand subjectivity and experience as

⁸⁵ Tim Cresswell, "Towards a Politics of Mobility," *Environment and Planning D: Society and Space* 28 (2010): 24–5.

⁸⁶ Stephen Graham and Simon Marvin, *Splintering Urbanism* (New York: Routledge, 2001).

constitutive of unequal mobilities.” Indeed, scholars taking a critical approach to mobilities understand them “as structured by domination and predicated on the immobilities of other persons and things. For instance, in order to provide profitable quasi-instantaneous replies to information requests across the world, Google owns buildings filled with servers and hires large numbers of maintenance specialists, who are anything but mobile.”⁸⁷ Approached in this way, mobilities literatures may indeed provide a useful means of address “asymmetries of power” produced by linkages of movement, capital, and privilege—especially within the network-driven urban imaginary of the Bay Area.

Sheller notes links to critical geography through Georg Simmel’s ideas of “urban metabolism” and Henri Lefebvre’s “rhythmanalysis,” though Lynne Pearce counts Lefebvre’s description of rhythm as limited, and unintentionally reproductive of a hierarchical perspective on urban space:

Although conceived as an attempt to grasp the complexity of the flows that constitute urban space...it was invented as a result of Lefebvre’s own panoptic view of the city: ‘the view from his apartment window allow[ed] Lefebvre to consider not just the rhythms of pedestrians and traffic, but also the rhythms of street entertainers, the rhythms of the body’ (Highmore, 2005, p. 22 [citing Lefebvre, 1996])...No matter how conceptually, or technically, difficult, somehow we have got to find ways of seeing, experiencing and (re)imagining urban space from ‘within’, ‘below’ and ‘alongside’ and eschew the scopic and ideological privileges of the intellectual/*flâneur* who will only ever know streetlife from a distance.⁸⁸

⁸⁷ Ola Söderström, Shalini Randeria, Didier Ruedin, Gianni d’Amato, and Francesco Panese, *Critical Mobilities* (New York: Routledge, 2013), 7.

⁸⁸ Sheller, “Foreword 2: Mobilizing Transportation, Transporting Mobilities,” 14; Pearce, “The Urban Imaginary: Writing, Migration, Place,” 9.

In considering cities, urban researchers, then, must take care to interrogate their vantage points, first in order to not replicate problematically panoptic or elite perspectives, and second, to be able to think with and alongside the communities they study. The call for a relational view of cities is fitting here, as in Jennifer Robinson's take on critical urban studies, which also combines an assemblage approach with a Lefebvrian analysis, and lends support to regional and lateral analyses of cities. In her discussion of the necessity of "elsewhere" to urban spaces, Robinson describes cities as "sites of assemblage and centrality, territorialization and connectedness," often linked conceptually to their surrounding regions, or to "features which they share with a selected range of other cities (as in "developing" or "poorer" cities, "advanced," "modern," or "postindustrial" cities). Both empirically and imaginatively, then, elsewhere is crucial to how cities are experienced and produced as well as to how we think cities."⁸⁹

Sheller has recently updated the mobilities paradigm, drawing in thinking from contemporary mobility justice advocates such as The Untokening, who build on the earlier call of Yee and others that community must steer policy. Sheller also builds on the "spatial turn" in the socio-political theory of Lefebvre, Massey, Soja, and Brenner

⁸⁹ Jennifer Robinson, "Arriving at' Urban Policies: The Topological Spaces of Urban Policy Mobility," *International Journal of Urban and Regional Research* 39, no. 4: 831–4.

and Schmid, among others.⁹⁰ Throughout *Mobility Justice*, she refines the question of “uneven mobilities” as explicitly political and insists on the centering of the racialized, gendered, sexualized, and politically marginalized and excluded.⁹¹

Questions of mobility justice include the ontological definition of *who counts as a person*, which as we know has historically excluded women, the enslaved, queers, and the differently abled, and continues to exclude non-human animals, plants, and living entities that are in fact included in many Indigenous ontologies. Mobility justice also demands recognition of Indigenous land rights and the notion that there is an “aesthetics of community” beyond the dualisms of Western philosophy, such that all humans are part of social relations that may include the land, and other non-human entities. Mobility justice brings to light the infrastructural and logistical power that courses through transnational struggles over rights to mobility across borders, as well as the intra-corporeal powers of the body.⁹²

This reformulation brings needed intersectionality into the discussion of mobility and urban place-making, along with a more in-depth reading of the political economy of what (and who) the city is and where it is located. She identifies that the former considerations are in fact absent from multi-scalar theorizing on planetary urbanization in Critical Urban Geography, such as Brenner’s in *Implosions/Explosions*.

Finally, Bay Area scholars Jason Henderson and Stephen Zavestoski (with Julian Agyeman), have turned the critical mobilities literature towards explorations of the contestations of various forms of transit in San Francisco (in Henderson), and towards the neoliberal “complete streets” paradigm of urban planning (in Zavestoski and

⁹⁰ The Untokening, “Principles of Mobility Justice,” November 11, 2017, <http://www.untokening.org/updates/2017/11/11/untokening-10-principles-of-mobility-justice>.

⁹¹ Mimi Sheller, *Mobility Justice: The Politics of Movement in an Age of Extremes* (Brooklyn, NY: Verso, 2018), 14, 60.

⁹² *Ibid.*, 61.

Agyeman).⁹³ In *Street Fight*, Henderson argues for a “progressive mobility”—one element of a typology of ideologically driven forms of mobility—that applies transportation and environmental justice principles to the governance of movement within San Francisco. Over the course of the text he addresses automobility, transit ridership, cycling and grassroots bike activism, and the notion of San Francisco as a national bellwether of transit futures, for good and ill. Henderson asserts that developments such as the private tech buses are inherently neoliberal and “consistent with the broader agenda of the privatization of space and market-based pricing of public access to space...With some exceptions, ordinary people cannot ride the private buses, and the routing and scheduling of these buses are not oriented towards the low-wage, low-skilled workers that clean and cook for the tech firms.”⁹⁴ Instead of a progressive mobility, they create an exclusive one, which recalls and adds additional dimensions to Graham and Marvin’s argument on urban tunneling in *Splintering Urbanism*.⁹⁵

⁹³ Stephen Zavestoski and Julian Agyeman, *Incomplete Streets: Processes, Practices, and Possibilities* (New York: Routledge, 2015).

⁹⁴ Henderson, *Street Fight*, 4.

⁹⁵ Jason Henderson, “From Climate Fight to Street Fight,” in *Transport, Mobility, and the Production of Urban Space*, ed. Julie Cidell and David Prytherch (New York: Routledge, 2015), 110-1.

Chapters

BART: Mass Transportation for the Elite

That the Bay Area is a multi-city region in need of shared transportation systems to make the best use of its crowded landscape has been an established fact since the 1940s. The idea for a Bay Area rapid transit system began to form in the 1950s to nominally address this reality, however its design and planning were just as influenced by the interests of the area's white-collar (and white) managerial class, property values and development, and the aims of the information technology and aerospace industries that had come to dominate the Bay's industrial and capital worlds. While the system that resulted succeeds in some aims of mass transit, it fails in others, and I argue that the process of planning, and constructing BART laid the metaphorical tracks for the Silicon Valley tech-driven transportation developments to come. While BART is often seen as an exemplar of a resurgence of a midcentury public grand urbanism that includes the development of systems like the DC Metro, its system plan was radically diminished before it ever launched, and it has never met the high standards that were set for its ridership by the gentlemen engineers from the Bechtel corporation, the aerospace industry, Westinghouse computing, and the Stanford Research Institute who crafted its futuristic vision of high-speed rail for well-heeled suburbanites. As a representation of an "elite mobility," the history of BART can be read as a critical juncture in the increasing neoliberalization and atomization of transportation infrastructure and design that continues into the present.

“Warning: Two-Tier System”: The Google Bus and the Implications of Privatized Urban Transportation

This chapter expands on an existing article and short documentary film I produced, which address public debate over the employees-only bus networks run by large tech companies in San Francisco and the surrounding region, as well as the San Francisco Municipal Transportation Agency (SFMTA) process to incorporate them in the public transit system through a licensed shuttle program. These works center on the buses as nodal points where physical and virtual networks intersect and render visible the diffuse presences of network ideology, income inequality, and gentrification. By the estimate of the San Francisco Metropolitan Transit Authority, by 2014 private buses provided some 35,000 daily “boardings” to commuters in San Francisco, around nine percent of the total ridership of BART. Most of these shuttles are a perk offered by tech companies and other large corporations—Wi-Fi-equipped private buses that shuttle urban-dwelling employees to suburban corporate campuses, and within the city. Their riders are typically young, unmarried, childless, wealthy recent arrivals, and 60 percent or more are white men.

The coming of the buses was linked by many long-term residents to a tidal wave of evictions in vulnerable communities—particularly communities of color such as the Mission and Oakland—as landlords and speculators vied for these deeper-pocketed new arrivals. There was also concern that the buses siphon ridership and funding from public transit systems, increase wear on street infrastructure, and contribute to economic, racial, age, and gender stratification of the city. The buses became the target of multiple protests, as the city and involved corporations touted the buses’

environmental benefits, all while non-tech commuters were stuck in traffic, waited for overcrowded public transit, or were priced out of their neighborhoods after the debut of a shuttle stop. While San Francisco proper has been the focus of news and activism around the shuttles and the displacement and gentrification to which they are linked, the buses range widely throughout Silicon Valley and the greater San Francisco region, from San Rafael in the north to Morgan Hill in the South, and travel with the same issues wherever they stop. In this, they speak to the highly interconnected and increasingly stratified reality of mobility in urban regions.

Speculative Transport: Ride-hailing and Autonomous Vehicles

Building on the history of elite, technocratic rapid transit represented by BART and the foreclosure of shared transit represented by the “Google Bus,” I consider the further fragmentation of shared mobility by ride-hailing platforms such as Uber and Lyft, and the contentious development of autonomous vehicles that may take their place. In many cases, the latter are developed with data on routes and passenger traffic aggregated by the former, if not produced by the exact same companies. I explore the logics of ride-hailing and the desire for networked, driverless robotaxis, as well as the political and ethical issues such developments present in accelerating inequities of mobility. These developments are propelled by tech’s desire to individualize consumers for greater market purchase, remap cities for its own use, and eliminate the sticky issues of labor and government oversight involved in both public transit systems and gig-driver management. This portion of my research is most squarely in the terrain of “the future”/the speculative, as the autonomous car is not yet a fully licensed reality.

Prototypes have nonetheless been in use all over the Bay without an operational legal framework to govern them and with uneven-to-disastrous results. The first autonomous ride-hailing service, Cruise, has just launched in the months as I conclude this project. As previously mentioned, the autonomous car is not a new idea, but an old one. It dates back to the first decades of automobility, with radio-controlled cars being tested in the early 1920s. *Future Urban Transportation Systems*, a federally funded report published by the Stanford Research Institute in the late 1960s, dreamt of networked autonomous cars as the future of public transit at the same time that BART was under construction. The continual return and repackaging of this idea, as well as its rooting in the same historical moment as the development of the Bay Area's "rapid transit of the future," makes it a fitting stopping place for this project.

Coda: Cities, Commoning, and Transit Post-COVID

It is not possible to conclude this work without consideration of the profound ways the ongoing COVID-19 pandemic has altered the grounds for my research and argument: It has expanded pre-existing quarantine logics driving social segregation and stratification, with still more quarantine and distance being presented as the solution to various social ills. It has accelerated the ongoing defunding of transportation and withdrawal of the public from common spaces, despite research demonstrating that shared spaces and conveyances, with proper guidelines and countermeasures in place, were not disease vectors. In this section I close by writing in defense of density, shared transit, and communal space, and consider the paradox of the pandemic, in which

temporary quarantine, at least initially served as a form of mutual aid geared towards returning us to a more collective life, and against quarantine as an enduring structuring principle of late-capitalist society. I reroute the conversation into my own speculations, here, drawing on the work of other researchers with similar interests and motivations to ask: what would a communal, sustainable transit future look like?

I. BART: Mass Transit for the Elite

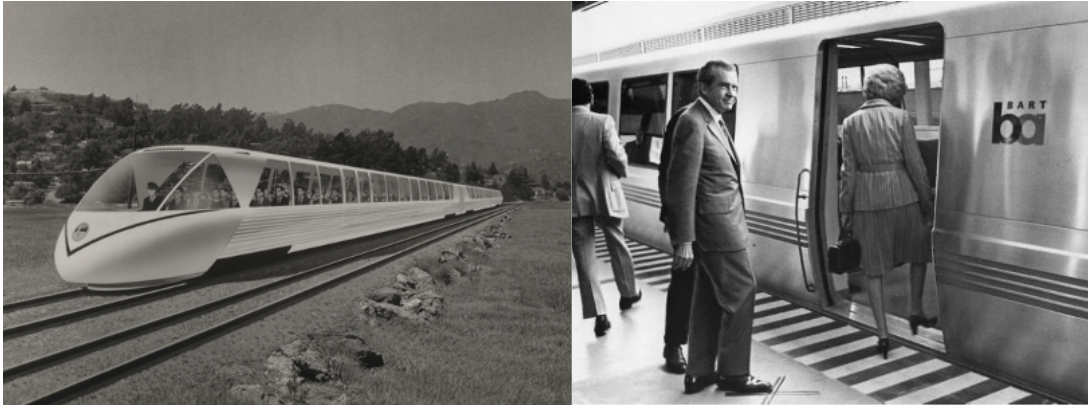


Figure 1.1: An image of a proposed BART train (BART, 1960); 1.2: Richard Nixon boards the brand-new BART, 1972. (BART, *SF Chronicle*)

The necessity of a collective means of transportation to move people through the Bay Area's cities, suburbs, and then-farming communities was apparent to those living in the region as early as the 1940s. Beginning in 1945, meetings of civic groups and business leaders around the Bay began to float the ideas that would later develop into the first regional rapid transit plan.¹ This followed on two decades which saw the first proposal for a trans-bay tube, and the construction of the Golden Gate and Bay Bridges connecting the Peninsula, Marin, and the East Bay, the latter of which included tracks for Key System trolleys. While an initial attempt at a grassroots citizen-led rapid transit district failed in 1949,² in 1951 the 26-member San Francisco Bay Area Rapid Transit Commission was appointed by the state with representatives from each of the Bay Area's nine counties. This commission actually ended up drafting the first long-range

¹ BART, "A History of BART: The Concept is Born," *Bart.gov*, accessed March 8, 2022.

<https://www.bart.gov/about/history>.

² Michael C. Healy, *BART: The Dramatic History of the Bay Area Rapid Transit System* (Berkeley, CA: Heyday, 2016), 22.

plan for the development of the Bay, as no such plan yet existed, a testament to the crucial links between regional transportation and regional identity, as well as the increasing environmental appeal of transportation, if not true ecological awareness. The Commission stated that, "If the Bay Area is to be preserved as a fine place to live and work, a regional rapid transit system is essential to prevent total dependence on automobiles and freeways."³

By the early 1960s, there was strong support for the creation of BART from some constituencies within the Bay's cities and towns. In San Francisco there was 67 percent voter support for the measure, largely drummed up by business elites and civic leaders, and propelled by pushback protest against the construction and expansion of freeways through the heart of San Francisco—the "freeway revolts" of the 1950s and '60s.⁴ But, like many midcentury transit endeavors, the concept of what became the BART system was heavily centered on the rapid-transit movement of wealthy elites from outlying communities in Marin, San Mateo, and Santa Clara counties to the downtown core, in an attempt to maintain the financial investment of white and moneyed social strata in the central city post-suburban expansion. In poor, working-class, and marginalized communities, such as the Mission, the arrival of BART was viewed less optimistically and was (correctly) predicted to herald gentrification, displacement, and rising property values. This turn of events was protested in op-eds, community publications, and street activism in terms that are strikingly similar to protests forty years later against the "Google Bus" as the driver of a wave of tech

³ BART, "A History of BART."

⁴ Henderson, *Street Fight*, 40–46.

workers arriving in the neighborhood, spiking rents and snapping up properties, with corresponding rises in no-fault evictions and displacement.⁵ For their part, the moneyed, white, suburban elites were equally apprehensive about the effect that BART stations might have on their sedate and exclusive communities, raising concerns about densification, damage to long-term property values, and crime resulting from “undesirable elements” having ease of access to travel through their enclaves.⁶ A similar resistance to rapid transit was found in the city proper among the largely white, property-owning communities in the west of the city, who supported rapid transit for the Bay Area as an alternative to freeway construction, and because the proposed lines did not cross into their neighborhoods. These neighborhoods later fought off other forms of transit expansion.⁷

While the renewal of investment in systems like BART, including the DC Metro and others, in the 1960s and 70s is often seen as symbolic of a resurgence of public grand urbanism, BART was never built as originally conceived, and I believe that this arguable failure is a critical juncture of increasing neoliberalization and atomization of transportation infrastructure and design that continues into the present. The funding for the planned Marin and Silicon Valley spurs of BART was diverted for highway construction, due to poor support among constituents primarily concerned with their property values and the imposition of general taxes for a service they had little-to-no

⁵ Basta Ya, “BART Profits from your Pockets,” *iBasta Ya!*, March, 1970, 6; “BART Cambia la Mission,” *iBasta Ya!*, April, 1970, 12.

⁶ Healy, *BART*, 8.

⁷ Henderson, *Street Fight*, 48.

intention of using.⁸ Ground had barely been broken for the tunnels and tracks before the Stanford Research Institute was publishing reports on possibilities for systems of pod-like autonomous transports that look very much like today's proposals for AI-orchestrated networks of autonomous cars.⁹ Despite BART's role at the forefront of the last wave of metropolitan transit system development, by global standards, Bay Area transit is best described as "anemic," and Silicon Valley, "a great place to raise a car."¹⁰ Its landscape is depicted by urban theorists as "decentered, sprawling, autotopic."¹¹ Though BART debuted in 1972, transit as percentage of all weekday trips in the region has declined incrementally since 1970,¹² and, of course, precipitously since March of 2020.

Because of the Bay Area's historical importance as a generator of information technology industries that produce much of the world's data infrastructure, I argue that this region merits more specific consideration, in particular forms of planning (or lack thereof) that will exert increasing pressure on regions worldwide in the decades ahead. The regional nature of the complex issues facing the San Francisco Bay also provides a useful example for thinking through recent critical literatures in geography and mobility studies to ask key questions about where the collective is located in the past and much-

⁸ League of Women Voters of the Bay Area, "Basic Information on Rapid Transit for the Bay Area," Rapid Transit Committee report, November 20, 1961.

⁹ Stanford Research Institute, *Future Urban Transportation Systems: Final Report, Volumes. I, II*, Prepared for Urban Transportation Administration, Department of Housing and Urban Development, Washington, DC (Menlo Park, CA: Stanford Research Institute, 1968).

¹⁰ Keith A. Spencer, "In the Bay Area, technology has gone hand in hand with imperialism for 500 years," *Salon*, December 8, 2019, <https://www.salon.com/2018/12/09/in-the-bay-area-technology-has-gone-hand-in-hand-with-imperialism-for-500-years/>.

¹¹ Walker and Schafran, "The Strange Case of the Bay Area," 10.

¹² Yee, "Towards Sustainable Transportation Policy in the United States: A Grassroots Perspective," 106–7.

hyped future of transit.

Recent contestations over the Tech company shuttles, and the incursion into public space of ride-hailing platforms and the automated vehicles that they prefigure (which I will explore in chapters 2 and 3), contain an extremely familiar constellation of actors and terrains of action to the history of BART's development. While BART, to my central point about the increasing individualization of mobility through urban space, is a collective mode of transportation, and a nominally public one, it is key in studying the history of mass transit to remember that over the course of its development in the US, public transportation has never been accessible to all. From their origin in the late nineteenth century, most major transit systems were initially privately funded, at least in part, and all are subject to a need to generate profit for their ongoing maintenance and support. In the case of the BART system, while its midcentury development was supported by public bond and tax revenue, a host of massive private corporations in industries including aerospace, electrical and mechanical engineering, and computer hardware planned and executed its construction. Interplay of town and county politics over real estate, land use, and property values and taxes had an outsized role in promoting the idea of rapid transit for the Bay Area, as well as whether or not BART as planned was built at all. Still, as John Stehlin notes: "There is a major difference between private operators and private users, between transport by the few for the many and transport by the few for the few."¹³

¹³ John Stehlin, "Transport in History: What Is, Was, and Wasn't," in *Counterpoints: An Atlas of Gentrification and Displacement in the Bay Area*, ed. Anti-Eviction Mapping Project (Oakland, CA: PM Press, 2021), 233.

I argue that BART and its kin—exemplifying transport by the few for the many—can be read as, perhaps, the last gasp of a midcentury appeal to the “greater good” and technocratic, collective planning—the infrastructural expression of a managerial liberalism that Fred Turner calls “the Democratic Surround.” At the same time, the then-unique aspects of BART’s manufacture—the public-private bond process that funded it; the appeal to a choice ridership; the engineering, business, and real estate interests forming the financial machinery that propelled it, represented a new model that later systems would follow. Previous mass transit plans, where they existed in a centralized fashion, had focused on the business of mobility—moving people efficiently through city regions with little consideration of transportation’s effects on those regions. The BART plan, however, pays significant attention to the land around its tracks and stations, with regard to zoning, development, and real estate, as much as it nominally attempts to recapture ridership from freeways and private automobiles.¹⁴

BART’s roll out and subsequent decades of history forecast later patterns of mobility in and around the Bay Area in important ways, particularly the creation and expansion of “elite mobilities,” in which the few and the wealthy serve their own needs for movement first, with trickle down effects for the rest of the populace. In their work on elite mobilities, Birtchnell and Caletrió argue that “mobility is inextricably tied up with power, inequality, stratification, governance and decision-making—it is about the ‘capacity to move’...so a movement of the few with elite mobilities at its core then permeates complex social systems from property ownership and politics to

¹⁴ Jake Coolidge, “No Little Plans: Envisioning the Bay Area Rapid Transit System and the Renewal of Rapid Transit in the United States,” Masters Thesis, San Jose State University, 2011, 96-7.

infrastructure design and investment.”¹⁵ Transit consultant Jarrett Walker calls this phenomenon among planners and officials “elite projection,” or the belief that what they “find convenient or attractive is good for the society as a whole.”¹⁶

In this chapter I will examine BART’s development through a number of lenses: a financial and industrial footprint that stretches back to the era of the transcontinental railroad with its equal blend of private profit versus public movement; the generation of public support and funding for BART through an appeal to elite, white, and suburban ridership and, inevitably, contestations to the same from working-class and marginalized commuters whose needs were not included in the concept of the system; and, perhaps most centrally, the engineering of BART using technologies that the SF Bay has come to be most known for—aerospace, information networks rooted in federal defense funding, circuit boards, and strings of code—with the aid of major corporate players in these fields. This last element, inarguably, has not produced a system which revolutionized the future of transit, as was glowingly promised at the time, but which was over-engineered into a state of technological isolation: difficult to operate, dependent on custom and proprietary parts, and characterized from its launch by mystifying errors and failures requiring expert intervention. In assembling the BART system as a choice architecture for a choice ridership, this confluence of actors in many

¹⁵ Thomas Birtchell and Javier Caletrí, “The Movement of the Few,” in *Elite Mobilities*, ed. Thomas Birtchell and Javier Caletrí (New York: Routledge, 2014), 6.

¹⁶ Jarrett Walker, “The Dangers of Elite Projection,” *Human Transit*, July 31, 2017, <https://humantransit.org/2017/07/the-dangers-of-elite-projection.html>.

ways set it up for partial failure from the start, though not for the reasons that anti-urban urbanists such as Melvin Webber would have had the public believe.¹⁷

Transportation History, Information, Space, and Separation



Figure 1.3: The Southern Pacific Railroad's Oakland Terminus, c.1870 (Library of Congress)

In the history of technology, many have written about the links between communication technologies and new modes of transportation. As the railroad collapsed the distance between distant coasts to a matter of days, the telegraph lines that sprouted along the tracks were able to cover that space in minutes. "This is indeed the annihilation of space," declared the *Philadelphia Ledger* over the first long-distance telegram, using popular rhetoric of the time also captured by Marx in the *Grundrisse*, where he linked the capitalist push for total domination of the global economic system

¹⁷ Melvin M. Webber, *The BART Experience: What Have We Learned?*, Institute of Urban and Regional Development and Institute of Transportation Studies, UC Berkeley, 1976

to an ever more networked and spatially condensed world. To “annihilate space with time” was to maximize profit by minimizing time spent both on communication and on the circulation of people and goods; in Marx’s view this was an “extraordinary necessity” of capital. As described by Rebecca Solnit in *River of Shadows*, the malleability of this space-time explains why, as Einstein attempted to describe the principles of relativity “he repeatedly seized upon the image of a train running across the landscape, a train whose passengers were experiencing time differently than those on the ground.”¹⁸ Trains, trolleys, and private cars created a “differential mobility with the more affluent classes becoming most freed from the restraints of time and distance.”¹⁹ The Critical Mobilities literature, however, reminds us that this mobility is not just differential, it is unequal.

While it is common in pro-public transportation circles to link trains, streetcars, and buses exclusively with the municipal and national systems that now largely run them, and to see them as purely democratizing and unifying, this overwrites the long history of their development through speculation, property development, commercial freight, and capital profit, and the class and racial segregations that spatially divided mass transit—which it often reproduced in the regions it passed through—for much of its history. There is no complete history of passenger rail in the US that does not reckon with its role in the westward expansion of Manifest Destiny, and the parallel seizure of tribal lands and removal or extermination of Native nations that it enabled. Nor are the

¹⁸ Rebecca Solnit, *River of Shadows: Eadward Muybridge and the Technological Wild West* (New York: Viking, 2003), 11-12.

¹⁹ J. Allen Whitt, *Urban Elites and Mass Transportation: The Dialectics of Power* (Princeton, NJ: Princeton University Press, 1982), 188.

indignities suffered by Black segregated passengers on cramped, worn “Jim Crow Cars,” or how mid-century bus protests and boycotts were a fulcrum for the Civil Rights movement, merely footnotes to a happier democratic future.²⁰ The very doctrine of “separate but equal” was decided on the basis of Homer Plessy breaching the sanctity of a “whites-only” train car to protest the racial segregation of Louisiana’s railways.²¹ In Philadelphia, 11 of 19 of its mid-nineteenth century streetcar lines banned Black passengers altogether and became sites of similar public struggles over access.²² These restrictions separated Black and other marginalized passengers not only from sharing equal space with white passengers, but from all the possibilities for movement and access represented by the new modes of transport.

Similarly, it must be recognized that the “wrong side of the tracks” is not a metaphor, and the long-term consequences of proximity to rail lines and infrastructure on marginalized communities, both economically and environmentally, are quantifiably real.²³ Racist patterns of transportation and urban development have taxed minority communities at the same rate as more prosperous white communities for transportation services not designed for them, and run interstate freeways through the heart of historically Black neighborhoods. Rail yards, bus depots, and industrial sites that

²⁰ Mia Bay, *Traveling Black: A Story of Race and Resistance* (Cambridge, MA: Harvard University Press, 2021); Candacy Taylor, *Overground Railroad: The Green Book and the Roots of Black Travel in America* (New York: Abrams Press, 2020), 151.

²¹ Robert Bullard, interview by Ashish Valentine, “The Wrong Complexion For Protection.’ How Race Shaped America’s Roadways And Cities,” *Weekend Edition*, July 5, 2020, <https://www.npr.org/2020/07/05/887386869/how-transportation-racism-shaped-america>; see also Bullard, Johnson, and Torres, *Highway Robbery: Transportation Racism & New Routes to Equity* (2004).

²² Geoff D. Zylstra, “Racial Struggle and Philadelphia’s Streetcars 1859-1867,” *Technology and Culture* 52, no. 4 (October 2011): 682–8.

²³ Elizabeth Oltmans Ananat, “The Wrong Side(s) of the Tracks: The Causal Effects of Racial Segregation on Urban Poverty and Inequality,” *American Economic Journal: Applied Economics* 3, no. 2 (April 2011).

carry heavy environmental health burdens have long been deliberately located in communities with, as historian of race and transportation Robert Bullard has said, “the wrong complexion for protection.”²⁴ As bell hooks wrote of her upbringing in the segregated South: “As Black Americans living in a small Kentucky town, the railroad tracks were a daily reminder of our marginality. Across those tracks were paved streets, stores we could not enter, restaurants we could not eat in, and people we could not look directly in the face...We had always to return to the margin, to cross the tracks, to shacks and abandoned houses on the edge of town.”²⁵

From the beginning of the railroad age, and the inflection point in the history of technology represented by the telegraph, spatial, informational, and social classing were present, as they had been in ocean travel before them. But beyond that, to be able to experience the “panoramic vision” of Schivelbusch’s railway journey was to be moving at a vastly different speed than those traveling by foot or by horse, with all the possibilities for access that entailed. And, of course, trains themselves were divided into literal classes, hardcoding the racial and social hierarchies of the day. There were plush, enclosed compartments of a few seats for wealthier passengers, and open seating or standing with few amenities for everyone else. These differing spatial arrangements created particular modes of socialization, communication, and use of travel time among passenger publics. Reading while traveling became a favorite pastime of bourgeois passengers, but was rarely observed in the lower-class cars, where gregarious

²⁴ See also Bullard, *Just Transportation* (1993) and Agyeman and Bullard, *Just Sustainabilities* (2002).

²⁵ bell hooks, *Feminist Theory: from Margin to Center* (Boston: South End Press, 1984), ix.

conversation prevailed. As described by Schivelbusch quoting a 19th-century traveler, during a typical train journey:

“The primitive, spacious third- and fourth-class carriages into which the proletarian traveling public was crowded characteristically promoted continuous communication: in the compartments of the bourgeois first- and second-class carriages, such communication had died out, at least by the end of the nineteenth century. ‘How often...I have...while traveling alone or with people with whom it was impossible to start a conversation, envied the travelers of the third and fourth class, from whose heavily populated carriages merry conversation and laughter rang all the way into the boredom of my isolation cell’, says P. D. Fischer.”²⁶

Fischer might have envied the third and fourth class passengers their sociality, but he chose to remain in the cocoon of his first-class compartment with his mute class peers.

This social division and greater isolation for first-class travel carried over into urban mass transit at its inception. The Paris Métro ran first-class cars on all trains until 1991, described by the *New York Times* at their retirement as a “safe haven from crowds and wandering minstrels to anyone willing to pay 50 percent more than the price of the ordinary ticket.” Until the 1970s, these cars had leather seats in contrast to the clattering wooden benches in second class.²⁷ This appeal to comfort and “safe haven” characterizes almost all discussions of developments in transit from the BART era forward—“security” (for and from whom?) and luxury, for a price. But separation as “protection” from undesirable social contact, as well as a sense (for some) of unwanted isolation—as in Fischer’s railway journey, were there from the outset. In Priscilla Wald’s study of the language and logic of contagion in the development of cities in the US,

²⁶ Schivelbusch, *The Railway Journey*, 72.

²⁷ Alan Riding, “Paris Journal: In a Class by Itself, and Now, Dear Paris, Classless,” *New York Times*, August 3, 1991, <https://www.nytimes.com/1991/08/03/world/paris-journal-in-a-class-by-itself-and-now-dear-paris-classless.html>.

railroads figure prominently as simultaneous vectors of both perilously democratizing mixing of regional groups and social classes, and pathogens.

Microbes commingled with mobility, as they suffused the language of social contact, social danger, and social regulation, with railroads in particular becoming the focus of microbial attention. Nothing better emblemized the increasing interconnectedness than the tracks that crisscrossed the nation. And nothing more conspicuously altered the social landscape and political economy. Objections to these transformations routinely found expression in microbial terms; in the mainstream media, discussions of the health risks posed by railroads considerably outweighed other expressions of social concern involving the railroads. The breakdown of geographical boundaries accomplished by improved travel was turning everyone into potential carriers as it reconfigured traditional communities.²⁸

Alison Bashford, a theorist of quarantine, the body, and the socio-political regimes of the 19th-century has discussed how sanitation controls and quarantine camps intersected long-distance railway lines, particularly at national and regional borders, such as around the shifting line where Europe was supposed to end and “the Orient” begin.²⁹ The class structure of shared conveyances not only maintained the divisions of the existing social order, but in the new paradigm of bacterial disease theory of medicine, physical separation served as a form of quarantine, preventing moral, political, racial, and bodily contagion.

The macro-level concern with international and transcontinental rail carried over to the micro-level transformations of inter-regional and intraurban train systems. In their work on the urban imaginary of Coney Island, Zukin et al document how the

²⁸ Priscilla Wald, *Contagious: Cultures, Carriers, and the Outbreak Narrative* (Durham, NC: Duke University Press, 2008), 122–4.

²⁹ Allison Bashford interviewed in Geoff Manaugh and Nicola Twilley, *Until Proven Safe: The History and Future of Quarantine* (New York: Farrar, Strauss, and Giroux, 2021), 69–70; see also: Alison Bashford, *Imperial Hygiene* (2004) and *Purity and Pollution* (1998); Angela Mitropoulos, *Contract and Contagion* (2012).

extension of the New York City Subway to the beach changed the class dynamics and population of the former Gilded Age resort, recreating it as a predominantly Black and Latino, working-class community that was distasteful to older, whiter residents. One interviewed in the late '60s complained: "We call the Boardwalk close to the subway station and the pier 'the jungle'...all the riffraff from the city comes out here and they get drunk." To some, the subway's arrival had led to the decline of Coney Island into a "dumping ground" and a "sink hole of crime and deprivation."³⁰ Rob Shields documented a similar shift in social patterns of leisure and pushback from the political and cultural establishment as Britain's railways transformed seaside resorts such as Brighton from havens for aristocrats into working-class holiday carnivals.³¹ The history of mass transportation has always seemed to exist at a point of tension—a desire for a spatial "alone together" to borrow a phrase from Sherry Turkle—that has too-often met the socially transformative possibilities of shared conveyance by partitioning such dangerous heterogeneities from view.

While no US city adopted a class model for its subways and streetcars, it was considered for New York's then-private Interborough Rapid Transit (IRT) in the planning stages, long before it became a branch of the Metropolitan Transportation Authority (MTA).³² IRT founder and financier August Belmont Jr., of course, had his own lavishly appointed private car, with mahogany trim, stained glass, a desk, a toilet,

³⁰ Zukin et al., "'From Coney Island to Las Vegas in the Urban Imaginary,'" 642–3.

³¹ Rob Shields, *Places on the Margin: Alternative Geographies of Modernity* (New York: Routledge, 1991) 85–87.

³² Gene Sansone and Roger P. Roess, *The Wheels that Drove New York* (New York: Springer, 2012), 384.

small kitchen, and hot and cold running water.³³ For the purposes of this argument, it is an unavoidable fact that another Gilded Age capitalist played a central role in both the history of rail in the west, and in the origins of what is now Silicon Valley: Leland Stanford. At various times he was Governor of California, Head of Wells Fargo, and President of the Central and later Southern Pacific Railroads that brought transcontinental rail across the western US to its Oakland terminus on the shore of San Francisco Bay. The completion of a rail line spanning the continent helped secure California, and its ports, agricultural land, and gold mines, for the US, as the territory had only been not-Mexico for 20 years at the point that the “golden spike” was driven by Stanford. Under Stanford’s watch, the Southern Pacific won a Supreme Court case against Santa Clara County (*Santa Clara County v. Southern Pacific Railroad*, 1886) over the railroad’s refusal to pay taxes on fences along its right of way—the route that is now Caltrain instead of BART—which opened the door to 14th-amendment protections being extended to corporations as individuals.³⁴

In profligate robber baron style, Stanford was also a vintner and a breeder of racehorses. He later turned the grounds of his Palo Alto Stock Farm into the campus of the university that still carries his name, as do the university research park and institute that have been central to the development of just about every major Silicon Valley concern from the 1940s on. It’s a worthy footnote to the genealogy of transit in the west, and illustrative of the close links between transit development and capital

³³ John E. Morris, *Subway: The Curiosities, Secrets, and Unofficial History of the New York City Transit System* (Philadelphia: Running Press, 2020).

³⁴ *Santa Clara County v. Southern Pacific Railroad Company*, [118 US 394 \(1886\)](#).

speculation, that Stanford was ultimately ousted from his position at the head of the Southern Pacific by fellow rail magnate Collis Huntington, whose nephew and protege Henry founded the now-legendary Los Angeles Pacific Electric “Red Car” system. The Red Cars, also a private enterprise, stretched passenger rail and streetcar lines across the Los Angeles region into the largest transit system in the country by the 1920s, before being dismantled in favor of freeways, due to declining profits, by the 1960s.³⁵

The demise of the Red Cars parallels the development of BART, with the 1962 bond vote that gave the BART District (BARTD) plan its go ahead overlapping the trips of the final Red Cars in 1961–63. In the SF Bay, the smaller, also-private Key System of electric passenger rail and ferries launched in parallel with the Red Cars, and shared their brief window of operation, carrying passengers from 1903–1958. Its service area is now plied by BART lines and the Alameda-Contra Costa or AC Transit bus system. At the point that the BARTD bond referendum went to a vote in 1962, its offices were located in the Flood Building in downtown San Francisco, formerly the headquarters of the Southern Pacific Railroad from 1907–17. This history of rail nationally, and specifically in the Bay Area, establishes a continuity of not just material form and spatial trajectory, but of assembling factors—the growth machine of capital interests—between BART and the technological infrastructures that preceded it.³⁶ If, as Carolyn Marvin writes: “the computer is no more than an instantaneous telegraph with a

³⁵ Robert C. Post, “Urban railways redivivus: Image and ideology in Los Angeles, California,” in *Suburbanizing the masses: Public transport and urban development in historical perspective*, ed. Colin Divall and Winstan Bond, 187-210 (New York: Routledge, 2017).

³⁶ John R. Logan and Harvey L. Molotch, *Urban Fortunes: The Political Economy of Place* (Berkeley, CA: University of California Press, 2007).

prodigious memory, and all the communications inventions in between have simply been elaborations on the telegraph's original work," then the telegraph (also developed in the US with funding from Stanford University) is to the personal computer and mobile phone, as the Southern Pacific Railroad is to BART and to everything that has followed in the Bay Area's space of transportation.³⁷³⁸

The BART Idea and the Growth Machines

In addition to the socioeconomic realities that make the Bay Area as a region a necessary concept, the topography of the Peninsula, Bay, and surrounding mountain ranges make it a very likely site for the development of centralized rapid transit. The local mountains and hills compress the available land before the shores of the Bay and there are a finite number of natural "transportation corridors" through this contorted landscape. The routes which were once paths between native communities, became the Camino Real of Spanish Mission colonization, became the trajectories of the 87, 101, and I-280 freeways. Since the early twentieth century, there has also been an ever-growing population, underserved by mass transit, who primarily use private cars to move from place to place.³⁹ From the WWII era, the necessity of mass transit to the region was discussed at local, state, and federal levels. The Bay was and remains a strategic Naval port, and played a significant role in the Pacific war effort. This was ultimately hampered, though, by traffic that was already so bad that a 1943 report from

³⁷ For a history of Stanford University's relation to the telegraph see Tom Nicholas, *VC: An American History* (Cambridge, MA: Harvard University Press, 2019), 83–4.

³⁸ Marvin, *When Old Technologies Were New*, 3.

³⁹ Whitt, *Urban Elites and Mass Transportation*, 41.

a subcommittee of the House Committee on Naval Affairs recommended that no further military industry be brought to the Bay Area: "Because of traffic congestion and delays, thousands of workers are forced to put in 12 or 13 hours a day in order to work 8 hours. The peculiar geographical situation in the Bay Area probably makes the transportation problem more acute than in any other section of the country."⁴⁰

In 1945, a state-funded Bay Area Region Council was formed to oversee multiple aspects of the return to a peacetime economy. Within the year it became the private, non-profit Bay Area Council (BAC), with a board of trustees largely made up of representatives of some of the largest corporate concerns in the region. The BAC supported itself through annual donations, and the initial list of donors included pledges of \$10,000 each from Bank of America, American Trust Company, Standard Oil of California, Pacific Gas and Electric, U.S. Steel, and Bechtel Corporation, among others. According to Coolidge, "industrial giants like United States Steel Corporation, Kaiser Steel, and Bechtel stood to gain from the lucrative contracts such a project would provide. On the other hand, Bank of America and like-minded businesses in downtown San Francisco and Oakland had significant real estate holdings; they viewed rapid transit as the best means of preserving the vitality of the central business district, and stood to benefit from increased land values adjacent to new stations."⁴¹

By 1951, "the BAC was the prime mover in convincing the California legislature to establish the San Francisco Bay Area Rapid Transit Commission (RTC) in 1951 to study transit problems in the nine Bay Area counties and to develop a master rapid

⁴⁰ Whitt, *Urban Elites and Mass Transportation*, 41.

⁴¹ Coolidge, "No Little Plans," 13.

transit plan for the area.”⁴² In a 1966 meeting of the state Committee for Economic Development, BAC President Stanley McCaffrey told the members: “We work with banks, railroads and utilities and other business groups, as well as with local chambers of commerce and industrial development associations in endeavoring to develop the kind of business climate which will be conducive to the growth of existing industry and which will be attractive to new industry.”⁴³ The presence of citizens, transit riders, or any other attention to the actual population of the Bay Area, is nowhere to be found in this accounting. It can be assumed, by extension, that the needs of the population in regards to mobility, separate from their utility to corporate interests as a labor force, were also not a material factor.

In 1953, the RTC contracted Parsons, Brinckerhoff, Hall, and Macdonald (PBHM) to propose a transit master plan for the Bay Area; the firm had been founded by one of the early developers on the New York City subway system. In 1954, the RTC contracted the Stanford Research Institute (SRI) to make recommendations on the financial aspects of the PBHM engineering plan as well as the type of agency that should be set up to construct and ultimately operate the proposed rapid transit system. These two reports culminated in the 1956 Regional Rapid Transit report (RRT), which advocated a unified system of regional interurban mass rapid transit. As part of the study, the consultants drew up regional outline plans looking ahead to both 1970 and 1990 with futurist optimism.⁴⁴

⁴² Stephen Zwerling, “BART: Manhattan Rises on San Francisco Bay,” *Environment* 15 (December, 1973): 15.

⁴³ “The Bay Area Story,” BAC pamphlet, undated.

⁴⁴ League of Women Voters, 1961; Coolidge, 62–3.

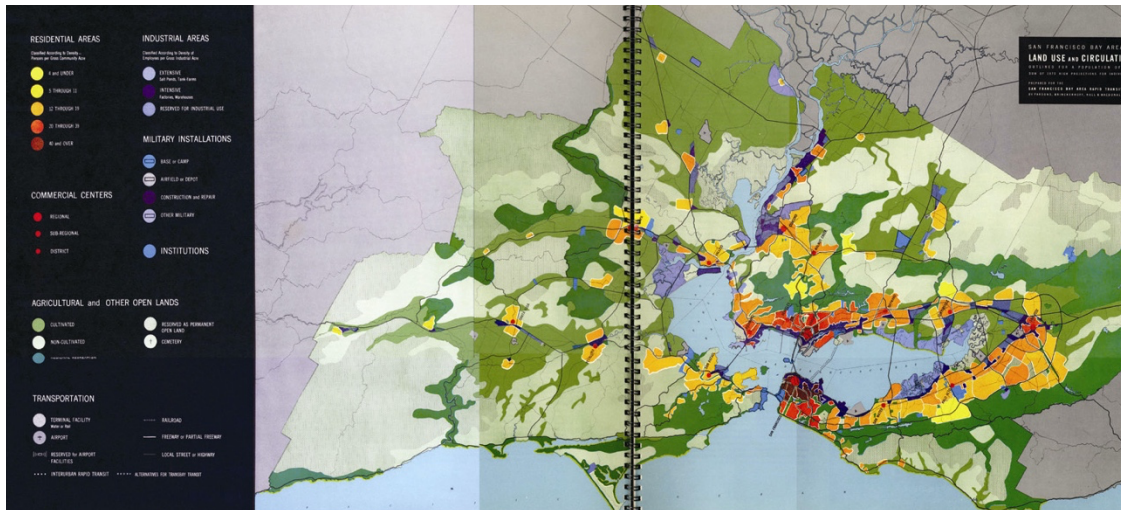


Figure 1.4: Land Use and Circulation Plan:1970, from *Regional Rapid Transit* by Parsons, Brinckerhoff, Hall & MacDonald. (PBHM, 1956).

In both the 1956 RRT document, and a 1957 report by the RTC to the state legislature, rapid transit for the Bay Area emerges as a high-speed, low-frequency “mainline” system connecting “each of the centers at its heart. Stations here will deliver travelers directly to their primary destinations where business, shopping, and cultural areas are clustered...At additional stations located outside the centers but within their residential orbits, interurban transit depends on local transit or private automobiles for the feeder service it cannot economically provide for itself.”⁴⁵ In the eyes of the RTC, trained by PBHM and the SRI, “the role of mass rapid transit in this network is to link centers and subcenters of employment and commercial activities to each other and to their tributary residential areas by means of a mass transit system embodying standards of service sufficiently high to attract the patronage of a large proportion of commuters and shoppers whose automobiles now congest the streets and approaches to them.”⁴⁶

⁴⁵ San Francisco Bay Area Rapid Transit Commission, “Report to the Legislature of the State of California,” December, 1957, 73.

⁴⁶ *Ibid*, 66-67.

In other words, this was not a system ever intended to move people between local points in a way that addresses the “last mile” question of public transportation.⁴⁷ In RRT’s the optimistic accounting of 1990 seen from the perspective of 1956, “1990 may well be the date when every garage will be outfitted with two cars,” the authors later expressed that the rapid-transit system was “intended to operate as a complement to a system of freeways, expressways, and arterial highways in an area where automobile ownership per capita is very high.”⁴⁸ This corresponds to Hanson’s point that transportation planning emerged as a profession in tandem with suburbanization, with a managerial class of engineers tasked to “keep automobiles moving so as to prevent strangulation of the cities”—a problem that was generally solved through the building of more infrastructure.⁴⁹

While there is brief mention made of the necessity of transit for “captive” riders—non-drivers who depend on public transit for their mobility, they appear almost nowhere in the various system plans and reports. BART, as designed, was always intended to work in tandem with private cars, and little mention is made in the 1957 report of connections to other regional transit systems, though connections to feeder bus systems were nominally discussed in later publications. It was not until the mid-to-late 1960s, after the adoption of the plan, that BART’s interface with other regional

⁴⁷ The American Public Transportation Association (APTA) defines the first or last mile as “the distance between a traveler’s origin/destination and a transit station/stop, commonly referred to as the first/last mile” (FLM). American Public Transportation Association, “First Last/Mile Solutions,” *Apta.com*, June 28, 2021, <https://www.apta.com/research-technical-resources/mobility-innovation-hub/first-last-mile-solutions>.

⁴⁸ San Francisco Bay Area Rapid Transit Commission, “Regional rapid transit : a report to the San Francisco Bay Area Rapid Transit Commission, 1953-1955,” (Menlo Park, CA: Stanford Research Institute, 1956), 18, 69.

⁴⁹ Hanson, “Foreword I: Transportation Geographies and Mobilities Studies: Toward Collaboration,” 5.

transit systems was seriously considered. A BARTD background paper on transit planning from 1970 is one of the first of the historical documents I accessed to mention the East Bay's AC Transit buses or SF's Muni buses and streetcars in any substantial way. It was not until 1970, decades into the BART process, that the regional Metropolitan Transportation Commission (MTC), was formed, again under the aegis of the BAC, to begin to coordinate regional transit planning among the Bay's nine counties.



Figure 1.5: *Comprehensive Plan for Regional Rapid Transit from Regional Rapid Transit by Parsons, Brinckerhoff, Hall & MacDonald (PBHM, 1956).*

The BART system depicted in the 1956 map in Figure 1.5 (also discussed through the cartography of Jake Coolidge in chapter 2), has a much, much larger footprint than what was actually constructed, initially reaching into Marin County, and completely circling the Bay. In both of the above quotes from the report, it bears remembering that these are drivers of 1957, when private car ownership was perhaps no longer a luxury, but not yet a necessity; this indicates an imagined suburban ridership of the comfortably middle class. Rapid transit based on the patronage of this public would fulfill “accelerating demand for single-family houses in dispersed suburban areas” while “preserving and enhancing at the same time the urban concentration of employment and commerce where the means to earn that standard of living must largely focus.”⁵⁰

Following the 1957 report, the RTC was dissolved and replaced with the Bay Area Transit District (BARTD), covering Alameda, Contra Costa, Marin, San Francisco, and San Mateo counties. In 1959, the district hired Parsons, Brinkerhoff, Quade, and Douglas (formerly PBHM), and San Francisco-based Tudor Engineering and Bechtel Corporations (hereafter PBTB) to begin planning the proposed rapid transit system. According to Whitt, “the decision by the district to hire private firms to develop plans for BART, rather than to build an “in-house” engineering group to do the job, was a consequential choice.”⁵¹ After five years, PBTB issued a “composite report” on the proposed system, which was the document put to public vote in 1962. The Composite Report presents these “Basic Concepts and Standards”:

⁵⁰ Ibid. 76.

⁵¹ Whitt, *Urban Elites*, 54.

The Bay Area Rapid Transit System will abate motor vehicle congestion on the regional highways and in the urban centers, will encourage a continued and high rate of economic development, and will preserve and enhance a high living standard. Rapid transit, as conceived in this system, will complement the private automobile as a mode of travel. At the same time, it must compete with the automobile. The relative attraction of rapid transit and the automobile, together with important considerations of public acceptability, were major factors in establishing standards for rapid transit methods, equipment, and operation.⁵²

The primary economic benefits of the system are listed as follows

1. Maintain and encourage profitable concentrations of business and industry and lessen disorganized suburban sprawl.
2. Improve the area's living and working conditions, economic efficiency and availability of workers, and attract a larger share of the nation's future economic growth.
3. Preserve and increase property values in the central cities, regional sub-centers, and outlying areas.
4. Permit more economic use of the additional thousands of acres of land that would otherwise be required for highway expansions and parking facilities in central business districts.

Again, the foci of this development are regional economic growth and industrial and real-estate profits, as well as the preservation of available land that might otherwise be consumed by freeways and parking lots for the same. None of this is surprising, Whitt argues in his detailed discussion of BART's gentlemen engineers, because from its origins "BART was a BAC product," down to private engineering of the system, rather than a public undertaking with more significant oversight from government.⁵³

⁵² Parsons Brinckerhoff Tudor Bechtel, "The Composite Report: Bay Area Rapid Transit: Reports Submitted to The San Francisco Bay Area Rapid Transit District Describing the Engineering, Financial And Economic Phases of a Rapid Transit Plan for Alameda, Contra Costa And San Francisco Counties," May, 1962, 82-83.

⁵³ Whitt, *Urban Elites*, 61.

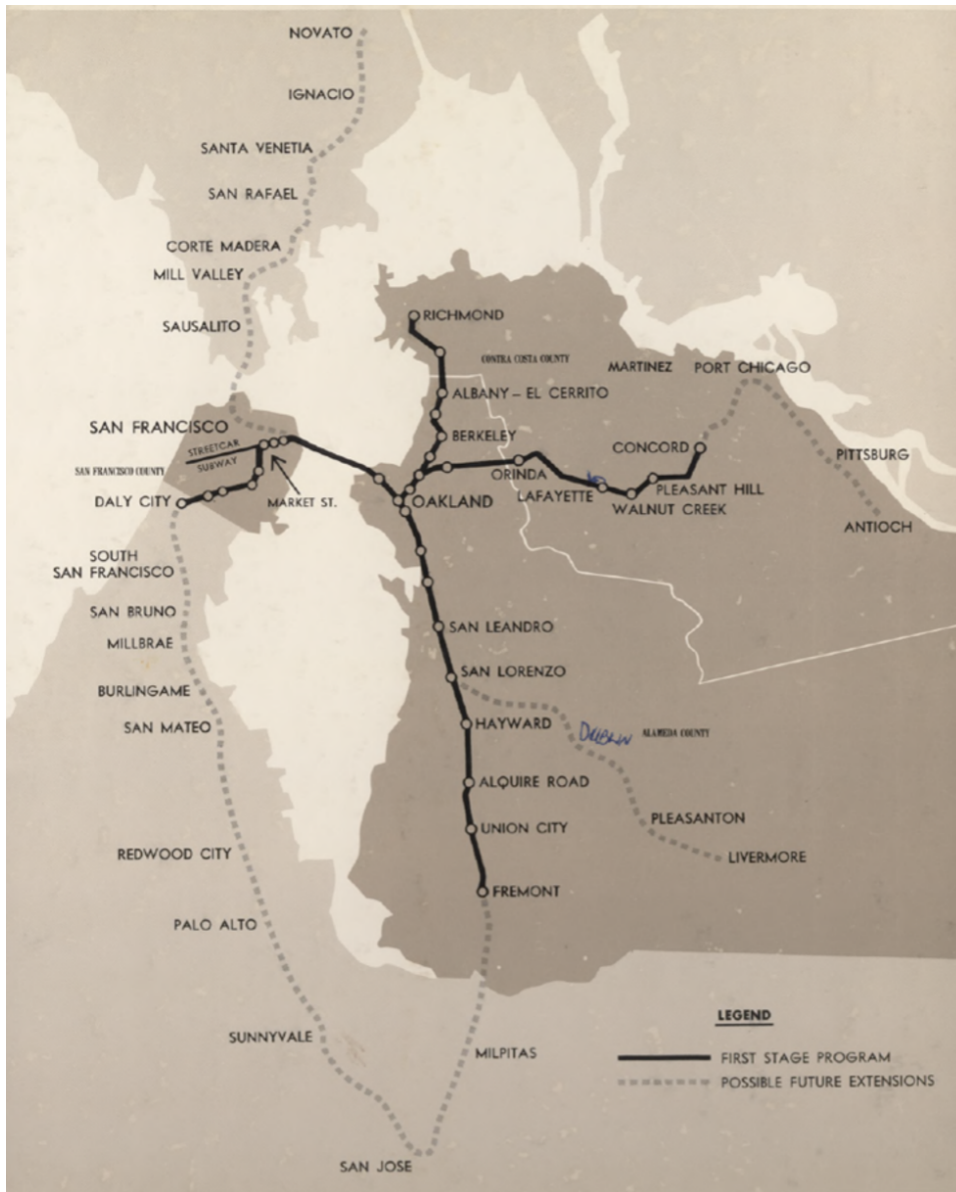


Figure 1.6: The much-reduced system map as of the Composite Report: the Marin and Silicon Valley spurs now appear as “possible future extensions.”, 1962 BARTD Composite Report, PBTB.

The lack of centralization in the BART process resulted in the disappearance of the planned complete circuit of the Bay before the public tax bond process ever began. Santa Clara County opted out in the first phase, before the creation of BARTD, citing the agricultural nature of the county and lack of necessity for rapid transit as

reasons for withdrawal, and choosing to use the funds dedicated to rapid transit for freeway construction.⁵⁴ In what is now Silicon Valley, however, engineering and real estate development had supplanted the region's former farms and orchards as the leading industries by 1950. Despite the aforementioned Committee on Naval Affairs report on the burden of industrialization on the circulation of the Bay Area, the Defense Department invested heavily in research and development in the region, with particular interest in transistors and microprocessors.

The Stanford Research Institute was founded in 1946 by the university and several local private investors for the specific purpose of obtaining these Federal dollars, giving rise to what Pellow and Park and others have called the "Military-Industrial-University Complex," to which we owe much if not most of current networked information technology. The Stanford Industrial Park (later the Stanford Research Park), future incubator of almost all of big tech, had already been founded by 1951, with Hewlett-Packard among the first tenants; HP had been started by its founders with seed capital from the dean of Stanford's school of engineering.⁵⁵ The university had a clear vision of what sorts of companies would be appropriate for the precinct of the research park—"light industry of a non-nuisance type," which would attract "technical employees of a high salary class"—a "better class of workers," who would be "very desirable residents." By 1970, Santa Clara County was receiving \$2 billion annually in defense contracts and the *San Jose News* was proudly proclaiming

⁵⁴ Healy, *BART*, 41.

⁵⁵ Louise Mozingo, *Pastoral Capitalism: A History of Suburban Corporate Landscapes* (Cambridge, MA: The MIT Press, 2011), 166; Nichols, *VC: An American History*, 109.

that Santa Clara was a “white collar county” with a 93.6 percent white population, putting statistics behind the racial coding of Stanford’s appeal to “better,” more “desirable” employees and county residents.⁵⁶ Meanwhile, 70–80 percent of the wage-labor force actually producing the components of Silicon Valley technology were Asian and Latino immigrants, the majority of them women. These laborers suffered high levels of toxic burden from their work environments and were not served either by the Valley’s exorbitant rents and restrictive housing policies—leading most hourly workers to live outside of the area and commute back in—or by its lack of mobility between communities.⁵⁷

Each county originally included in the BART District needed a majority vote of its Board of Supervisors approving the plan, or they would be out. Both San Mateo and Marin Counties voted to remove themselves this way, as the growth machine behind BAC and BARTD collided with growth machines operating within the Bay’s satellite counties, and their particular interests. In many ways, this can be seen as a rejection of the system by the very constituencies it was designed to serve. In San Mateo, the idea of their county taxes supporting a “free ride” for residents of other counties was anathema to the Board of Supervisors and county elites. Real estate developers exerted significant pressure on a no vote out of fear that BART would draw buyers away from the county’s nascent shopping centers, and that the taxes for the rapid-transit bond

⁵⁶ David Naguib Pellow and Lisa Sun-Hee Park, *The Silicon Valley of Dreams* (New York: New York University Press, 2002), 59–64.

⁵⁷ *Ibid.* 9-10

would make the pricing of properties in the county less competitive. Developer David D. Bohannon, in particular, heavily lobbied the Board of Supervisors to drop out.⁵⁸

Bohannon was the builder of some 25,000 homes around the Bay in the 1930s and 40s, including the Hillside development in San Mateo, where covenants in property deeds restricted the community to white homeowners only—a common form of unofficial redlining at the time. Ads for the new development used the deed clauses as a promotional attribute: “Let us tell you of the protective covenants that guarantee Hillside’s enduring character for all time to come.” This has resulted in heavily segregated communities in San Mateo to this day—in 2020 only one percent of Hillside high school students were Black— though the clauses are no longer enforceable. Shortly after the launch of Hillside, Bohannon became president of the National Association of Homebuilders, which speaks volumes about how normalized such practices were in property sales and lending at the time. In 1955, Bohannon blocked a planned racially integrated development in Milpitas by suing the City Council and pushing them to raise sewer connection fees for the development to an unworkable level.⁵⁹

In addition to the property and community “purity” panic, BART’s arrival in San Mateo County was expected to put the existing Southern Pacific-run private commuter line (now Caltrain), out of business, an objection raised by Louis Chess, San Mateo

⁵⁸ Healy, *BART*, 49.

⁵⁹ Richard Rothstein, “The Black Lives Next Door,” *New York Times*, August 14, 2020, <https://www.nytimes.com/2020/08/14/opinion/sunday/blm-residential-segregation.html>; <https://web.archive.org/web/20150702163727/http://www.mychf.org/go/hall-of-fame/past-honorees/bohannon-david-d/>.

County Supervisor and a former Vice President at Southern Pacific. Southern Pacific's commuter ridership had been steadily declining since the late 1940s, however, eventually leading them to petition the state to discontinue the service in 1977, after SP's long-distance passenger rail had been turned over to Amtrak in 1970. In the State Assembly meeting concerning the petition, Alan DeMoss, SP's current vice president, was primarily concerned that the operating losses of the commuter line were being absorbed by SP's paying freight customers.⁶⁰ Questioned about his responsibility to the public, DeMoss said: "Well I'll say that in just one sentence. My public responsibility is not to go bankrupt."⁶¹ Instead, the Southern Pacific Peninsula commute became state administered and was rebranded Caltrain in 1980. This transfer represented an opportunity to make an SP/Caltrain right of way available to BART, an opportunity that the MTC declined to pursue, focusing on minimizing expenditures and underwriting existing bus and rail service.⁶²

In Marin, though independent engineering studies had shown that the Golden Gate Bridge could carry a second deck for rapid transit tracks, the Redwood Empire Association Authority (REAA) funded private studies claiming the opposite. Though the calculations used for the private studies were shown to be faulty, the REAA succeeded in convincing the Marin Board of Supervisors to drop out.⁶³ There were also concerns that the tracks would reduce space available for private car traffic, as the REAA was an

⁶⁰ California State Legislature, "Future Public Transportation Plans in the San Francisco/San Jose Corridor Including Implementation of AB 1853," Assembly Committee on Transportation, December 2, 1977, 27–32.

⁶¹ *Ibid.*, 39.

⁶² *Ibid.*, 178–80.

⁶³ Healy, *BART*, 48.

organization dedicated to promoting road construction and tourism. Marin, at the time, was subject to its own pro-suburban growth machine, advocating for the county as a “mecca for the homemaker, where suburban life in a beautifully wooded and flowered countryside may be combined with business of the metropolis.”⁶⁴

Marin local government in the ‘50s and ‘60s was its own configuration of similar interests to San Mateo’s—pro-residential development, pro-freeway, and anti-public transport, even as traffic rapidly became one of the most important local issues and Greyhound lobbied to be released from its contract to provide what limited service was available. Starting in the mid-‘60s, however, an unlikely union of elite nimbyism and regional conservationism, eyeing the suburban explosion of San Mateo and Santa Clara Counties, put a stop to grander plans for the development of Marin.⁶⁵



Figure 1.7: Rendering of rapid transit trains on a proposed second deck of the Golden Gate Bridge. *America Moves Ahead with Rapid Transit, General Electric, 1961.*

⁶⁴ Redwood Empire Association, “Brief History of the Redwood Empire Association” (Santa Rosa, CA: Redwood Empire Association, 1926).

⁶⁵ Louise Dyle, “Revolt Against Sprawl: Transportation and the Origins of the Marin County Growth-Control Regime,” *Journal of Urban History*, November 2007.

Despite the withdrawal of two integral counties, San Francisco, Alameda and Contra Costa remained in BARTD, and the Composite Report proposal paid for by public taxes and the sale of tax-exempt bonds was successfully voted on in November 1962. At the time there was no federal and little state funding for public transportation and certainly nothing on the scale of BART, so the feat of assembling the system under these conditions must be noted. But again, it was this void of priorities and public funds that pushed the proposal and its execution into the “Keynesian-capitalist” hands of the BAC and BARTD.⁶⁶ Past the bond proposal, BART was intended to pay for its operations largely out of passenger revenue, as opposed to being supported by ongoing tax or other state or federal revenue streams. This has created a perpetual funding crisis and repeatedly hampered the updating and expansion of the system.

The midcentury Bay Area also lacked a citizen-based transit advocacy coalition or “straphanger” organization such as exists in most large cities today. While the growth machines of the Bay had their versions for and against the rapid transit question, citizen groups and actual urban planning departments debated different takes on what might have been possible. A 1961 internal report from the rapid transit committee of the Bay Area League of Women Voters details their research on the pros and cons of the BART proposal, at the point that San Mateo and Marin were still included in BARTD. Groups like the League—liberal democratic and invested in the reform of the existing system—epitomize midcentury civic-mindedness and belief in an informed electorate and technocratic governance. The League had its roots in the woman suffrage

⁶⁶ Henderson, *Street Fight*, 49.

movement, with all the racist and nativist beliefs of its founder Carrie Chapman Catt, and its early adherents in California included women who were early members of the Sierra Club (also indissociable from a nativist approach to “wilderness”), and early female graduates from Stanford among their membership. The report prominently states “THE LEAGUES OF WOMEN VOTERS OF THE BAY AREA HAVE NOT TAKEN A STAND ON THE DISTRICT’S PLAN AT THIS TIME,” instead presenting an for/against survey of views. It is an interesting snapshot of what presumably middle-class, educated residents of the Bay understood of the plan at the time. Topics of concern included: population growth and traffic congestion, land use, community development, financial implications, the interdependence of Bay Area Communities, economic growth, and, lastly, convenience.

Unsurprisingly, this citizen perspective of the system shows more focus on the experience of individual riders than was displayed anywhere in actual BART promotional materials. But the categories covered and the order of importance display a priorities similar to those of the engineers, and indicate a middle-class-to-elite set of concerns. For example, under “Land Use”:

Proponents say:

- 1) Rapid transit can save some of the land now earmarked for freeways, parking lots, and extended highway rights-of-way, for more productive use.
- 3) As much as 30 acres of land are needed for one freeway interchange. Development of a rapid transit system will save this amount of land for productive use. This land will remain on the tax rolls.

Opponents say:

- 1) Rapid transit may cause blight and decay in borderline areas of major cities by encouraging people to live outside the city in which they work. Without rapid transit, they probably would live in the city.

Community Development

Proponents say:

1) Planners consulted by the District felt that rapid transit was a necessity for the Bay Area, because the development of the transit system will tend to generate efficient and orderly patterns of land use and community development.

Opponents say:

6) Many fear that the distinctive character of their communities will be destroyed by the effects of a rapid transit system. For example: some residents of Marin County fear that the county will become an extension or suburb of San Francisco. They feel that rapid transit would extend the “big city” tendencies throughout the county.

Financial Implications

Proponents say:

4) Poor transportation and consequent congestion hurt property values. The cost of a good rapid transit system, with well-located stations, can be more than made up by the appreciation in values of property adjacent to the stations, which will produce increased tax revenues.

Opponents say:

8) Many people strongly object to the property tax as the method of financing the system. The property owner is already overburdened by other taxes for school, sewers, etc., and many of them are unhappy about the inclusion of the rapid transit in their tax bill.

At the end, the report did consider alternatives to the BART proposal, including different configurations of rapid transit (monorails, divided express bus lanes), but a higher-frequency system with more stops, or one with a different configuration of rail lines—perhaps one with more interconnections between lines, or local/express tracks—was not among them. In the discussions of the League of Women voters, as in other parts of the Bay Area public, contestation to the BART proposal that considered what it might otherwise have been, as opposed to what it proposed to do, was not prominent. More space was devoted to modified car and freeway-based solutions, including, tellingly for what I will cover in chapter 3, a discussion of networked automatic and electric cars:

(e) Automatic control of automobiles and the use of electric cars. Major controls would likely be embedded in the roadway or shoulder of the freeway with some minor installation to the automobiles.

Advantages: This device would allow maximum use of controlled roadways. Travel would be safer than with manually operated automobiles. Congestion would be less and the trip more, enjoyable. Electric cars would make it possible to build more streets and freeways underground which would free more surface land to other uses.

Limitations: Probably of greater benefit for longer' trips. Probably little difference in time saved than, with conventional automobile travel in urban areas. Still only in the experimental stages. May prove to be impractical in general use.

A 1966 San Francisco Department of City Planning Transportation Plan

discussing the state of transit in San Francisco proper shows that many of the flaws of BART, as well as the realities of transportation for all communities within the city, were available critiques at the time. PBTB's set of blinders in approaching the project was not a historical artifact, but an active choice. Consider the tone and focus of this quote in contrast to previously cited passages of the RTC and BARTD publications: "We need to accommodate the desires of all people who will travel in San Francisco twenty years from now," the City planners wrote. "We must know the number of people choosing to travel from each location to all others at various times during the day, within and through San Francisco. We must weigh the relative attraction of these different locations and the choices of travel mode available...our vitality is dependent upon ease of access from all parts of the metropolitan area."

We must recognize that we are continuing to subsidize the rush-hour motorist...The carrying charges on this investment work out to about \$4.00 per round trip per automobile. If this cost were charged directly to the user, he would very likely decide not to bring his automobile with him downtown, but instead use the facilities provided by mass transit. At the same time, it must be recognized that, due to the nature of the mass

transit provided—buses and streetcars traveling on the same right-of-way as automobiles—we have for some time not had this additional capacity of mass transportation available. During our peak hour period in San Francisco, streetcars and buses have been jammed inside and the streets congested outside, with potential additional customers choosing to endure the jam in the more comfortable surroundings of their automobiles rather than the crushed condition within the mass transit vehicle.⁶⁷

These planners seriously weighed the burden of car traffic on urban mobility, and sought alternatives to shift its primacy, as mass transit that did not work towards this goal was ultimately self-defeating. They look at the situation from the point of view of the passenger, as a rider looking to travel from point to point, not as a potential consumer, or a quantifiable unit of real estate profit generation.

Selling BART, Science Fiction

In his 1976 intended epitaph for BART, Melvin Webber wrote: “If BART has achieved any sort of unquestionable success, it is as a public relations enterprise.”⁶⁸ The Composite Report is surprisingly short on the sort of dull technical detail that one might expect from such a document, and is instead carefully designed and printed on substantial paper stock, with many large maps and infographics, images, and color-coded sections. It is a polished piece of PR, selling a particular vision of a rapid transit future, rather than considering what type of mass transit would best serve and increase the existing the ridership of the Bay Area.⁶⁹ To Zwerling, BART was a “prime example

⁶⁷ San Francisco Department of City Planning, “Working Paper: Transportation Plan,” December, 1966, 3–5.

⁶⁸ Webber, “The BART Experience: What Have We Learned?”.

⁶⁹ Stephen Zwerling, *Mass Transit and the Politics of Technology: A Study of BART and the San Francisco Bay Area* (New York: Praeger, 1974), 29-30.

of legislation through technology: to constrain, if not enforce, social choices,” he wrote. “BART is a product not only of technology but of technocracy.”⁷⁰ The archived papers of former BART president Arnold C. Anderson include multiple press releases from the years leading up to the release of the Composite Report with detailed renderings of trains and stations, meant to get the public at large behind the upcoming vote on the bond measure that would put the necessary tax dollars and funds supplied by the public behind the plan.

The growth machine at the center of the BART project included a substantial promotional effort, dedicated to convincing particular publics within the Bay Area that this specific form of rapid transit was what they needed. In addition to the carefully designed print materials, BARTD representatives made hundreds of speeches and slide presentations from 1960–2, to lodges, Rotaries, and civic groups such as the Commonwealth Club.⁷¹ The materials produced for this endeavor display the elite perspective and intended ridership of the system designers. The view-from-above maps, infographic renderings of data, and pervasive sense of technological wizardry contribute to the impression of a cohesive, rational system engineered by the managerial class. These images exemplify a disembodied view of urban space where, as Lynne Pearce notes, the physical space of the city is static and travelers and their conveyance are enabled to move through it. Seen not from the perspective of the traveler, but from some third-person, panoptic perspective, they display how “the ‘urban’ imagined from a ‘distance’ and/or ‘above’ is rendered distinctly anonymous,” not

⁷⁰ Ibid, 137.

⁷¹ Healy, *BART*, 47.

particular, local, or lived in.⁷² Images in the Composite Report, also indicate the ideal rider-type for the new system: Cutaway renderings of proposed stations depict them as patronized by very *Mad Men*-esque business commuters. The facing image in Figure 1.8 shows a phalanx of nearly indistinguishable white, suit-clad company men with briefcases and horn-rimmed glasses. In other renderings the occasional white woman with a bouffant hairdo, pencil skirt suit, and handbag appears.

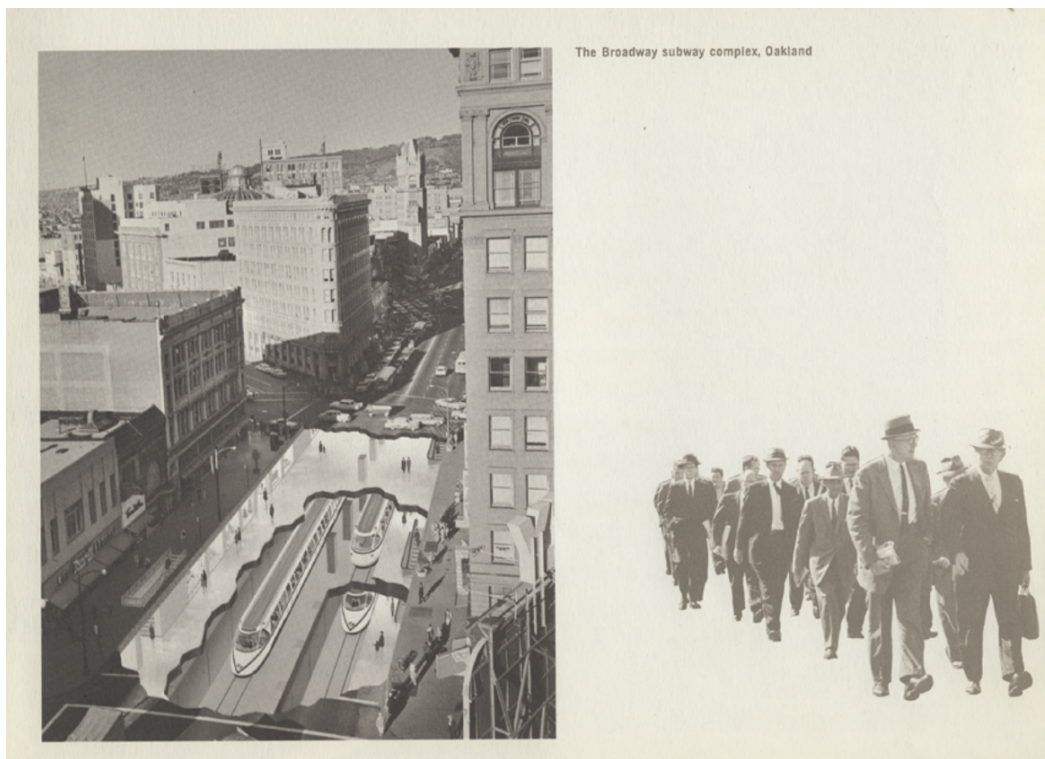


Figure 1.8: Typical illustration from the 1962 Composite Report (PBTB).

To convince the public of both their expertise and the necessity of the BART plan, its designers and promoters leaned heavily on space-age design elements and the allure of the new, technologically advanced, automated, rational, and clean. Beginning

⁷² Pearce, "The Urban Imaginary: Writing, Place, Migration," 8.

with the 1956 RTC report, possible trains are depicted with a consistent set of characteristics—they are metallic, streamlined, and are usually shown on a monorail or other elevated track, separated from and not hindering private cars; alternatively, they are shown at sunny, modern suburban rail platforms or crossing pastoral open land.

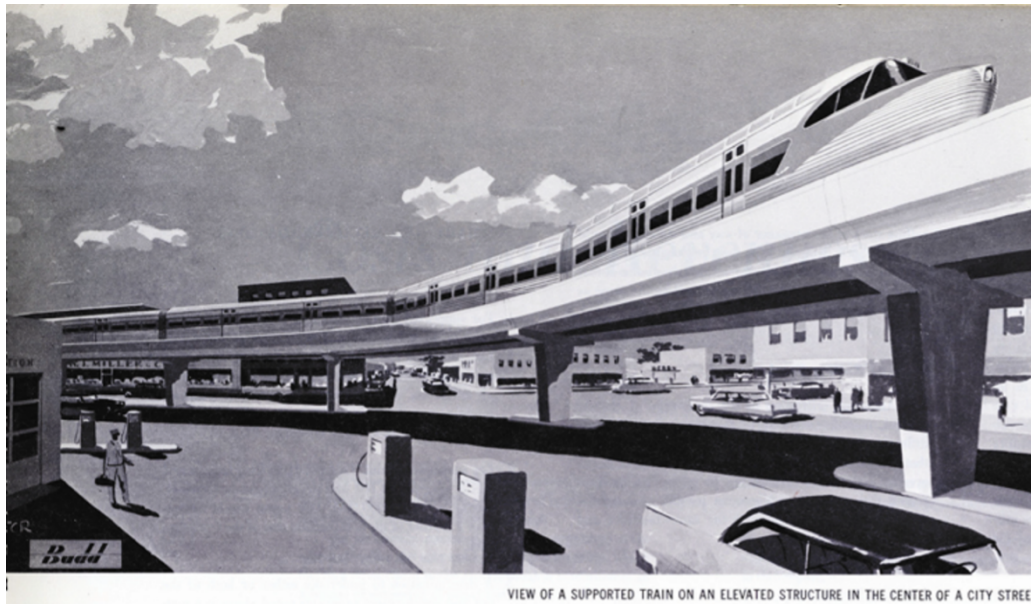


Figure 1.9: An early rendering of a train from the 1956 report, showing rapid transit above street level (PBHM).

“We determined that one of the best ways to give the public a sense of what they might eventually be voting for was to put together visuals which would show a very space-age-looking transit system...we had an artist do a series of renderings showing sleek trains...other renderings gave examples of clean, well-lighted, and very modern-looking stations, with marble concourses,” BARTD Assistant General Manager Bill Stokes said of the promotional effort.⁷³ There are few people in these renderings, and

⁷³ Healy, 46.

fewer pedestrians or crowds of passengers. On the contrary, there is a strong sense of remove, underscoring that this is *rapid* transit, but not public or mass transit.

The image of the crowd, so linked to older, eastern transit systems from the early twentieth century, was something BART's planners strove to counter in their communications. Over and over, the new trains are described as safe, quiet, comfortable, seated, and geared towards longer-distance commuters. They were designed to summon up the feeling of being in the private, domestic space of "a den or library," according to Jay Bolcik, the former BART Manager of Schedules and Service Planning and a rail historian at the Prelinger Library. "The inside of the cars was designed to meet or exceed the comfort of your car."⁷⁴ There were to be seats for all, but no space allotted for standing-room passengers, and no overhead rails or other conveniences planned to even accommodate the possibility. "This will be no cattle-car operation," BARTD General Manager John W. Peirce was quoted as saying in a 1963 special publication of *Railway Age*.⁷⁵ The message was clear: these were not the crowded, noisy, dirty, uncomfortably heterogeneous, proletarian conveyances of the industrial age.

Central to the futuristic allure of the BART program was its planned use of computer technology. As often as the trains were described as clean and safe, it was underscored that they would be computer-controlled, as in the images in Figures 1.11 and 1.12 from a promotional pamphlet on rapid transit published by General Electric.

⁷⁴ <https://www.bart.gov/news/articles/2022/news20220525>

⁷⁵ *Railway Age Weekly*, "Mass Transport: Blueprint for Survival," 1963.



Figure 1.10: Interior of the first BART cars, with a commuter parking lot seen through the window. (BART, c. 1970)

BAY AREA RAPID TRANSIT SYSTEM SPEED – COMFORT – CONVENIENCE

San Francisco's plan for progress calls for modern, computer-controlled, 80-mph rapid transit cars to speed Bay Area residents to their destinations. The safety and comfort of rapid transit cars will replace the time-consuming, nerve-racking commuting of today.

Because of the need to relieve congestion in Bay Area centers of business and industry, the San Francisco Bay Area Rapid Transit District was created by the California Legislature. The proposed rapid transit system resulted from study of the area's transportation needs. The study indicated that this growing metropolitan area must fully utilize all modes of transportation—autos, buses, and high-speed rapid transit—each to its best advantage.

General Electric is now designing and building equipment for tomorrow's modern rapid transit systems—systems that will make metropolitan areas even better places in which to live, work and play. Modern living becomes increasingly attractive when fast, efficient transportation is available between commercial centers and adjoining communities. Everyone benefits from coordinated metropolitan transportation. To work where you want while living where you want is your best reason for planning and building a coordinated metropolitan transportation system.
Section 603-4, General Electric Company, Schenectady 5, New York.



EASY ACCESS to the whole area will be possible with the new system. Transit cars on exclusive rights-of-way will operate at 90-second intervals during rush periods.

Progress Is Our Most Important Product

GENERAL  ELECTRIC



Figures 1.11–12: Images of a possible BART train from a promotional pamphlet on mass transit published by General Electric. Note that the train in the second image is depicted traveling alongside a sunny suburban highway (*America Moves Ahead with Rapid Transit*, General Electric, May 1961).

A 1960 BARTD news release prominently states that the renderings of proposed stations show “computer-programmed trains.”⁷⁶ At a time when a single mainframe could occupy entire floors of buildings, or indeed entire buildings— as many institutional computers did, this must have seemed impossibly advanced. The League of Women Voters report enthused: “Costs will be cut by use of automation to keep the total number of employees to a minimum, including a computer billing system, and an automatic electronic dispatching system, which requires only one “driver” and one “conductor” on each complete train.”⁷⁷

⁷⁶ 1960 news release, BARTD, ITS Library, Arnold C. Anderson collection.

⁷⁷ League of Women Voters, 1961.



Figure 1.13: From BART: A Bright New Day for the Bay Area, a brochure from the 1972 launch (BART).

A section of a 1972 promotional brochure (Figure 1.13) discusses BART's status as the world's first computer-supervised transit system, its central command center, and all the advantages this would bring in terms of speed, safety, efficiency, and cost. The computer-control of the system is described as "help[ing] the commuter." "You might say our computer has helped to bring back good old-fashioned personal service." As BART was under construction, George Lucas ended up filming sections of his sci-fi film *THX 1138*, about a dystopian future, within sections of the Transbay Tube.



Figure 1.14: Still from George Lucas's THX1138, shot in BART's Transbay Tube (Warner Bros. 1971)

The Lake Merritt center served as a backdrop for the interchange where all aspects of daily life were surveilled and controlled. In 1976, a monolithic six-sided arcade kiosk was installed in the Powell Street station in San Francisco, where BART riders could play Atari's Pong, Tank, Le Mans, Space Race and other brand-new computer games.



Figure 1.15: Atari games installed at the Powell Street Station, 1976. (Gary Fong, San Francisco Chronicle)

Along with its computer infrastructure and crafting of high-tech allure, BART gained another unique first by contracting an aerospace firm to design and build its cars. By choosing Rohr Industries instead of a company experienced with manufacturing rail cars, BART's planners severed another link with the sooty, populist shadow of early 20th-century rail. While the contract with Rohr was in part due to a low bid that BART was required by state law to accept, it was seen as an asset and entirely in keeping with the system that had been promoted for so long. Rohr-built cars of lightweight extruded aluminum and fiberglass would live up to the utopian renderings of the early reports. The BART supervisors and Rohr embarked on a program of redesigning the subway car from the ground up, including plans based on performance metrics and not on standard and easily repaired and replaced parts. Westinghouse Electric came on board, providing a unique high-speed propulsion system as well a fully automated train control system of a kind that had never been attempted before, and which pushed the limits of available technology.

Other choices made to emphasize the “disruptive” break of this transit network with those that had preceded it included tracks set at a different angle than standard rails, as well as a distinct width of five feet, six inches that necessitates proprietary brakes, wheels, and track repair vehicles—all quite costly, as there is no economy of scale for their manufacture, spread across the rail industry as a whole.⁷⁸ It also means that BART is not interoperable with other train lines, all of which share the same standard gauge of four feet eight-and-a-half inches. While this choice was made by

⁷⁸ Wallace Turner, “5 on Automated Train Hurt as Brakes Fail,” *New York Times*, October 3, 1972. <https://www.nytimes.com/1972/10/03/archives/5-on-bay-area-train-hurt-as-automated-brakes-fail.html>.

PBTB engineers to insure a faster, more stable ride and require less stopping power, as well as to prevent the aerospace-crafted cars from becoming too aerodynamic and tipping over in high wind situations, it has guaranteed that only BART trains can run on its tracks, which has closed its corridors and the Transbay Tube to any other type of rail traffic.⁷⁹

On the system's launch the design of everything from the Lake Merritt "Mission Control" to the uniforms of employees was calculated to underscore the system's computer- and space-age attributes. Station employees and transit security wore friendly, flight-attendant like blazers and pantsuits, while the train operators wore jumpsuits with racing stripes in BART colors. (The security uniforms were later replaced with standard police blues, as passengers weren't able to readily identify them).⁸⁰ Gone were the sharp suits and bouffant coifs of the RTC's imagined suburbanites. They were replaced with afros and minidresses as BART deliberately tried to cultivate a *Star Trek*-like image of groovy diversity, as well as to belatedly reflect the demographics of their employees and ridership. According to interviews with early staff and riders, a utopian futurist sense of collective undertaking also characterized work on system operations.

⁷⁹ BART, "50 years of BART: Why BART uses a nonstandard broad gauge," *Bart.gov*, July 8, 2022, <https://www.bart.gov/news/articles/2022/news20220708-2>;

⁸⁰ Healy, *BART*, 102; BART, "History."



Figure 1.16: BART employees in the early 1970s (BART)

The result of all this futuristic and proprietary ingenuity, which the machine behind BART had hoped to franchise around the world, was not a paradigm-smashing new template for how transit should be done, but a finicky precision system requiring frequent lengthy and costly, or sometimes ad hoc repairs due to the difficulty of obtaining replacement parts. All of this was at the expense of Bay Area taxpayers and transit riders. At the same time that BART was installing Atari games in stations, the automated control system was loading the grid with “ghost trains”—errors prompting the system to believe that a phantom train was already on the tracks or in the station, delaying an actual train—as well as periodic mystifying power surges. This situation was later determined to be due to overheating circuit boards, and was temporarily resolved by placing ice packs on them. BART had only been in operation a month when the infamous “Fremont Flyer” incident took place. A train’s computerized braking controls

failed and launched a car carrying passengers off the tracks at the end of the line in Fremont, fortunately resulting in no injuries.⁸¹ A *Chronicle* article about the launch of the Atari games described a rider “who kept feeding the slot for Space Race, a game in which a spaceship tries to avoid a grid full of electronic hazards, something like BART.”⁸²



Figure 1.17: BART disrupting the Fremont station, October 2, 1972. (Lonnie Wilson, Oakland Tribune)

BART and the Public

So what happens when the technocratic vision of a managerial elite takes physical form and starts circulating within the dynamic and processual life of an urban

⁸² Peter Hartlaub, “An Atari arcade on BART? In the 1970s in SF, it was game on,” October 19, 2018, <https://www.sfchronicle.com/oursf/article/An-Atari-arcade-on-BART-In-the-1970s-in-SF-it-13319320.php>.

area, with all the messy, competing, overlapping and shifting interests, constituencies, and social and cultural groups that comprise its daily life? In her work on the creation and promotion of Grand Paris, Theresa Enright draws on Jameson and Harvey, among others, arguing that “neoliberalism relies on imaginative speculation as part of its orientation toward a future.” By extension, “Grand urbanism relies on a future-oriented mode of speculation and vision, and in so doing it posits a parallelism between the artistic utopian representations of the city and the institutionalized governance directing policy and investment. It poses a relationship, as it were, between the aesthetic and the economic through the political.”⁸³ While the BART project can’t lay claim to the title of grand, the assembled elements—private finance and industry directing an aspirational and promotional urbanism—place it on a continuum of projects using the utopian future as means of recruiting public support in the present. Attoh identifies in transportation projects like BART or AC Transit traces of the modernist urbanism of Mumford and Howard or Le Corbusier, in which changes in the physical structure of cities could bring about changes in their social worlds—what David Harvey calls a “utopianism of form.” Attoh cautions, however, that such projects are more properly classified as failed utopias, because of the way they ignore the rights and material needs of those they claim to serve. “Not only do utopias rely on a selective view of society’s future, but they bracket and ignore those elements in society that complicate or undermine the promises they embody.”⁸⁴

⁸³ Theresa Enright, *The Making of Grand Paris: Metropolitan Urbanism in the Twenty-first Century* (Cambridge, MA: The MIT Press, 2016), 68, 92.

⁸⁴ Kafui Ablode Attoh, “Rights in Transit,” Doctoral Dissertation, Syracuse University, 2013, 77-79.

As BART's engineers moved into planning the actual tracks and right-of-ways of the system, they began to encounter increasing pushback from communities throughout the Bay. First Berkeley, then Richmond and other cities and neighborhoods went to the table with BARTD about the locations of stations (above or below ground) and the alignments of tracks. By 1967 nearly half of the planned 33 stations had been relocated, many moved underground and out of sight, others shifted to accommodate the interests of property owners and developers.⁸⁵ Some were subject to the same pressures faced in suburban communities, as in Rockridge, where the location of the station and the possibility of early transit-oriented development was a subject of public meetings and resulted in the preservation of single-family zoning.⁸⁶ In others, the concerns centered on lack of involvement of marginalized communities in the planning of BART stations in their neighborhoods, and the financial pressures that new development and foot traffic would surely bring.

In the late '60s and early '70s, growing discontent in the Mission over gentrification, rising rents and displacement crystalized around the imminent construction of two BART stations in the neighborhood at 16th and 24th and Mission. *iBasta Ya!* the community newspaper centered on activism around Los Siete de la Raza—seven men from the community affected by racist police brutality, published the following as part of an Anti-BART manifesto:

⁸⁵ Healy, *BART*.

⁸⁶ Webber, "The BART Experience," 15–6.; J.A. Goldfarb, "BART: A Regional Actor in the Multi-Tiered Metropolis," Master's Thesis, University of California, Berkeley (1982), 107.



Figure 1.18: Anti-BART manifesto in *iBasta Ya!* (1970)

Instead of a place for large families to live there has been an increase of higher income single people and of married couples without children. These people have moved in as realtors rebuild and replace two and three story flats with eight and twelve unit apartment houses...Property taxes and land values in the Mission are soaring: renting to more people allows the landlord to pay high costs and taxes as well as allow him to make more money from rents...The newer trend will be helped by Bay Area Rapid Transit (BART). Land costs are rising all over San Francisco, but in the Mission the rise is higher and faster because two BART stations will soon connect us with downtown San Francisco. The increased land values will make large apartment houses more profitable and desirable for landlords.⁸⁷

In 1966, the City Planning Commission's "Mission District Urban Design Study" had proposed that existing businesses along Mission Street be replaced by high-rise housing that could deliver more passengers directly to the planned BART stations, while businesses would be concentrated in plazas around the two stations. The one at 16th street, they suggested, could be geared towards tourists with an international food market, restaurants, gift shops, and kiosks selling Mexican crafts. At 24th street, high-density retail and additional high-rise housing could attract "couples without children"

⁸⁷ *Basta Ya!* "BART Profits from your Pockets."

and “single persons.” Community activism was ultimately able to kill the measure by a margin of one vote, but development and relocation of new residents to the Mission continued as the planned launch of BART grew closer.⁸⁸ In this era, continued street activism, local organizing, and the formation of the Mission Coalition Organization (MCO) were able to fend off the worst of these proposals, but problematic trends in development and displacement in the neighborhood continue to the present. These have gotten worse with each wave of tech-enabled new arrivals in the area, peaking first in 1999 during the first dot-com boom, and achieving near obliteration of the old Mission in the years between 2013 and the start of the COVID-19 pandemic, which I will discuss in the next chapter.

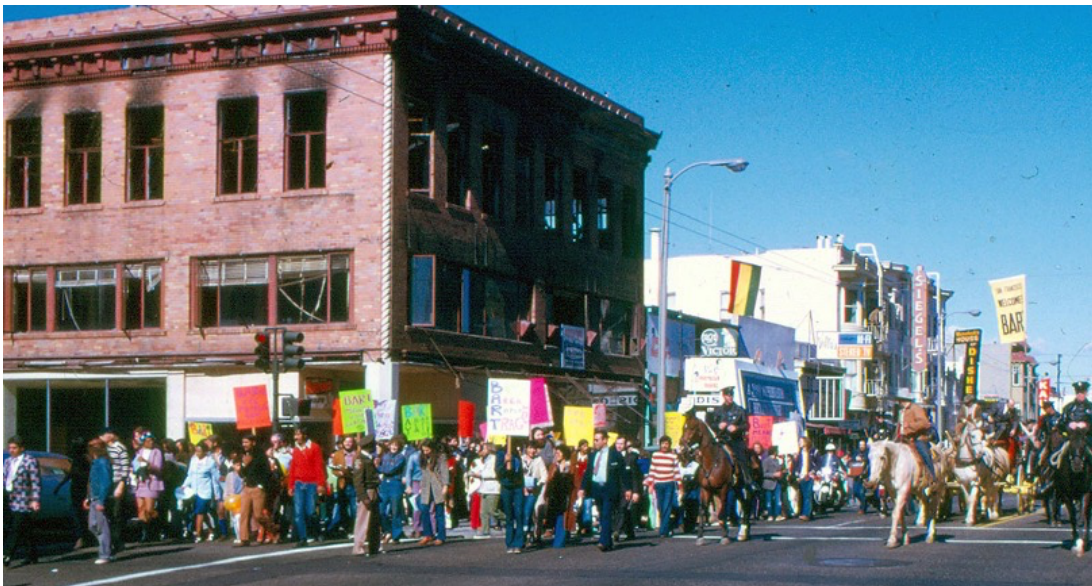


Figure 1.19: Mission Anti-BART Protest, April 1970 (Francisco Flores Landa/ Found SF)

⁸⁸ Marjorie Heins, *Strictly Ghetto Property: The Story of Los Siete de la Raza* (Berkeley, CA: Ramparts Press, 1973), 78–81.



Figure 1.20: 1962 Composite Report Vision for 24th and Mission (PBTB)

Plans such as the Mission District Urban Design Study were after-the-fact attempts to address the needs of communities that were nowhere in the suburban dreams of BART's gentlemen engineers. As Melvin Webber opined in 1976, a few years after BART's opening: "it was never intended to serve the kinds of short-distance trips that local buses, trolley cars, and center-city subways serve. It was not designed to carry low-income persons from central-city homes to suburban factories, even though BART officials belatedly voiced such claims." The particularities of BART's design—that unlike major metropolitan systems such as New York's subway or London's Tube, its trains cannot run local and express on the same line; that there is only one line in each compass direction; that the stations are spaced at intervals of a few miles creating issues

of access that don't accompany last-mile-oriented systems such as buses and streetcars—stranded BART in a middle ground that was clearly not intended for transit-dependent riders, but was too optional for those with the ability to travel in other ways. "Station decor is handsome," Webber wrote. "But outside BART's premises, the passengers are on their own. They must find their way to the station by bus, car, or foot, make the transfer, and then find their way at the other end after leaving the BART station. While they are BART's guests they are treated very well; outside the premises they are rather neglected." While touting feeder bus service early on, efforts to align the BART schedule with those of existing transit services were "nonchalant" at best. Then there was the issue of cost: at the time of its launch. According to an early rider I spoke with, a ride on BART within the city cost .30 compared to AC Transit and Muni's quarter, a meaningful price differential in a world where purchases could still be made for a nickel.

The choice ridership that BART's designers initially chose to court—those with the wherewithal to own cars in midcentury suburbia—did not need the system that was built for them as an alternative to their automobiles. This is evident in the manifold ways the system design did not challenge the supremacy of the car, with its unwalkable, peripheral park-and-ride stations, and elevated tracks placed above the highways and streets of the Bay. While BART's launch was initially associated with a decline of 14,000 cars from area thoroughfares—not the 48,000 forecast in the 1962 composite report—induced demand, in which available road space (such as adding new lanes to highways) prompts more people to drive, soon closed that gap. After four years of

service, only 44,000 annual trips on BART, just 35 percent of the total, were made by people who formerly drove, where the designers had predicted 157,000. Meanwhile, a quarter of the ridership had not made their trips at all previously, and were not car owners. One of highest volume trips was entirely intraurban, from the East Bay to San Francisco across the Transbay Tube, where standing-room riders outnumbered seated passengers at peak hours. This proletarian cattle-car scene, which BART's designers had worked so hard to prevent, led some riders to stick plungers to the roofs of the cars to create handholds for themselves where none had been provided.⁸⁹ The popularity of the Transbay trip prompted the BART Board to lower its cost to \$.25 by 1975, but the cost of the most expensive trajectory in the network was still \$1.40.

The development of BART had been paralleled in the East Bay by the consolidation of what was to become AC Transit. It represents a sort of alternate universe of Bay Area mass transit—a public-driven process making use of existing infrastructures, in place of BART's Tomorrowland aesthetic and elite engineering. AC Transit's roots were in multiple private transportation schemes—trolley cars and ferries—launched during the nineteenth century by Francis “Borax” Marion Smith, who had made a fortune on mining and the cleaning agent that became his sobriquet. These various lines were later consolidated into the Key System of trolleys, streetcars, and a transbay ferry service. When the Bay Bridge opened in the 1930s, the Key System ran commuter trains across it, connecting East Bay communities and San Francisco. As previously noted, however, as with the Los Angeles “Red Cars,” the revenue-based,

⁸⁹ Ralph Blumenthal, “Coast Mass Transit Hailed Despite Woes,” *New York Times*, Aug 22, 1975, 50.

private financing of the Key System led to its end in 1948 due to increasing competition from automobile use; the Bay Bridge commuter rail was suspended in 1958. Citizen organizing and a 1956 public vote intervened and created the AC Transit District and a \$16.5 million public bond to buy out the Key System and maintain the routes that residents had come to depend on, as well as to expand them by converting the streetcar lines to more flexible bus routes. AC Transit's board was elected whereas the early BART board was appointed. This did not change until 1974, when public criticism and a state inquiry into BART's delayed launch, operating deficits that would require public subsidy, and technological failures such as the Fremont Flyer incident, forced the shift to a democratically elected BART board.⁹⁰

The influence of AC Transit's largely working-class and minority ridership on its existence and structure—through the later efforts of citizens groups such as the Alliance for AC Transit and the Bus Riders Union—gave shape to that system, and to transportation politics in the Bay Area and ideas of the rights of transit riders more broadly.⁹¹ But at all times, the riders of buses, in the historically Black, Latino, and working class neighborhoods of the East Bay (as well as on the local-stop street cars of SF Muni) were fighting broad public perception that such transportation spaces were “Black space,” in the terms of Elijah Anderson, to BART and Caltrain's “white space.”⁹² The 2005 *Darensburg v. MTC* case is emblematic of the citizen advocacy that came out

⁹⁰ Healy, *BART*, 172.

⁹¹ For a thorough discussion of the development, internal and external politics of AC Transit and its ridership, see Attoh, *Rights in Transit*.

⁹² Elijah Anderson, “The White Space,” *Sociology of Race and Ethnicity* 1, no. 1, 2015: 10-21, <https://doi.org/10.1177%2F2332649214561306>.

of AC Transit's ridership—an Oakland-dwelling, bus-dependent mother of three sued the MTC for civil rights violations over its funding of rail projects such as BART and Caltrain instead of bus service to Black, brown, and lower-income ridership. While the suit was not successful, it set a precedent and illustrated the differential funding structures and inequalities of the Bay's transit systems, entering them in to the public record and paving the way for later conversations about mobility justice and transportation as part of the right to the city.

AC Transit's development was hardly free of struggles and contestations over administration, funding, labor, and ridership. To Zwerling, however, analyzing the two systems in the early 1970s, AC Transit was distinct from BART in that it was responsive to the needs of the public it served, "using present resources to serve present requirements for mass transportation."⁹³ BART, by contrast, was prescriptive: "an attempt to create rather than to serve the future... a desirable image of the future."⁹⁴ BART's rationalized, radial plan did not address the cross-haul needs of the transit-dependent riders of the Bay Area, which were, and are, local. Muni, by contrast, has reveled in the extreme localness of its service coverage, boasting in 2021 that 98 percent of San Franciscans were within two-to-three blocks of a Muni stop at any given time, even given the challenges of operating public transit under pandemic conditions.⁹⁵ This is possible, in Walker's analysis, because Muni "relies on connections"—connections between lines multiply the possibility that a passenger will be able to get

⁹³ Zwerling, *Mass Transit and the Politics of Technology*, 18.

⁹⁴ *Ibid.*, 137.

⁹⁵ Julie Kirschbaum, "Bringing Back Muni Better," *SFMTA.com*, April 20, 2021, <https://www.sfmta.com/blog/bringing-back-muni-better>.

between points A and B within the system.⁹⁶ The MTC's first plan on the state of the region's transit admitted that the current development, with its focus on high speed and low connectivity would only perpetuate "the old pattern: broader and broader commuter suburbs, denser and denser high-rise office centers."⁹⁷ Whitt argues that not only does this planning not challenge automobile usage, it may actually encourage it. "BART will not challenge the dominance of the private automobile, for it was not designed to do so," he writes. "BART will not increase the mobility of the poor and thus help to redistribute life chances, for it was not designed to do so."⁹⁸

BART not as Planned, but as Produced

Zwerling argued in 1974 that "BARTD [had] committed itself (and the Bay Area) to a prescriptive technology that cannot be adapted to alternative futures." Citizen pushback and the patterns of actual ridership, however, have transformed BART into something more responsive to public need than ever envisaged by the acronym coalition of PBTB, BAC, SRI, etc.⁹⁹ Ridership has remained well below the numbers ambitiously predicted by PBTB, but has stayed relatively consistent over the decades even as the modal share of automobile trips has increased. BART ridership is also substantially intraurban, with traffic between San Francisco and the East Bay representing more than 70 percent of trips pre-pandemic.¹⁰⁰ The riders of the Bay Area

⁹⁶ Jarrett Walker, *Human Transit: How Clearer Thinking About Public Transit Can Enrich Our Communities and Our Lives* (Washington, DC: Island Press, 2012), 156–8.

⁹⁷ Metropolitan Transportation Commission, Draft Environmental Impact Report of the MTC Regional Transportation Plan Adopted June, 1973 (1974), 9–13.

⁹⁸ Whitt, *Urban Elites*, 76.

⁹⁹ Zwerling, *Mass Transit and the Politics of Technology*, 18.

¹⁰⁰ BART, "Monthly Ridership Report May 1 2022 and Trailing 12-months,"

have adapted to BART and pushed it to move towards their needs, though the system design neglected them from its inception. The late but vital development of citizen advocacy has pushed for at least partial state funding of BART operations, a shift away from a revenue-based model. The efforts of the Bay Area Land Use and Transportation Coalition (BATLUC, now TransForm) among others, yielded a \$375 million infrastructure investment in 1998, and a 3.5 million refurbishment of BART's automated control architecture and rolling stock through 2016's Measure RR.¹⁰¹

In 2013, a one-year research project studied access issues on the East Bay C Line between Orinda and Concord, with the specific intent of addressing first- and last-mile travel to and from BART stations. Among the report's considerations were increasing feeder bus service where existing connections to AC Transit are low or infrequent, and adding infrastructure to encourage pedestrian and bike access.¹⁰² These recommendations resulted in the adoption of a system-wide station access policy, which specifically lists among the priorities: "Reduce the access mode share of the automobile by enhancing multi-modal access to and from BART stations in partnership with communities and access providers," and "Equitable Services: Invest in access choices for all riders, particularly those with the fewest choices."¹⁰³

<https://www.bart.gov/sites/default/files/docs/202205%20MRR.pdf>.

¹⁰¹ Yee, "'Towards Sustainable Transportation Policy in the United States,' 110-1; BART, "Measure RR Bond Oversight Committee," BART.gov, accessed August 8, 2022,

<https://www.bart.gov/about/bod/advisory/bond>.

¹⁰² BART, "'Central C-Line First Mile/Last Mile Connections Plan, Corridor Access Pilot Program, FINAL REPORT" March, 2014, <https://www.bart.gov/sites/default/files/docs/2014%20C-Line%20Access%20Study.pdf>.

¹⁰³ BART, "Bart Station Access Policy Adopted June 9, 2016"

<https://www.bart.gov/sites/default/files/docs/BART%20Access%20Policy%20-%20Adopted%202016-06-09%20Final%20Adopted.pdf>

BART must also be counted as a success of a kind—for all of its oversights and missed opportunities—due to the sheer fact of its scale and existence. Grand infrastructure, and public-spending intensive campaigns of its kind are nigh impossible to achieve in the dwindling of the “Democratic Surround” from the Nixonian ‘70s to the tax-averse, center-right present. It is a publicly accessible rapid transit system with a partial public tax base and a democratically elected board, operating in a climate in which the neoliberal think tank The Cato Institute is comfortable publishing statements such as “Public transit is second-class transportation. It is slower, less convenient and more expensive than driving. Policies that encourage low-income people to remain dependent on transit effectively lock them in steerage while everyone else travels first-class.”¹⁰⁴ Public transportation, it seems, is just one more place bootstraps logic can be applied, pushing people towards the more individualistic, rugged, and self-reliant world of driving, environmental consequences be damned.

Against the odds of cost overruns, perpetual funding crises, and lower-than-predicted ridership, BART has continued its slow process around the Bay. Between 2012 and 2020, the Fremont line was extended to San Jose, making three stops, in South Fremont/Warm Springs, Milpitas, and at the Berryessa Transit Center, where it connects to Valley Transit Authority (VTA) buses, including rapid service to downtown San Jose and Diridon Station. At Diridon riders can connect to Amtrak, Greyhound, and Caltrain, making the longstanding dream of a complete transit circuit of the Bay a possibility, if a somewhat impractical one. Currently to get from the East Bay to Silicon

¹⁰⁴ Randall O’Toole, “Public Transit Is Second-Class Transportation” *Cato Institute Commentary*, July 24, 2020, <https://www.cato.org/commentary/public-transit-second-class-transportation>.

Valley on public transit would require a BART to VTA to Caltrain transfer. By 2040 BART is planned to finally connect directly to Diridon Station and Caltrain, and to make its own stop in central Santa Clara, alongside but not on the Caltrain tracks, only 70 years after BART debuted, and nearly a century after its creation was first proposed.¹⁰⁵

By 2018, the entire BART fleet was planned to be replaced, along with major upgrades to the control system, though as of 2022 some older trains are still in circulation. The new cars, called the “Fleet of the Future,” are constructed by Bombardier, which also builds cars for the MTA and Amtrak, among others. The Fleet of the Future, this time, looks much like the present of other public transit systems, with accessible cars, expanded standing room, overhead hand rails and racks, plastic seating, and a host of other considerations based on the needs of a diverse riding public. In images announcing the new cars, they are shown at platforms in visibly mixed-use urban areas, such as the Fruitvale BART station’s mid-rise TOD, with a mixed grouping of passengers in casual clothes waiting to board. There is also not a car nor a highway in sight, and these images are shot either from below, or at the eye-level of a prospective passenger. Signage prominently indicates seating for disabled, pregnant, and elderly riders, and space for people with strollers, luggage, and bikes.

¹⁰⁵ Valley Transportation Authority, “VTA’s BART Silicon Valley Phase II,” accessed August 8, 2022, <https://www.vta.org/projects/bart-sv/phase-ii/>; George Avalos, “VTA aims to grab key site ahead of downtown San Jose BART project,” *San Jose Mercury News*, June 6, 2022, <https://www.mercurynews.com/2022/06/06/vta-grab-buy-site-downtown-san-jose-bart-project-develop-transit>.



A New Era Begins

The first of 775 new BART train cars went into service January 2018 and are ready to take you on a quieter, cooler, and more comfortable ride. The new cars will help relieve crowding on the BART system. Here are some tips to help you navigate the Fleet of the Future.



Figure 1.21: Promotional campaign for the “Fleet of the Future,” 2018 (BART).¹⁰⁶

Predictably, long-distance suburban riders have already registered their complaints about these design changes. A recent redditor complained in r/bayarea: “I take bart [sic] from Montgomery to Berryessa and back no less than twice a week. On

¹⁰⁶ BART, “New Train Car Project,” *Bart.gov*, accessed August 8, 2022. <https://www.bart.gov/about/projects/cars>.

the old trains it's a fairly leisurely trip, but the seats on the new trains make my back hurt so much, and they have less legroom. You can't even use the window sill as an armrest. Just an overall terrible experience." Intra-city riders on the other hand, overwhelmingly prefer the new trains: "The AC works in the new ones, that's all that matters." "More standing room for rush hours." "Old trains, look at the old advertising and you'll understand why the trains were designed that way. New trains are a direct response to requirements for modern times. Well ventilated, easy to clean and easy to get in and out of."¹⁰⁷



Figure 1.22: Train rendering from a 1960 BARTD news release (Berkeley ITS Library, Arnold C. Anderson collection)

¹⁰⁷ Reddit, "I really loathe the new BART trains," accessed August 10, 2022, https://www.reddit.com/r/bayarea/comments/tsb0bn/i_really_loathe_the_new_bart_trains.

2. “Warning: Two-Tier System”: The Google Bus and the Implications of Privatized Urban Transportation



Figure 2.1: Anti-Google Bus stickers in the streets of the Mission, 2014

The Battle of the Buses

Beginning in the mid-2010s as a new tech boom accelerated in the Bay Area, there was increasing awareness and contestation of the presence of private shuttle buses run by large tech companies such as Google, Facebook, Apple, and Yahoo! on the streets of San Francisco. These buses are a corporate perk offered to tech workers, allowing them a car-free commute to points throughout San Francisco and Silicon Valley, as well as the greater Bay Area. By 2013–4 they had become a flashpoint of public protests over the perceived correlation between the influx of new, young, moneyed tech workers, and skyrocketing rents, waves, of eviction, and the displacement of long-standing area communities—particularly communities of color and those of service and public sector workers, and those creating so much of the art and

culture that famously kept San Francisco “weird.”

I became interested in the phenomenon of the buses and the protests over them, as they seemed to represent a visual touchstone for diffuse effects of wealth and power happening out of the purview of the average resident, as well as a material manifestation of the impact of network-driven ideology on the urban space of the Bay Area. In this chapter I examine these aspects of the Battle of the Buses, but also hope to extend them into a broader regional argument that considers the effects seen in microcosm in the streets of San Francisco across the multi-city urban region around them. In this case study, I see evidence of an ongoing trend towards tech-driven foreclosure of public/collective space—embodied here by the buses as a moveable space of mobility—as well as ongoing processes of socio-economic stratification foreshadowed in the interplay of early information technology companies and the development of the BART system discussed in chapter 1, and carrying forward into the bubble/quarantine logic of the self-driving car and other speculative technologies I will address in chapter 3.

The previously noted dearth of contemporary theorizing on transportation within sociology, geography, and urban planning that can reckon with the complex regionality of the Bay Area presented a challenge in grounding this work in more than the observational. Richard Walker’s in-depth historical analysis of the transformations of the Bay Area in response to the tech economy in *Pictures of a Gone City*, as well as his work with Alex Schafran on the paradigmatic “peculiarities of the Bay Area” as an object of urban study lend tremendous support to the argument I am pursuing. In the

Mobilities literature, Urry and Sheller argue for a social analysis that incorporates the vast scale of contemporary multi-modal mobility, including virtual mobility, and the circulation of ideas, which would superficially seem to accommodate some of what is at question. Beyond this, Prytherch and Cidell's insistence on motion as the constitutive element of contemporary life, and basic unit of urban research laid groundwork on which I can travel. In the Bay Area, it is hard not to see in transportation planned and executed by companies that exist for and on the Internet as a "material form of communication."¹ And yet, it remains critical, as Shannon Mattem and others have cautioned, that this recognition not normalize the incursions of these networks into the built and lived environment.

These "asymmetries of power," in Söderström's words, are produced by linkages of movement, power, and privilege—especially within the network-driven urban imaginary of the Bay Area and the corporate campuses and server farms that propagate it. One cannot ask questions about who is being moved from place to place without also considering whose mobility may be limited, extended, impeded, or eliminated by that movement. Graham and Marvin argue transportation can be seen as tunneling through cities, metaphorically as much as literally, creating networks between "valued parts of the metropolis and drawing them into intense interaction with each other" while less desirable parts of the city are deprioritized or effectively unplugged from the network, creating an uneven urban space-time that contracts for the wealthy

¹ Prytherch and Cidell, "Transportation, Mobilities, and Rethinking Urban Geographies of Flow," 28.

and expands for the poor.² It is visible in the relatively high speed buses that allow tech workers to travel throughout the Bay Area for free (not just between their home communities and campuses), and to nap, work, or socialize, while so many other residents are stuck in traffic or in place due to lack of readily available transit access. Though Graham and Marvin draw on a network logic, they also describe these networks as one aspect of cities produced by complex power relationships between public governance, private entities, citizen organizing, and all the gradations between.

In 2018, Mimi Sheller revisited the mobilities paradigm and expanded her argument to include previously under- or undiscussed questions of transportation justice, drawing on the activism of groups such as The Untokening project.³ She, too, writes about the “space-time compression” of inequitable mobilities: the differential access to movement produced by developments such as paid rush-hour lanes express lanes she argues, privileges “kinetic elites,” typically white and male, whose travel time is considered of higher value. “Having to wait,” she writes, “while others ‘speed’ past, is a form of power.”⁴ She concludes by asking “what if the commons were not just about the sharing of a territory, a space, a resource, or a product... What if we conceived of mobility itself as a commons and the commons as mobile?”⁵ This formulation moves

² Graham and Marvin, *Splintering Urbanism*,

³ The Untokening, <http://www.untokening.org/>

⁴ Sheller, *Mobility Justice*, 115.

⁵ *Ibid*, 524.

the idea of a commons away from property relations, and the mid-nineteenth and -twentieth century grand transportation and infrastructure projects that rendered the common in the form of the “common good,” providing a pretext for eminent domain and endless histories of exclusion and displacement. In its place, a mobile commons is something collective, social, lived, and away from the abstract, purely informational understandings of cities and the movement of people through them—as population flows, data points, and schematic networks.

The City and the Valley: The Tech Shuttle Problem as Bellwether⁶

When Stamen Design mapped the routes of the private buses that ferry tech workers between their homes in San Francisco and their jobs in Silicon Valley for the 2012 Zero I Biennial, their aesthetic choice to render the map as a transit-system schematic made an open secret within San Francisco obvious to the world: that in many ways, the city of San Francisco was being annexed by the suburban tech-industry hubs of Palo Alto, Mountain View, Redwood City, and Menlo Park.⁷ Fleets of buses launched by large tech companies were tunneling through the space time and traffic of the Peninsula, closely linking rapidly gentrifying neighborhoods with suburban corporate campuses and prioritizing their workers over all other San Francisco residents.

⁶ Portions of this section of the chapter were originally published in *Boom: A Journal of California*, in 2014 as an essay, “Mapping Our Disconnect: On the transit system we have, not the one we might have had, or wish we had.”

⁷ Stamen Design, “The City from the Valley: Google, Apple, Facebook buses,” *Stamen.com*, accessed August 1, 2022, <https://stamen.com/work/the-city-from-the-valley>; <https://web.archive.org/web/20160914162541/http://2012.zero1biennial.org/stamen-design>.

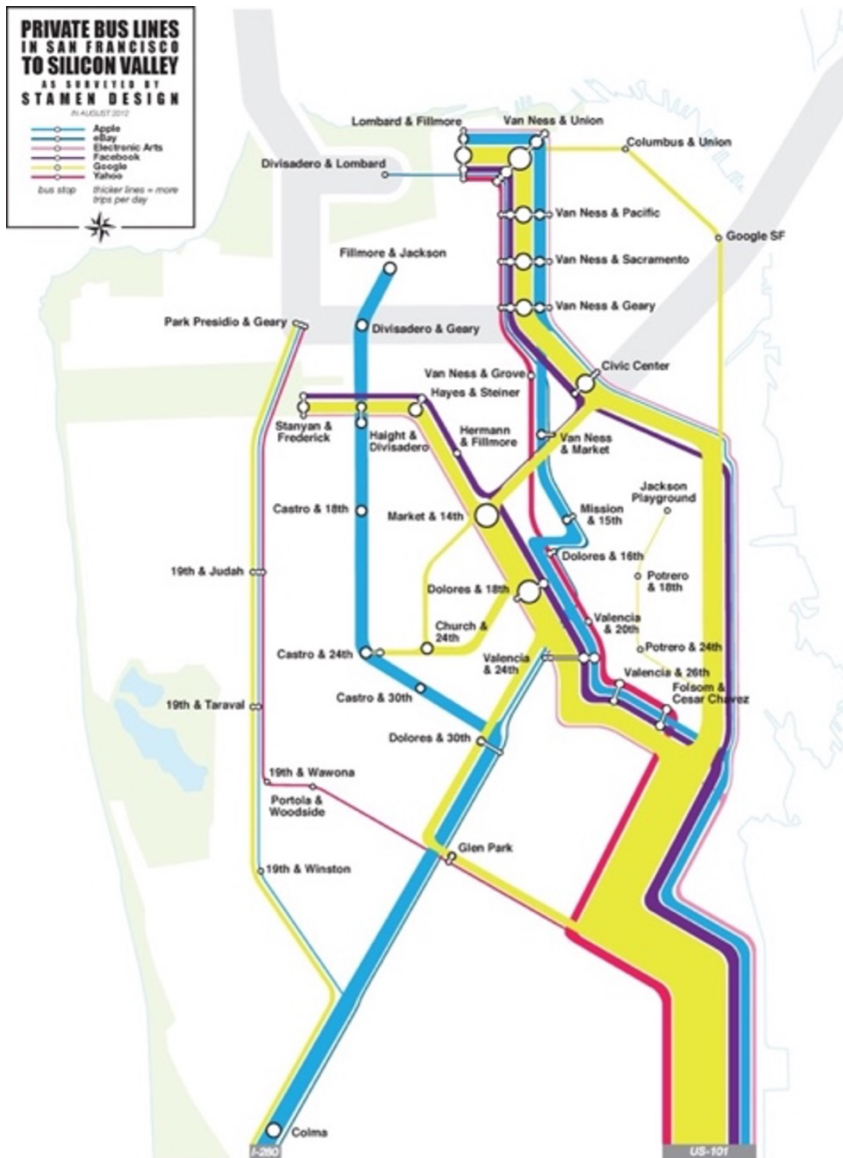


Figure 2.2: Stamen Design, *The City from the Valley* (Stamen Design, 2012)

This map became a flashpoint in the midst of growing unease about escalating housing pressure in the Bay Area, particularly in San Francisco proper, over the course of the 2010s. A contemporary article about Stamen's map in *VentureBeat*, described the arrival of the buses as a net "win," and put them into direct conversation with the region's public transit infrastructure and interest in sustainability:

Stamen estimates that the number of people taking these shuttles is huge: over 14,000 people per day, or 35 percent as many as train service Caltrain, which also runs between San Francisco and Silicon Valley.

That could be a sign that something is not working with public transit. If so many companies are forced to pay buses to carry workers to and fro, it's probably a safe bet the existing train systems aren't convenient enough.

On the other hand, at least those 14,000 people weren't driving their own cars up and down 101 and 280, adding to traffic congestion and pollution.⁸ These three discursive elements—privatized innovation, the failure of inefficient public infrastructure, and superficial corporate greening—became central elements of debate over regional transportation and gentrification over the next decade. The first two, of course, are familiar from both the planning of the BART system, and the almost immediate critique of its failures and bureaucratic bloat.

But the linkage between the buses and a wished-for but unrealized mobility in the Bay Area was also apparent to non-techies, along with a clear sense of being on the outside of radical shifts in the nature of their communities. In a post on the popular sci-fi culture website *io9*, San Franciscan and speculative futurist Annalee Newitz wrote of the buses that they were reserved for “techno-elites”:

Companies do not publicize these bus lines, and indeed these companies actively discourage people from finding out about them. Undoubtedly, they fear that ordinary people who just want to get around in San Francisco will mistake them for public transit and try to pay a couple of bucks take one of the many empty seats.⁹

⁸ Dylan Tweney, “Shuttle buses taking over Silicon Valley, awesome visualization shows” *VentureBeat*, September 24, 2012, <https://venturebeat.com/offbeat/shuttle-buses-taking-over-silicon-valley-awesome-visualization-shows>.

⁹ Annalee Newitz, “The hidden bus routes in San Francisco that are only for techno-elites,” *io9*, January 16, 2013, <https://io9.gizmodo.com/the-hidden-bus-routes-in-san-francisco-that-are-only-fo-5976477>.

Indeed, the "Google buses" had accrued the aura of an urban myth since they began running in 2006. At the time there was a vague sense of their increasing presence, but little knowledge about how many of the large, unmarked motorcoaches blended in with the tourist traffic on city streets. The buses were mentioned in jealous grumbles by those without a free, fast commute, and more angrily when the arrival of the buses was implicated in unending rises in rents, or when their outsize bulk bottomed out on the city's precipitous hills. Residents would only be alerted to the debut of a tech-shuttle stop in their area by the sudden appearance of huddles of young, mostly cis-male, mostly white techies in suspiciously expensive jeans and hoodies clutching phones and tablets. This would be followed in due course, it seemed to many, by fancy coffee bars and craft eateries replacing neighborhood institutions and corner stores, and accelerating increases in rents, then in evictions.

All this upheaval accommodated Silicon Valley workers' desire to live in a "vibrant, hip" urban center, despite spending 60-80 hours per week of their lives working within the confines of massive suburban campuses where everything from meals to haircuts and car care were provided on site, to prevent workers leaving the corporate bubble. In 2010, the Director of the San Francisco County Transportation Authority (SFCTA), José Luis Moscovich, echoed Langdon Winner in attributing the rise of the tech-company shuttles to the cultural blankness of the Valley. "Silicon Valley is not providing the quality of life or entertainment or recreation or cultural choices that [tech workers] would like to have available to them," Moscovich told *Streetsblog*. "I think that transportation is fundamentally an activity that derives from economic activity. To

the degree that people continue to make locational decisions based on those factors, we're probably going to see a growth of private shuttles as employers mold themselves to the needs of their employees."¹⁰



Figure 2.3: Documentation from 2013 of commuters waiting for the Facebook bus at 24th and Valencia in the Mission, ignoring the mural *Roots and Frequencies Basic to Our Education* (1994) by Marta Ayala.

Sometimes these tiny flash mobs would appear at Muni stops, but never board the public buses and streetcars, waiting instead for the white or silver monoliths bearing cryptic codes (GBUS to MTV [Google Bus to Mountain View]) that would lumber in to collect them, often idling along curbs marked for city vehicles and actively impeding public transit. The municipal government was seemingly such an afterthought for the companies operating these buses that the San Francisco Municipal Transportation

¹⁰ Matt Baume, "New Study Recommends Augmenting the Benefits of Private Shuttle Service," *Streetsblog*, July 26, 2010, <https://sf.streetsblog.org/2010/07/26/new-study-recommends-augmenting-the-benefits-of-private-shuttle-service/>.

Authority (SFMTA) had to request Stamen's 2012 data—gathered by a squad of bike messengers paid to tail the buses from locations gleaned from Foursquare logins—because they were unsure how many tech shuttles were traveling city streets and using Muni stops to pick up and drop off workers.¹¹

“There are hundreds of luxury buses serving mega-corporations down the peninsula, but we refer to them in the singular, as the Google Bus,” Rebecca Solnit wrote in a piece in the *London Review of Books* shortly after the appearance of Stamen's map, “and we—by which I mean people I know, people who've lived here a while, and mostly people who don't work in the industry—talk about them a lot. Parisians probably talked about the Prussian army a lot too, in the day.”¹² The buses had become a synecdoche for all the ways that the most recent tech boom was and is altering San Francisco. With a plan in hand that showed not only where many of the buses stopped but how often, more San Franciscans had a sense of the impact of the tech shuttles. By adding width to the lines to convey the volume of riders, Stamen's map also gave a sense of scale and frequency of the tech shuttle routes, using a graphic technique first used by Charles Joseph Minard to chart Napoleon's campaign against Russia and eventual retreat with a much-diminished army. By compressing the routes of Google, Apple, Facebook, Yahoo!, and eBay into a single visualization, Stamen's design made it possible to argue that these routes constituted a de-facto transit system using city bus stops to move tens of thousands of people each day.

¹¹ Stamen Design, “The City from the Valley.”

¹² Rebecca Solnit, “Get Off the Bus,” *London Review of Books*, February 20, 2014
<https://www.lrb.co.uk/the-paper/v36/n04/rebecca-solnit/diary>.

Marty Lev, Google's VP of Safety, Security, and Transportation had said back in 2007, when the Google buses carried only 1,200 employees daily: "We are basically running a small municipal transit agency."¹³ By 2014, the number of riders of all tech shuttles in the city had grown to more than 20 times that, roughly equivalent to the number of daily passengers on Caltrain, ferried on a disorganized fleet of 750 buses. By early 2020, before the covid-19 pandemic, there were at least 1,020 shuttles plying the region's streets and freeways daily, as one news article put it "a private transportation system worth more than \$250 million," which effectively constituted the seventh-largest transit agency in the region.¹⁴ As public objections increased, the SFMTA created a project group to assess the scope of the issue at a series of open houses and public hearings. I attended two open houses regarding the locations of proposed shuttle stops, and listened to comment after comment from residents who had witnessed buses parked in bus stops and bike lanes, or idling for hours; and others registering complaints about the effect of the buses on rents, evictions, and business closures, all of which were recorded by beleaguered-looking SFMTA staff.

The group also collected information about how many private shuttles were operating in the city, including intra-city shuttles from businesses, schools, and universities, as well as stopping locations and frequency of vehicles, towards the idea of establishing a permit system that would make official the shuttles' ad hoc use of city

¹³ Miguel Helft, "Google's Buses Help its Workers Beat the Rush," *New York Times*, March 10, 2007, <https://www.nytimes.com/2007/03/10/technology/10google.html>.

¹⁴ Zara Stone, "Inside a Secretive \$250 Million Private Transit System Just for Techies," *OneZero*, February 24, 2020, <https://onezero.medium.com/only-the-elite-have-nice-commutes-in-silicon-valley-8b2761863925>.

infrastructure. Meanwhile, tech bus stops in San Francisco and the East Bay were the focus of direct action protests. Creative interventions led by local affordable housing organizers and tenants unions included an April Fool's stunt announcing the launch of "GMUNI," ostensibly making the private shuttles available to the general public. Another blocked in Google Buses whose sides were then papered with banners advertising their "Gentrification and Eviction Technologies" in Google's childlike primary-color scheme. Buses were barricaded with sawhorses bearing placards that read: "Warning: two-tier system," or "Warning: private use of public infrastructure." Other protests opted for the more direct message of smashed windows.¹⁵ Public discontent intensified on reports that the permit program was going to charge the tech companies nothing for their use of city streets and curbs, and later, only a pittance of \$1 per stop.¹⁶



¹⁵ Protests spiked again in 2016, and in 2018. <https://mashable.com/article/google-bus-attacked>; <https://www.nytimes.com/2018/05/31/us/google-bus-protest.html>.

¹⁶ ABC 7 News, "Acrobats, activists block Google bus in Mission District," ABC7News.com, April 1, 2014, <http://abc7news.com/technology/acrobats-activists-block-google-bus-in-mission-district/22919/>; Michael Cabanatuan and Kurtis Alexander, "Google bus backlash: S.F. to impose fees on tech shuttles Agency's restrictions, charges unlikely to silence vocal critics," *SFGate*, January 21, 2014, <https://www.sfgate.com/bayarea/article/Google-bus-backlash-S-F-to-impose-fees-on-tech-5163759.php>.



Figures 2.4–5: Documentation from an April 2014 anti-Google Bus protest, protesting the eviction of multiple tenants, including public school teachers, a single mother, and senior citizens, from a building owned by Google lawyer Jack Halprin.

The situation became so contentious that Google distributed a memo to employees with a list of talking points to use in conversation with locals and during the public comment process of the pilot program:

- *I am so proud to live in San Francisco and be a part of this community
- *I support local and small businesses in my neighborhood on a regular basis
- *My shuttle empowers my colleagues and I to reduce our carbon emissions by removing cars from the road
- *If the shuttle program didn't exist, I would continue to live in San Francisco and drive to work on the peninsula
- *I am a shuttle rider, SF resident, and I volunteer at.
- *Because of the above, I urge the Board to adopt this pilot as a reasonable step in the right direction¹⁷

To Google's Transportation Team, the stakes of the permit program and of a unified response to public condemnation were obvious. Yet tech workers inconvenienced by blockades or discomfited by their sudden visibility often professed confusion that they,

¹⁷ Alexia Tsotsis, "Google's "High Handed" Bus Memo," *TechCrunch*, January 20, 2014, <https://techcrunch.com/2014/01/20/google-sends-high-handed-memo-with-busing-talking-points>.

lowly wage workers, were the subject of protests when surely the real villains were their billionaire employers. Others were quick to denounce the protestors as luddites standing in the way of progress, and choking on jealousy that they lacked the necessary skills to access the elite realms of tech work.



Figure 2.6: Meme shared by tech workers on Reddit in 2014.

A comment on a Reddit thread from 2014 is typical of the snarky attitude barely concealed below the corporate talking points:

All you people opposed to these busses are selfish assholes. If you had the brains to work at Google, you would be lining up at that bus stop, latte in hand. So get off your high horse and try changing the workplace you have instead of destroying others'.¹⁸

¹⁸Reddit, "To Those Protesting the Google Bus in San Francisco," https://www.reddit.com/r/AdviceAnimals/comments/2bj5m6/to_those_protesting_the_google_bus_in_sa

Writing about transit protests that have increased in frequency over the past few years, particularly during pandemic shutdowns and the racial justice movements of spring and summer 2020, Enright argues that such protests “reveal transit systems as institutions engineered for social control, but also as essential sites of collective action and resistance. Struggles over transportation signal infrastructure in general as an important lever of social change and they suggest that mobilizing for mobility in particular is essential to effecting equality, freedom, democracy, and in many cases, the simple continuation of life itself.” Protests such as those around the tech shuttles and other new and exclusionary forms of transit are not about bitterness or resistance to necessary and inevitable change, but “the substantive capacity to manage the logistical apparatuses and organizational spaces [the infrastructure] that comprise contemporary cities.”¹⁹ In this, the motivations of movements like the tech bus protests align with Sheller’s logic of “the commons as mobile.”²⁰ If the space of transportation is part of the commons, then by extension, the right to the city extends to the right to movement within it. Attoh, among other critical urbanists, calls for transportation struggles to be acknowledged for what they are, Lefebvrian contestation over “who should have the benefit of the city and what kind of city it should be.”²¹

In 2017, the pilot shuttle program was made permanent and the tech buses did, in fact, become an official part of San Francisco’s transit grid. A lawsuit brought by a number of local organizations and labor unions requesting a thorough environmental

¹⁹ Theresa Enright, “Commotion,” *Society + Space*, October 8, 2020, <https://www.societyandspace.org/articles/commotion>.

²⁰ Sheller, *Mobility Justice*, 524.

²¹ Attoh, *Rights in Transit* (2019), 7.

impact study before approval, was thrown out by the judge in half an hour as “moot.”²² The map that Stamen created in 2012 is now mirrored by an interactive ArcGIS map on the SFMTA website, indicating the locations of the 135 permitted shuttle stops, with green lines documenting the streets buses are allowed to travel. While the program included some gains for the community—fees per stop were increased to \$7.31; massive double-decker coaches are only permitted on major thoroughfares, not side streets; and shuttles must not interfere with the functioning of public transportation—these are widely considered insufficient compensation for the damage caused to long-term residents, public-sector and service workers, communities of color, and other groups living well outside of the \$117,000 per year that was considered median-to-low-income for the region by 2018.²³ John Avalos, a city council member representing the Excelsior, was among the first to call for regulation of the buses, and described them in an interview as a clear indicator of the wealth coming into the community “remaining in fewer and fewer hands,” mostly those of recent arrivals who had displaced long-term residents of his district.²⁴ Tenants I interviewed in the Mission, several of them teachers in the local public schools, described a steady outflow of their colleagues to communities far outside the city, some as far as Martinez in Contra Costa county, a round-trip commute of up to four hours a day. Faced with such obstacles many

²² Joe Fitzgerald Rodriguez, “Lawsuit against tech bus program fails in SF court,” *San Francisco Examiner*, April 28, 2016, <https://www.sfexaminer.com/news/lawsuit-against-tech-bus-program-fails-in-sf-court>.

²³ SFMTA, “Commuter Shuttle Map,” *SFMTA.com*, accessed August 2, 2022, <https://www.sfmta.com/maps/commuter-shuttle-program-interactive-map>; Emmie Martin, “In San Francisco, households earning \$117,000 qualify as ‘low income,’” *CNBC*, June 28, 2018, <https://www.cNBC.com/2018/06/28/families-earning-117000-qualify-as-low-income-in-san-francisco.html>.

²⁴ Interview with John Avalos, 2014.

teachers, first responders, SFMTA employees, and other vital but underpaid workers had no choice but to leave the city or region altogether.²⁵

Research by planners and geographers studying the escalating crisis suggests that the arrival of the buses was not merely a visible index of tech-driven gentrification—as a housing activist living in SOMA put it: “a slap in the face of the community”—but that it directly correlated to the rises in rents and evictions observed by so many residents of affected neighborhoods.²⁶ Research by Alexandra Goldman, of UC Berkeley’s School of Urban and Regional Planning, on the effect of the shuttles on the local housing market showed that rent increases of more than 20 percent were correlated with the locations of tech bus stops. Urbanists Matthew Palm and Deb Neimeier went farther, establishing a negative correlation between rents and distance from a tech-bus stop, as well as a statistically significant link between rents and the number of tech-industry jobs available within a 45-minute bus trip from a given location, results which were not matched by the number of jobs available within a 45-minute car trip.²⁷ The Anti-Eviction Mapping project, launched by a coalition of tenant advocates and researchers who were also involved in the anti-bus protests, documented that from 2011–13, 69 percent of no-fault evictions in San Francisco occurred within four blocks of a tech bus stop.²⁸

²⁵ Dana Goldstein, “The Fight to Keep Teachers in Tech Hubs From Being Priced Out,” *New York Times*, January 4, 2019, <https://www.nytimes.com/2019/01/04/us/teachers-priced-out-tech-hubs.html>.

²⁶ Interview with Teresa Dulalas, 2013.

²⁷ Matthew Palm and Deb Neimeier, “Measuring the Effect of Private Transport Job Accessibility on Rents: The Case of San Francisco’s Tech Shuttles,” *Transport Findings*, February 15, 2019: 3, <https://doi.org/10.32866/5100>.

²⁸ Anti-Eviction Mapping Project, “Tech Bus Stops and Evictions, San Francisco,” *Antievictionmap.com*, September 25, 2015, <https://antievictionmap.com/blog/tech-bus-stops-and-evictions-san-francisco>.

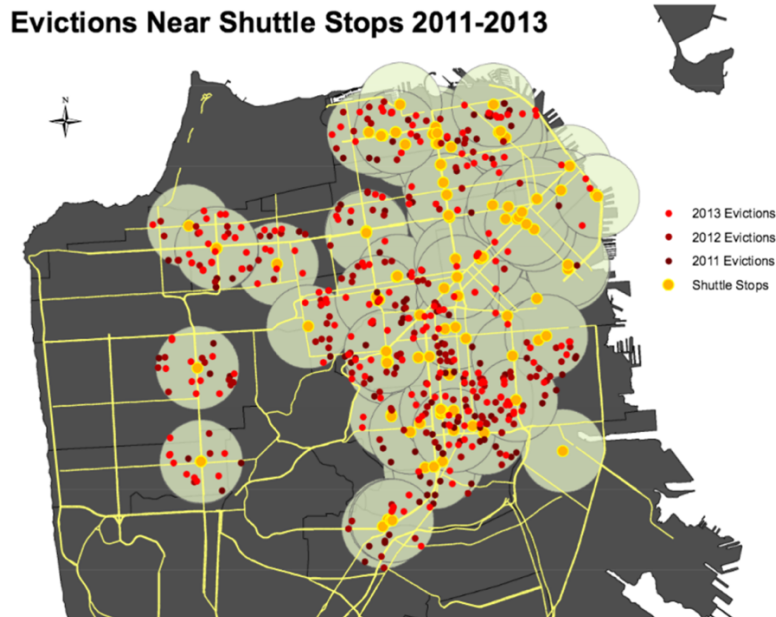


Figure 2.7: Anti-Eviction Mapping Project map correlating evictions and tech shuttle stops, 2014.

Goldman also reported that prior to the shuttle program, 90 percent of tech shuttle stops were made in locations reserved for SFMTA vehicles. In 2017, a Facebook employee answering a Quora question about shuttle commutes and neighborhoods in the Bay Area opined:

I took the shuttle for about two years. I chose my apartment so I could be close to a stop, and that part is pretty important in the shuttle experience imo [in my opinion]. ...In my case, I only had to walk 5 minutes or less downhill. Then a bus comes where you're guaranteed a comfortable seat and wi-fi access (which sometimes doesn't work great, but there are worse problems). And the bus drops you exactly where you need to be— there's no need to worry about missing a connection or anything, so you can read, sleep...You don't really have to remain vigilant the whole time...After Facebook I worked in a small (shuttle less [sic]) startup in mountain view. That made me appreciate how superlatively wonderful the shuttle experience is compared to public transportation (2 hours+ each way and much more stressful).²⁹

²⁹ Quora, “As a Facebook employee commuting from SF to Menlo Park, what is some qualitative feedback on what the shuttle ride is like?” <https://www.quora.com/As-a-Facebook-employee-commuting-from-SF-to-Menlo-Park-what-is-some-qualitative-feedback-on-what-the-shuttle-ride-is-like>.

In the past twenty years, officially planned and zoned transit-oriented development (TOD) projects, which attempt to locate development of both housing and commercial retail clusters near transit stations, have dominated conversations about urban development, transportation, and growth. The California Department of Transportation describes such projects as “a moderate to high-density development (either new construction or redevelopment) within an easy walk of a major transit stop, with a mix of residences, employment, and shops.”³⁰ There purported benefits of such developments are many, from limiting sprawl, easing congestion, and supporting transit ridership, to providing infill that might support increased affordable housing. But as Karen Chapple and Anastasia Loukaitou-Sideris discusses, there is a “dark side” to TOD, principally that “such projects contribute to increases in land and property values,” and therefore “may be more susceptible to gentrification and displacement and thus detrimental to the households that depend on transit the most.”³¹ As Pollack, Bluestone, and Billingham detail in their study of the changing demographics of TOD areas and the development of new public transit: “Newly transit-served neighborhoods not only grow—they change. After a transit station goes into operation, the typical neighborhood resident is wealthier and housing stock more expensive, two indicators of gentrification.”³² I argue that these same dynamics apply to neighborhoods now

³⁰ California Department of Transportation, “Baselines: Current and Future Transit and Demographic Trends,” Prepared for the California Statewide Transit Strategic Plan. (Sacramento: California Department of Transportation, 2011), http://www.dot.ca.gov/hq/MassTrans/STSP/Baselines_Report_071911.pdf, 43.

³¹ Karen Chapple and Anastasia Loukaitou-Sideris, *Transit-Oriented Development or Community Dividends: Understanding the Effects of Smarter Growth on Communities* (Cambridge, MA: The MIT Press, 2019), 38.

³² Stephanie Pollack, Barry Bluestone, and Chase Billingham, “Maintaining Diversity in America’s Transit-Rich Neighborhoods: Tools for Equitable Neighborhood Change,” Dukakis Center for Urban and Regional Policy, October 2010, 30.

served by tech bus stops, but in a less official and visible way, which allows even less opportunity for community decision-making or opposition to the effects of these changes, as there was in the Mission against the proposed planning around BART in the 1970s.

In many ways, the tech shuttles resemble a more socially filtered form of bus rapid transit (BRT) networks built in many cities since the 1990s with the intent to capture the market share of choice riders—those with the means to commute in other ways—versus transit-dependent riders: the poor, marginalized, elderly, and/or disabled, who rely on transit for mobility and might be best served by TOD. In 2020, transit planner Christof Spieler wrote that to lure choice ridership, transit agencies “needed to provide great service—shiny new rail lines, and limited-stop express commuter buses—that had to be fast, reliable, comfortable and safe to get people out of their cars.”³³ If this contemporary description feels like an echo of the aesthetic and social considerations that were made during the BART campaign to secure the ridership of wealthy, white suburbanites, that is no accident, as the logics applied are largely congruent. The central difference is that in this case the tech shuttles’s “bus rapid transit” is not even nominally public.

If a foreseeable outcome of the addition of new public transit to a neighborhood is the rapid gentrification, property speculation, and eviction identified by Pollack et al, then adding transit systems that freely and exclusively serve those who are

³³ Christof Spieler, “Racism has shaped public transit, and it’s riddled with inequities,” *Urban Edge* August 24, 2020, <https://kinder.rice.edu/urbanedge/2020/08/24/transportation-racism-has-shaped-public-transit-america-inequalities>.

already privileged can only amplify this effect.³⁴ The ability of regions to undertake the kind of policy-making that can prevent these effects, however, rests on clear communication and transparency between all the actors intersecting in the space of an urban area—and the recognition that they are all parts of the same physical community, sharing space and collective priorities. It is now a widely accepted criticism of TOD that it has too often contributed to gentrification and displacement, as literatures on smart growth, transit, and regional planning have failed to adequately address existing communities, and the overlapping impacts of poverty and race.³⁵

While the tech shuttles are now a non-public part of the San Francisco public transit grid, the reluctance of the tech companies that run buses to share any information about their operations with the SFMTA has not changed. A 2020 article described tech companies as being far from forthcoming about their buses or the routes they travel, despite the city's shuttle permit program, citing “concerns around data sharing [tied] to safety and protecting workers who previously felt assaulted and attacked.” As recently as 2018, the Santa Clara Valley Transit Authority “had to sift through hidden-camera footage to ascertain shuttle use on its highways. ‘The best we can do is spy on them in video cameras,’ Adam Burger, the VTA’s transport planner, told his board.”³⁶ Prior to the tech bus protests, Google and other companies had touted their shuttle programs on their corporate websites, described them in glowing terms to the press, and made a public case for their sustainability. A 2012 guide to employer-

³⁴ Pollack et al, “Maintaining Diversity in America’s Transit-Rich Neighborhoods,” 30.

³⁵ Chapple and Loukaitou-Sideris, *Transit-Oriented Displacement or Community Dividends*, 4, 30, 40.

³⁶ Stone, “Inside a Secretive \$250 Million Private Transit System Just for Techies.”

sponsored transportation plans included details on the extent of Apple, Google, and Yahoo!'s operations at the time.³⁷ The same year a *New York* magazine writer was able to interview those in charge of multiple bus programs. Brendon Harrington, Google's director of transportation programs, discussed the buses' carbon savings, solar powered charging stations, and reductions in single-car trips. The clear message was that the benefit of the shuttles was environmental first, and work productivity second.³⁸

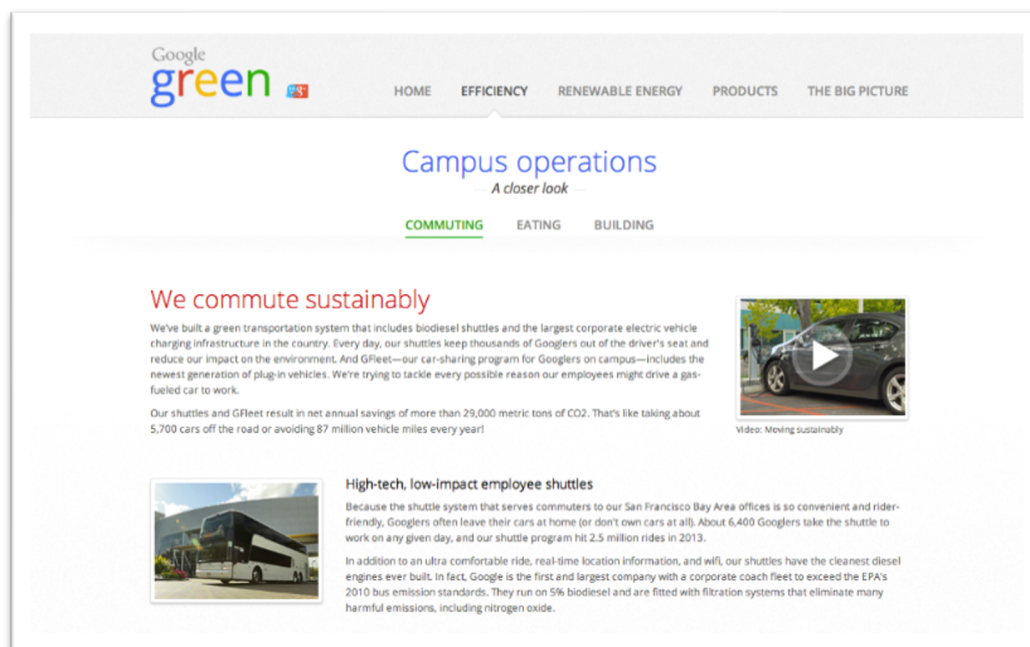


Figure 2.8: the Google Green website (Google, 2014).

Before the protests, Google's "Google Green" initiative website included information about the company fleet of "ultra-comfortable" and clean employee shuttles. Google Green, however, was later rebranded Google Sustainability, and

³⁷ Community Transportation Association of America, "Success Stories of Employer-Sponsored Transportation Programs," August, 2012, http://www.ctaa.org/webmodules/webarticles/articlefiles/2014_SuccessStoriesEmpTranspPrograms.pdf.

³⁸ Kevin Roose, "The Commuter Kings: Riding Along on Silicon Valley's Exclusive Shuttles," *New York* December 6, 2012, <https://nymag.com/intelligencer/2012/12/silicon-valleys-exclusive-shuttles.html>.

information about the bus network is now nowhere to be found. Apple's 2019 Environmental Responsibility Report goes into great detail about its low-carbon and plastic-reduction initiatives, but the only trace of its commuter bus program appears in one line of a data set of carbon emissions that lists the "business fleet."³⁹ The full extent of a company's shuttle network may not even be visible to employees, who are sometimes informed by "commute counselors" about which stops are available to them.⁴⁰ In considering the tech shuttles in a 2010 study on their effects on transportation within San Francisco, the SFCTA was optimistic about both their environmental benefits and the possibility that they could be increased by eliminating redundant buses traveling identical routes; the SFCTA claimed that "many shuttle operators expressed an interest in consolidating operations." No such consolidation ever occurred.⁴¹

The culture of the large Silicon Valley tech companies, broadly, is one of secrecy, insularity, and competition. In the same way that the corporate campuses intentionally bunker themselves against their surrounding communities, preferring to create a filtered "public" space for the use of workers only, those in charge of the corporate transportation programs see the bus networks as roving extensions of the campuses—a "public transit" system for employees only. In a piece for *The Point* magazine, essayist Min Li Chan, then a tech worker commuting from San Francisco wrote:

"From the moment I leave my apartment in the morning to take the bus, I'm exclusively among my own kind... This setup hearkens to the platonic ideal of the corporation—the idea that the corporation is, as the writer

³⁹ Apple, "Environmental Sustainability Report," (Cupertino, CA: Apple, 2019), https://www.apple.com/environment/pdf/Apple_Environmental_Responsibility_Report_2019.pdf, 58.

⁴⁰ Lauren Hepler, "Silicon Valley's new extreme: The 2:30 a.m. tech bus from Salida," *Protocol*, February 5, 2020, <https://www.protocol.com/silicon-valley-tech-shuttles>.

⁴¹ Baume, "New Study Recommends Augmenting the Benefits of Private Shuttle Service."

George Saunders once recounted, a “beautiful contemporary construct ... where if you just produce, you would be protected.” In the model propagated by progressive tech companies, labor is reframed as talent that warrants nurturing, against the backdrop of a support structure that includes free meals, on-site health care, education stipends, generous vacation and parental-leave policies, and yes, the double-decker bus that transports you to and from your office. There is nothing left to do but one’s life’s work. The flip side of tech’s protective cocoon is the insularity that allows tech workers like me to bypass the quotidian experiences that would otherwise connect us with the physical communities surrounding our homes and workplaces.⁴²

Tech workers I interviewed who rode the Google and Facebook buses provided details about the amenities of these “protective cocoons”—leather seats, fast wi-fi, water and snacks, a protected environment in which they could clock extra work hours and confer with colleagues—in the same terms they used for the campuses themselves.

An engineer working at a Google campus in the Valley wireframed a scene that corresponds directly to Turner’s description of Facebook headquarters as an ersatz public sphere. There was a pool, basketball courts, a salon, yoga classes, massages on demand, multiple cafés and restaurants, relaxation and collaboration nooks that resembled hipster coffee bars and lounges, and bright murals and installation art throughout the property. All of these elements, along with the naïvely bright Google logo colors used as a unifying design theme, are intended to create a sense of sociality, and a youthful, anti-establishment kind of work environment. At the same time, the engineer described visibly color-coded RFID badges that employees wore at all times and which readily identified them as salaried, contract, temp, or hourly workers. Differing levels of perks were accessible to workers based on their employment tier—e.g.

⁴² Min Li Chan, “The Google Bus,” *The Point*, July 19, 2017, <https://thepointmag.com/examined-life/the-google-bus>.

contract workers like the engineer could use the massage chairs, but not book a hands-on massage, and might or might not be able to ride the bus network. An hourly-wage kitchen staff member I spoke with felt completely excluded from the corporate largesse and described feeling “like a second-class citizen,” barred from accessing any of the benefits available to full-time employees.

Artist Andrew Norman Wilson's 2011 film *Workers Leaving the Googleplex* documents his interactions with Google supervisors and security when he, a red-badged contract employee working on Google video projects, dared to speak with and film the yellow-badged hourly workers of the Google Books-digitizing ScanOps project, and was summarily dismissed from the company.⁴³ He reports that, at the time, full-time employees had white badges, interns wore green badges, contract workers like himself, red, and a “fourth class” of “strictly data-entry labor,” yellow badges. Wilson states that his red badge granted him access to all the advantages that full-time employees enjoyed, except for “ski trips, Disneyland adventures, stock options, and holiday bonuses.” The ScanOps workers, however, were prohibited from taking advantage of company perks such as the buses and free meals, despite also being contract laborers, and were on a 4am–2pm shift, staggered from other divisions. Wilson's account and filmed documentation show that the majority of the yellow-badge workers were people of color, and many of them are seen leaving the campus by car.

To enforce these social distinctions, Google encouraged staff members to self-police and to report employees acting out of turn, or worse, interlopers from the

⁴³ Andrew Norman Wilson, *Workers Leaving the Googleplex*, 2011, color video, <http://www.andrewnormanwilson.com/WorkersGoogleplex.html>.

general public. The engineer I interviewed explained how, alongside street art-style murals and Arduino-enabled installations, Googleplex walls were adorned with posters warning staff to look out for “tailgaters”: those attempting to siphon corporate perks reserved for chosen staff and/or eavesdrop on conversations that might reveal projects in development. This policy was phased out in 2020, mid-pandemic while no one was working in-office anyway, with Google CEO Sundar Pichai acknowledging the possibility that such policies could lead to POC staff, in particular Black employees, being unfairly policed.⁴⁴ Up until that point, though, my interviewee described it contributing to an environment of “constant defensiveness and paranoia.” Wilson attempted to meet and interview some of the ScanOps team after approaching them in the shared parking lot of their adjacent buildings at the Googleplex, and was later fired when one of the ScanOps employees “followed the instructions on the back of her badge...to call a certain manager [also a red-badged contract worker], if anyone asks about the work of the yellow-badge class.”

In keeping with this, it is not surprising that, despite all the fail-safes to keep out unwanted, some kinds of tech work are still not allowed on the corporate buses. An Apple dev wrote about working on the company bus in 2015, describing a virtual ouroboros of suspicion and non-disclosure:

You can have things that you can physically do on the bus, but if they involve a secret project of some sort that people could see then you can't do them on the bus (so no UI [user interface] work on the bus if it involves new UI, even if your part isn't UI, or at least not new UI, but you need to run the stuff

⁴⁴ Paresh Dave, “Google sets 2025 leadership diversity goal, ends 'tailgater' ID checks,” *Reuters*, June 17, 2020, <https://www.reuters.com/article/us-minneapolis-police-google/google-sets-2025-leadership-diversity-goal-ends-tailgater-id-checks-idUSKBN23O3EA>.

with new UI to test it, no dice). The bus may be full of Apple employees, but it is extremely likely that they are not all disclosed on the same projects.⁴⁵

Jason Henderson, who has comprehensively chronicled the history of contestations over mobility in San Francisco, describes the city as a place that, despite its progressive veneer, has a strong neoliberal political bent that has often prioritized business investment and public/private partnerships over public infrastructure spending. Moreover, he finds that there is a conservative ideology of mobility at play in SF politics that privileges automobility, street use for parking, and individual movement within the city over collective, subsidized modes of transport. Arguing that all regimes of mobility are inherently ideological, he sees in neoliberal/conservative mobilities—such as the tech company shuttles and their official inclusion in regional transit—the “separation of infrastructure into premium and basic mobility. Premium mobility networks include exclusive urban spaces that are islands of wealth and power connected by electronic express toll lanes and congestion charging zones where one pays a fee to drive into certain parts of cities, new, premium high-speed rail and luxury motor coach bus service.” Henderson describes this premium urban spatiality and temporality available only to the wealthy as “an intensive political withdrawal from collective forms of action like public transit in favor of personal mobility and secession from the public sphere.”⁴⁶

In an article linking mobility to Lefebvre and Harvey’s “right to the city”

Henderson directly addresses the private tech shuttles as an example of this secession.

⁴⁵ Quora, “Is time on the Apple bus considered time at work?” <https://www.quora.com/Is-time-on-the-Apple-bus-considered-time-at-work>.

⁴⁶ Henderson, *Street Fight*, 26–7.

The “Google bus” networks, he writes, are a “shadow industry solution’ to declining public transit.” He asserts that private buses are entirely “consistent with the broader agenda of the privatization of space and market-based pricing of public access to space.”⁴⁷ In this Henderson again sees troubling signs of segregated networks of mobility—separated into luxury and economy tiers. Don Mitchell, writing from the perspective of the Bush-administration years of the 2000s, called this “SUV citizenship”: a fundamentally conservative mode of interaction, grounded in era court rulings that instantiated the “right to be left alone” in public space. Mitchell recasts this, correctly, as “the right to exclude” and describes this right to extreme individuation from other members of the same community using the metaphor of the fuel-inefficient, bloated sport-utility vehicles (SUVs) that were emblematic of the time. “Cocooned in a sealed chamber, behind tinted glass, with the temperature fully controlled, and the GPS system tracking, and sometimes dictating, our every turn, our every stop and start, we are radically isolated from each other, able to communicate only through the false connectedness of the cell phone. We ride high and sovereign; we are masters of space; we are safe against all who might intrude, all who might stand in our way.”⁴⁸ There is little to differentiate Mitchell’s description of SUV citizens from the ridership of the tech buses, perched above the heads of car commuters in comfort while others are behind the wheel, traveling express while those on regional transit make all local stops or idle

⁴⁷ Henderson, “From Climate Fight to Street Fight,” 110–1.

⁴⁸ Don Mitchell, “The S.U.V. model of citizenship: floating bubbles, buffer zones, and the rise of the ‘purely atomic’ individual,” *Political Geography* 24, (2005): 96–7, [doi:10.1016/j.polgeo.2004.06.003](https://doi.org/10.1016/j.polgeo.2004.06.003).

on the platform. The right to exclude in this case is enforced spatially by the confines of the shuttles, and economically by company credentials required to board.

While it is true that large numbers of commuters traveling by bus is preferable to them traveling in individual gas-guzzling SUVs, and that the buses are a collective mode of transportation, at least within the collectivity of the corporation, arguments about the “sustainability” of the buses quickly fade when weighed against their many impacts on the stability of the communities they serve. They epitomize what Daniel Aldana Cohen calls “luxury ecologies”—neoliberal strategies serving the professional class and “creative” industries. This distinction perhaps helps to separate the class hierarchy of the tech shuttles from less formal “democratic ecologies” of shared transit like jitneys, vanpools, and community-organized shuttles such as those that serve dispersed Chinese-immigrant communities in many large US cities.⁴⁹ In the course of pursuing my research I have fielded more than one question that draws connections between the Google buses and these low-infrastructure, often public-private or entirely private transportation options, as they are fast, flexible, emissions-saving, and easily rerouted based on community need. Is it not “luddite” to object?

To respond to those questions, a theoretical framework that can address not just the how or how many of transit ridership, but also who is being served and with what corollary impacts, becomes vital. It is not the formality or informality of these networks that I am questioning; it is, in the case of the tech shuttles (and BART, and the

⁴⁹ Daniel Aldana Cohen, “The Other Low-Carbon Protagonists: Poor People’s Movements and Climate Politics in São Paulo,” in *The City is the Factory: New Solidarities and Spatial Strategies in an Urban Age*, ed. Miriam Greenberg and Penny Lewis (Ithaca, NY: Cornell University Press, 2017), 149.

ride-hailing services I will discuss in chapter 3), the bias and exclusion built into their design. Despite the vaunted ingenuity of Silicon Valley, the lack of coordination within this system results in multiple buses operated by different companies plying the same routes minutes apart and often traveling partly or mostly empty. Tech firms and the regional governments that enable them claim the buses are “win-win”—preventing traffic, pollution, and further paving of Silicon Valley. The buses do take tens to hundreds of thousands of individual car trips off of the Peninsula’s already overburdened roads, if you accept that employees making \$90,000 per year to start are very likely to otherwise commute by car, and that it’s sustainable for tech workers to live in San Francisco (or Santa Cruz, or Oakland, or San Rafael...) while working 60–80-hour weeks on corporate campuses miles away in Silicon Valley, when they are expected to show up in person.

While the buses reduce corporate carbon emissions, their role in spreading displacement and gentrification increases the regional footprint. Residents forced to relocate farther and farther away from their employment make even longer commutes by car, reflected in the fact that the Bay Area has the highest percentage of “super commuters”—those commuting more than two hours a day—in the nation, almost all whom originate in lower-income communities to the east and south of San Francisco and Silicon Valley. Between 2009 and 2017, the same time period marked by the most recent tech boom and the rollout of the shuttles, the number of super commuters in the Bay Area increased by 126 percent.⁵⁰ In addition, those underserved by drained

⁵⁰ Erin Baldassari, “Bay Area super-commuting growing: Here’s where it’s the worst:

public transit systems are also more likely to commute by car, and car travel has represented a bigger modal share of Bay Area transit every year since mid-century, despite the launch of BART. In a particularly cruel twist, in 2014-15, it was reported that those car commuters include the shuttle drivers themselves, some of whom live as far away as Stockton, a two-hour drive from Silicon Valley. Other bus drivers simply gave up on trying to maintain a residence in the Bay Area and moved into their cars.⁵¹ A janitor at Facebook, one of the hourly-wage workers excluded from company perks such as the buses, reported to *OneZero* that he spent eight percent of his income on transit costs to Menlo Park. At the same time, Facebook was offering its salaried employees a \$10,000 bonus to move closer to work.⁵²

With the exception of Box, none of the large Silicon Valley tech companies appear to have considered subsidizing public transit access for their employees, and few are located near stations on any of the regional systems, in keeping with an overall logic of isolation from the common. Facebook, Google, and Apple's headquarters are all located more than three miles from the nearest transit stops, and both the Googleplex and Facebook HQ are situated in a peri-urban hinterland alongside the San Francisco

Alameda, Contra Costa counties continue to lead the way in the worst Bay Area commutes," *San Jose Mercury News*, September 11, 2019, <https://www.mercurynews.com/2019/09/11/supercommuting-is-not-just-for-central-valley-dwellers-map-shows-growth-in-bay-area-commutes>.

⁵¹ Wendy Lee, "Tech bus drivers forced to live in cars to make ends meet," *San Francisco Chronicle*, September 21, 2015, <https://www.sfchronicle.com/business/article/Tech-bus-drivers-forced-to-live-in-cars-to-make-6517928.php>.

⁵² Reuters, "Facebook offers employees \$10,000 to live close to the office," *Reuters*, December 17, 2015, <https://www.theguardian.com/technology/2015/dec/18/facebook-offers-employees-10000-to-live-close-to-the-office>.

Bay, wedged between industrial parks, freeways, and seas of parking lots.⁵³ An Apple employee interviewed in connection with the SFCTA's 2009–10 study, who described himself as a transit activist said "he used to bike to Caltrain to get to work, but reluctantly switched to the shuttles... 'A lot of people who were driving are now taking the shuttle," he said. "The shuttles are doing pretty well with picking up people who were driving otherwise.' 'Part of me feels a little bit bad about it, because... frankly, those of us who were taking Caltrain instead of driving were some of Caltrain's better customers. We would buy monthly passes, etc. But, on the other hand, there's no question in my mind that there were a lot of people who were just driving down to Apple, and now they're taking transit, basically. They're not driving, and that's a lot of cars off the road."⁵⁴

The Valley and the Region

Of course, the issues correlated with the metastasizing tech economy and the arrival of the shuttles do not only affect San Francisco, though protests and public debate there have been the most highly publicized. Private buses run by tech companies cover a vast terrain including communities in all of the Bay Area's adjoining counties. In 2013, because of the exponential growth of the region, the Census Bureau classified the Bay Area as the twelve-county San Jose-San Francisco-Oakland Combined

⁵³ Allison Arieff, Benjamin Grant, Sarah, Jo Szambelan, and Jennifer Warburg, "Rethinking the Corporate Campus: The Next Bay Area Workplace," *SPUR*, April 20, 2017, <https://www.spur.org/publications/spur-report/2017-04-20/rethinking-corporate-campus>.

⁵⁴ Michael Rhodes, "Employee Shuttles Finding Their Place in SF's Complex Transit System," *Streetsblog*, Aug 5, 2009, <https://sf.streetsblog.org/2009/08/05/employee-shuttles-finding-their-place-in-sfs-complex-transit-system>.

Statistical Area (CSA), stretching from Santa Cruz County in the south and Sonoma County in the north, and inland to San Joaquin County.⁵⁵ It is, as Walker writes: “commonly dismembered, underestimated, and misjudged,” due to the multi-nodal nature of its three main cities and many smaller ones, and a sprawling area the size of Connecticut and Rhode Island combined that contains the fourth-largest population cluster in the US.⁵⁶ While San Francisco is commonly thought of as “the city,” as it is the most stereotypically urban, with its relatively high density and skyscrapers, San Jose is actually the region’s largest, despite being mostly suburban due to the sprawl of Silicon Valley communities. The problematics of urban space in this period of the accelerating tech boom—pressure on an insufficient housing market, divisions and contestations over mobility—might be felt more acutely in areas most desirable to those working in tech, but their capillary affects have been felt everywhere in the Bay Area’s greater urban consolidation. While each county and community within the Bay Area has its particularities of culture, demographics, politics, and governance that shape these issues on a local level, there is an absence in the literature addressing the Bay Area that takes into consideration the true scope and nature of its urban area.

Not long after I first became aware of the tech buses traveling through the valley and into San Francisco, I began to see them stopping in Santa Cruz just downtown from the university campus. First there were the Google and Apple Buses, then Facebook, then Yahoo! and Netflix. Soon Amazon had opened a satellite office in

⁵⁵ US Census Bureau, “San Jose-San Francisco-Oakland, CA Combined Statistical Area” (2012), https://www2.census.gov/geo/maps/econ/ec2012/csa/EC2012_330M200US488M.pdf.

⁵⁶ Walker, *Pictures of a Gone City*, 237

Santa Cruz and huddles of intently talking young, male engineers and entrepreneur types began to appear on Pacific Avenue downtown; the lines of those waiting for the buses' multiple daily stops grew longer and more visible. A local resident I interviewed who worked for Apple and lived in Santa Cruz when he was hired, said that the existence of a local bus stop in Santa Cruz was considered an asset in his hiring process. This was also true for a Facebook coder I spoke with who commuted from Santa Cruz: Facebook's local bus stop on Pacific Avenue boosted her application. Without being able to ride the buses to and from Cupertino, the Apple employee told me, he would not have continued to live in Santa Cruz, which is separated from Silicon Valley by mountains and redwood forest, with the treacherously windy route 17 as the only highway through them. After swiping on to the Apple bus with his RFID-chipped company ID, he was able to nap and work, protected by the secure onboard wi-fi, and the non-disclosure agreements of anyone else on board. From downtown Santa Cruz, the bus would make two stops in Scotts Valley, and then go express to Apple HQ in Cupertino, using the Valley's carpool lanes to speed past gridlock.

During this same time period, Santa Cruz, like communities throughout the Bay Area, began to experience a crisis of affordable housing. The influx of new residents and their high salaries was far from the only reason for this, but while local tenants were already paying 30-70 percent of their income in rent, the techies (and their economic peers) could often afford to buy whole properties for cash down, to speculate on home ownership, and to turn additional profit by offering their properties as short-term vacation rentals through Airbnb and other platforms, rather than

providing long-term dwellings at an affordable rate.⁵⁷ As in San Francisco, evictions and homelessness increased, rents and housing prices went up by incredible margins year to year, and Santa Cruz rapidly became the most unaffordable city of its size in the US due to the gap between the cost of living, and the wages available in the immediate region to those not earning at a tech-industry level.⁵⁸ Finally, in early 2021, Santa Cruz County's Board of Supervisors approved letters to Facebook, Google, Amazon, and Apple asking them to contribute funding for affordable housing in Santa Cruz. "Our high housing prices are significantly impacted by the demand from Silicon Valley workers," they wrote, "... it is reasonable for major over-the-hill corporations to help respond to our county's affordable housing crisis."⁵⁹

While I was trying to learn more about the tech buses, their routes, and frequency, throughout the region, I stumbled upon an internal Google document that wasn't password-protected, which listed the locations of all then-existing company bus stops. Acting under the general hacker ethic that "information wants to be free," I grabbed the location data file and then worked with Matt Jamieson, a fellow UC Santa Cruz graduate student and cartographer, to map and condense those stops into likely routes to and from the Googleplex in Mountain View. In doing this, I chose to emulate Stamen Design's aesthetic choice of a transit-system schematic, showing the locations of stops as "stations" and the trajectories between them as color-coded "lines" (see

⁵⁷ No Place Like Home project, "The Issues," *No Place Like Home*, <http://noplacelikehome.ucsc.edu>.

⁵⁸ Aurand et al., "Out of Reach: The High Cost of Housing."

⁵⁹ Santa Cruz Sentinel, "Editorial: Why housing has become even more unaffordable during pandemic," *Santa Cruz Sentinel*, February 26, 2021, <https://www.santacruzsentinel.com/2021/02/26/editorial-why-housing-has-become-even-more-unaffordable-during-pandemic>.

Figure 2.9). As of the middle of the last decade, the Google Bus network alone extended from Santa Cruz and Morgan Hill in the south, all the way to San Rafael in the north. It is a massive system, which up until the COVID-19 pandemic, only continued to increase in size and frequency. It must be underscored that its scope did not include the hundreds of other buses run by Apple, Facebook, Yahoo!, Genentech, Electronic Arts, Box, and many companies besides. The Anti-Eviction Mapping Project plotted Google and Apple bus stops in 2015, documenting that both companies buses stop in almost identical locations, from Morgan Hill to Pleasanton. As of 2020, the map had sprawled even farther, to Salida and Manteca in the east, and as far as Gilroy to the south.⁶⁰

What shuttle networks will look like in the transformed post-COVID work world, however, remains to be seen. It is worth noting that the accidental visibility of Google's 2013 bus data is absolutely a thing of the past. According to the Google engineer I spoke with, all information about the current bus routes and stops is on a password-protected company intranet for employees.

There was another map that circulated widely in the media in the same time frame that I was pursuing this research, produced by cartographer Jake Coolidge, which resurrected the regional, single-system dream of the original BART proposal from the Rapid Transit Commission (RTC), discussed in Chapter 1 (see Figure 2.10).⁶¹ It was impossible not to notice, while mapping the footprint of Google bus stops, how closely

⁶⁰ Anti-Eviction Mapping Project, "Google and Apple Bus Stops, SF Bay Region," *Antievictionmap.com*, accessed, June 12, 2021, <https://www.antievictionmap.com/google-bus-stops-sf-bay-region>; Hepler, "Silicon Valley's new extreme."

⁶¹ Adam Mann, "13 Fake Public Transit Systems We Wish Existed," *Wired*, January 28, 2014, <https://www.wired.com/2014/01/fantasy-transit-maps/>.

it corresponds to the original RTC plan, linking the South Bay, Marin, and inland Contra Costa and San Joaquin communities all on a single system with no modal transfers. By visualizing the data in this way, I argue that big tech companies recognize, as did the early BART planners, that the Bay Area is a highly interconnected urban region in need of transit that seamlessly links its three large cities and twelve counties. The geographic reality of this interconnectedness was visible from the perspective of the 1950s, when Silicon Valley was still partially fruit farms, not server farms. It didn't require a Census Bureau designation 60 years later to make it a material truth of the region.

What is distinct about Coolidge's rendering is that the RTC-based plan visualizes the Bay as an interlinked network at least theoretically accessible to any transit rider who could pay the fare to navigate it, the many problems with station location, access, and frequency that would hamper BART's success notwithstanding. While the map I created was intended to highlight the systemic nature of the tech world's transit undertaking and its material presence in the region, it is, of course, an entirely privatized, filtered, RFID access-controlled space. The tech companies, with their libertarian disdain for bureaucracy and public process, have chosen to "disrupt" the development of regional transit for their own purposes, instead of applying their world-class engineering skills to the structural problems of the communities where their workers live, and from which they extract significant value. As John Stehlin writes, "Rather than use their immense economic and political power to build a coalition for regional transit

expansion (and consolidation), tech firms like Google simply built a parallel system for themselves.”⁶²



Figure 2.9: Map documenting the extent of the Google bus network in 2013–4, which I produced with cartographer Matt Jamieson.

⁶² Stehlin, “Transport in History: What Is, Was, and Wasn’t,” 235.



Figure 2.10.: Jake Coolidge's speculative BART map based on the original RTC plan (Jake Coolidge, 2013)

3. Speculative Transport: Ride-Hailing to Autonomous Vehicles



Figure 3.1–3: Lyft Promotional Image 2019; Cruise Taxi promotional image, 2022; image of networked autonomous transports from Stanford Research Institute's *Future Transportation Systems: Volume I*, 1967.

Bay Area Transit at the Seams

Public transportation in the greater San Francisco region from 2010–20, concurrent with the rise of the tech shuttles, was, to put it bluntly, a mess. In the words of Seamless Bay Area, a nonprofit advocating for a more unified and interconnected transit grid, “Public Transit in the Bay Area does not work for people.” Their website prominently states:

Unreliable service, slow speeds, lack of connections, confusing information: the poor experience of using Bay Area public transit causes many people to avoid it completely. It's no wonder only 5% of people's trips in the Bay Area are on transit, while at least 70% are in cars.⁶³



Figure 3.4: The Bay Area's fragmented transit landscape, SPUR 2015.⁶⁴

Despite the launch of the multi-system, stored-value Clipper Card in 2010, which allows riders to use the same fare card across 24 of the region's 27 separate transit

⁶³ Seamless Bay Area, <https://www.seamlessbayarea.org/>, accessed July 20, 2022.

⁶⁴ "Seamless Transit," SPUR, May 11, 2015, <https://www.spur.org/publications/urbanist-article/2015-05-11/seamless-transit>.

providers, the Bay Area transit landscape remains the most complicated and fragmented in the US. Each of the existing systems operates, plans, and funds itself independently, with only minimal efforts made to align schedules between the biggest carriers, such as BART, Muni, Caltrain, and AC Transit. While BART has covered much ground since its initial planning in terms of serving transit riders, particularly in the last decade, big- picture issues remain—multiple modal transfers, long walks to and between stations, and difficulties with first- and last-mile access in many service areas.

A 2022 post from *Streetsblog* highlighted the lack of integration between systems, even in the highest frequency and passenger-traffic parts of the Bay, with this photo, showing bars separating BART and Muni tracks in downtown San Francisco. Though both systems are accessible on the same fare card, the fare paid to one doesn't transfer to the other, necessitating the physical separation of riders. *Streetsblog* noted that to make the system change “one must climb a flight of stairs, go through an exit



Figure 3.5: Bars separating BART and Muni tracks in Downtown San Francisco (*Streetsblog SF*, 2022).

gate, cross a mezzanine, go through another set of fare gates, pay another fare (no transfers allowed), and go down another set of stairs only to, more often than not, miss one's connecting train."⁶⁵

Because of these factors, transit share in the Bay Area declined relative to other US major metropolitan areas 1990–2012.⁶⁶ By early 2020, public and activist calls for a seamless, integrated mass transportation system had reached the level of the State Assembly. Just a month before shelter-in-place orders, member David Chiu introduced AB 2057 calling for a Bay Area Seamless Transit Task Force, which would have produced a report on necessary reforms by January 2023. By April 2020, the energy and resources for this project were diverted from the seamless future of Bay Area transit to pandemic recovery efforts in the present, as ridership plummeted to a fraction of pre-COVID levels. By June 2021, regionwide ridership was still 67 percent lower than it had been in 2019. Against this background, the MTC moved forward from pandemic recovery, drafting the Bay Area Transit Transformation Action Plan, adopted in July 2021. The plan is full of necessary, long-overdue intentions for regional transportation, and defines the proposed "Transit Transformation" in the following way:

Design, adequately invest in, and effectively manage a public transit network that is equitable, inclusive, frequent, affordable, accessible and reliable; is integrated with unified service, fares, schedules, customer

⁶⁵ Rudick, Roger, "SPUR Talk: Will the Bay Area Finally Get Integrated Transit?" Jan 20, 2022, <https://sf.streetsblog.org/2022/01/20/spur-talk-will-the-bay-area-finally-get-integrated-transit/>.

⁶⁶ Ratna Amin and Sara Barz, *Seamless Transit: How To Make Bay Area Public Transit Function Like One Rational, Easy-To-Use System*, (San Francisco: SPUR, 2015), 10.

information and identity; and serves all Bay Area populations, resulting in increased transit ridership and reduced growth in vehicle miles traveled.⁶⁷

In essence, the Transit Transformation will aim to create public transit of a kind that could have been meaningfully considered since the BART-planning era—frequent, local, and focused on the needs of all riders—but hasn't been.

These priorities in plain language from an agency with the clout to achieve them suggest that change might be in the near future of Bay Area transit, but hopes for their implementation must be measured against the crawling timeline of BART expansion, or the fact that the Clipper Card has existed in its current form for more than a decade without significant changes in system integration. A project to streamline wayfinding and direct passengers between systems with more clarity is, as I conclude this project, just entering the draft stage and is expected to launch in a limited trial form in 2024.⁶⁸ The pandemic continues to evolve, and though some in-person work and travel has resumed, nearly three years of fear of interior and public spaces may have shifted already declining transit ridership patterns for the long term. By March 2022, BART PR and local news outlets were celebrating as the steep spikes in gas prices due to the Russian invasion of Ukraine turned some travelers towards public transit. A Tweet on BART's official account proudly announced two straight days at 33–34 percent of pre-pandemic ridership.

⁶⁷ Blue Ribbon Transit Recovery Task Force, *Bay Area Transit Transformation Action Plan* (San Francisco: Metropolitan Transit Commission, July 2021), 3, https://mtc.ca.gov/sites/default/files/documents/2021-09/Transit_Action_Plan_1.pdf.

⁶⁸ Adina Levin, "MTC Commissioners uphold disability advocates' calls for accessible wayfinding," Seamless Bay Area, July 22, 2022, <https://www.seamlessbayarea.org/blog/2022/7/22/mtc-commissioners-uphold-disability-advocates-calls-for-accessible-wayfinding>.

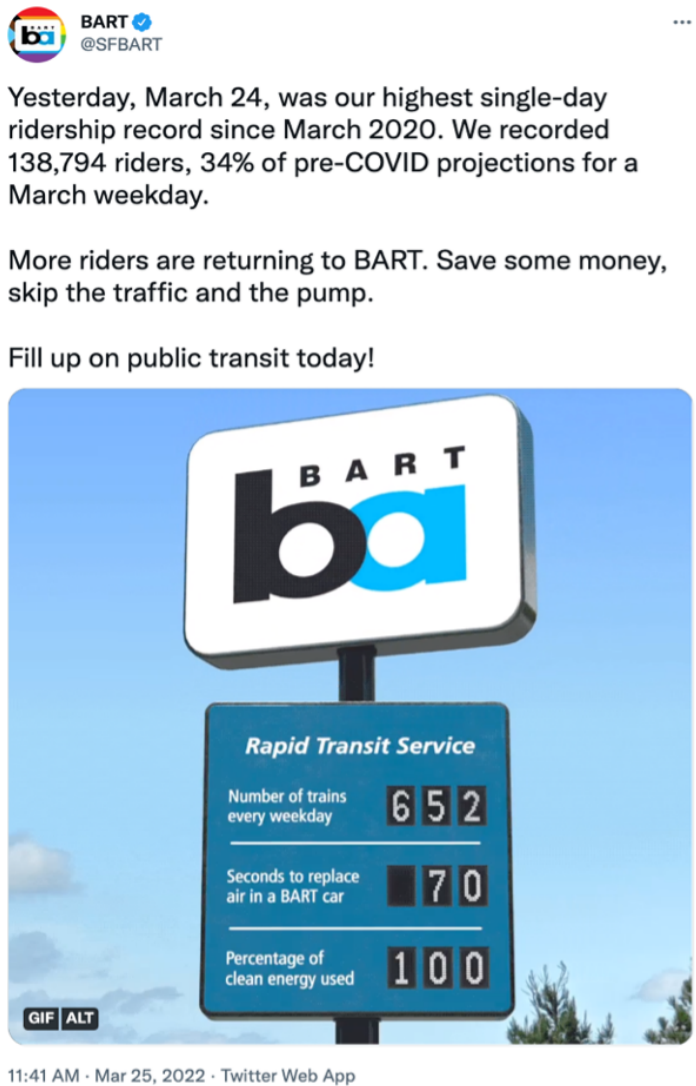


Figure 3.6: BART twitter announcing “high” rider numbers (BART, 2022)⁶⁹

The effects of this fragmentation of the transit sphere, though, are not felt in all communities equally. BART’s tweet about the return of ridership specifically links increased numbers to those who are choosing to travel by transit when they could drive, framing the BART logo as a gas station sign, and encouraging drivers to “fill up on

⁶⁹ BART (@SFBART), “Yesterday, March 24, was our highest single-day ridership record since March 2020. We recorded 138,794 riders, 34% of pre-COVID projections for a March weekday,” Twitter, March 25, 2022, 11:41 am, <https://twitter.com/SFBART/status/1507427387213975553>.

public transit!" According to the MTC's Action Plan, roughly 50% of public transit riders in the Bay Area are transit dependent, so the courting of a choice ridership with the option of defaulting to driving, remains a complicating factor.⁷⁰ A 2015 report from planning and policy think tank SPUR found that "half as many people travel from central Alameda County to San Francisco as travel from the Peninsula/ Silicon Valley/San Jose to San Francisco. However, 44 percent of the Alameda County trips use public transit while just 17 percent of the Silicon Valley trips use public transit."⁷¹ Some of the gap between transit-dependent, largely Black, brown, and lower-income riders in the East Bay and "choice" Silicon Valley riders could be accounted for by the increasing numbers of tech shuttle buses traveling the region after 2007. A larger percentage can be attributed to a kinetic-elite commitment to automobility in one form or another—through the aversion to public transit that shaped BART and failed to reduce regional car traffic meaningfully, and most recently through the addition of ride-hailing platforms such as Uber and Lyft.⁷²

From 2009–10 on, as Google, Apple, Facebook, and others were building and expanding their networks of employees-only private buses, their neighbors and colleagues were developing so-called ridesharing platforms: Uber, Lyft, Sidecar, and others. These apps initially promised to reduce car traffic by letting gig-based drivers "share" trips in personal vehicles in the same way that Airbnb rentals supposedly shared

⁷⁰ Blue Ribbon Transit Recovery Task Force, *Bay Area Transit Transformation Action Plan*, 11.

⁷¹ SPUR, *Seamless Transit*, 7.

⁷² James Wilt defines automobility as "the driving of all personal vehicles including cars, SUVs, pickup trucks, and minivans, as well as the broader political and cultural biases that justify its continuance," an understanding that I will also employ; James Wilt, *Do Androids Dream of Electric Cars?* (Toronto, ON: Between the Lines, 2020), 12.

the living spaces of those who were temporarily out of town, or renting a spare bedroom to cover their rent or mortgage. But, as the years since have shown, the platform or “sharing economy” has contributed to a broad undoing of worker and workplace protections by converting part- or full-time jobs with benefits and unions into side-gigs for those whose ambitions lie elsewhere, as well encouraging landlords to turn more profit through short-term renting than they could by housing ongoing tenants.⁷³ By 2017, the SFCTA estimated that ride-hailing services were making 15 percent of all vehicle trips within the city, compared to just one percent for taxis and public transit.⁷⁴ Research on the effects of ride-hailing in cities with public transit systems has shown that it produces predictable decreases in both rail and bus ridership, which intensify over time as local familiarity with the option of such services increases.⁷⁵ This produces serious issues of access, as the ride-hailing companies have made it their business to convince the public and lawmakers that they are simply providing a platform to connect drivers and riders, and are not taxi companies subject to government oversight. The siphoning of ridership from public transportation to ride-hailing excludes the elderly and poor who may not have computers or smartphones and cannot afford the constantly shifting demand-based pricing, as well as disabled passengers whom

⁷³ For more detail on the structure and economics of gig work and so-called sharing platforms, see Deepa Das Acevedo, *Beyond the Algorithm: Qualitative Insights for Gig Work Regulation* (2020), and Alexandra J. Ravenelle, *Hustle and Gig: Struggling and Surviving in the Sharing Economy* (2019).

⁷⁴ San Francisco County Transportation Authority, *TNCs Today: A Profile of San Francisco Transportation Network Company Activity* (San Francisco: SFCTA, June, 2017), https://www.sfcta.org/sites/default/files/2019-02/TNCs_Today_112917_0.pdf.

⁷⁵ Michael Graehler Jr., Richard Alexander Mucci, and Gregory D. Erhardt, “Understanding the Recent Transit Ridership Decline in Major US Cities: Service Cuts or Emerging Modes?,” Transportation Research Board 98th Annual Meeting, January 2019.

freelance drivers using their personal vehicles are not required to accommodate. Maintaining a set percentage of wheelchair-accessible vehicles (WAVs) in a region requires regulation and the collective acknowledgement that for-hire cars represent a structural part of the local transit picture, things that the ride-hailing platforms have been extremely reluctant to do.

And the ride-hailing companies are not the only competitors inserting themselves into the Bay's fragmented transportation landscape, nor are hailed-rides the only "solutions" being offered by the companies that provide them. Simultaneously with the development of the Google Buses, Uber, and Lyft, multiple different projects within Silicon Valley went into research and development to produce autonomous "self-driving" cars, primarily with the intention of running them as networked robotaxis, a process that has been accelerated by the absolutely immense data-gathering projects that ride-hailing platforms represent. Uber and Lyft both invested heavily in AV technology, serving as a bridge from ride-hailing to driverless vehicles. Though those projects have since been sold off, as has Google's Waymo division, all are still in active pursuit of the goal. AVs have inexorably crept into city streets around the US, but particularly in the Bay, often operating quasi-legally, and frequently producing traffic jams and accidents, some of them tragic. In the next sections I will consider the history and present of the ride-hailing platforms and autonomous-vehicle development, as well as Silicon Valley's fixation on automotive, atomized forms of "pod" transit, keeping kinetic elites and their trajectories free from unwanted social mingling, and preserving higher-speed mobility for the highest bidders. The ride-hailing services, and now, as of June

2022, the fully driverless hailed rides available on a limited basis in San Francisco, are the distillation of a neoliberal politics that seeks to privatize and atomize the space-time of shared mobility under the guise of efficiency, flexibility, safety, and “democratizing” transit. The driverless autonomous vehicles (AVs) run by Cruise, a division of General Motors, extend this trajectory by not just encapsulating and privatizing mobility, but removing the labor of the vehicle driver from the picture entirely. While BART and the Google Buses represent largely local iterations of these problematics, ride-hailing has taken a mere ten years to achieve the scale of mass transit, with millions of drivers and riders on the roads, not just in the Bay, but around the country and the world.

Ridesharing to Ride-Hailing

In 2010, three years after Google started running its buses, Uber went into business matching riders to drivers through a GPS-based smartphone app, enabled by the recent launch of Apple’s iPhone, among others.⁷⁶ The impetus for the creation of the Uber app was also similar to the self-focused logic behind the buses: frustrated with the lack of luxury and convenience of traditional taxi cab and black-car services, co-founder Garrett Camp decided to improve their functioning, for his benefit. As Mike Isaac writes in *Super Pumped: The Battle for Uber*, “Garret Camp was pissed off...he had all the money in the world, and still couldn’t get around town.” Public transit was not a consideration as it was “gross” and inconvenient, and taxi services didn’t give him the

⁷⁶ Sidecar CEO and co-founder Sunil Paul had patented the idea for ride-hailing over a wireless network as early as 2002, but shelved the idea due to technological limitations and bureaucratic drag; Carolyn Said, “Could Sidecar Patent Trip Up Uber, Lyft?” *SFGate*, May 15, 2015, <https://www.sfgate.com/business/article/Could-Sidecar-s-patent-trip-up-Uber-Lyft-6267124.php>.

exclusivity he craved, or, worse, had blocked him for trying to game their dispatch systems to his advantage—by calling multiple cabs, taking the first one to arrive, and then ignoring the rest.⁷⁷ That a transportation model now in every major city around the world (that hasn't managed to ban it) began with the leisure-time annoyance of a 30-something white man who was already worth tens of millions, should be a cautionary tale for all. In many ways, the transformations brought about by the ride-hailing platforms are the most illustrative of the dynamics I am attempting to identify and analyze, because they have played out in plain sight over a huge terrain, not just regionally, as in the case of BART, or only for the benefit of a limited ridership, as with the tech shuttles. In the period since I began my dissertation work, these platforms have expanded from Bay Area-based experiments to a global and seemingly permanent part of the mass-transit landscape. They have also intersected with my life and the ways my social circles and home communities function in many ways.

In the lexicon of transportation planners, companies such as Uber and Lyft are known as Transportation Network Companies (TNCs), that is: they provide transportation to passengers, they operate large networks, and they do so for profit. This terminology helps to clarify the nature of these services, which have tried to obscure their aims, means, and mode of operation from the beginning. I first became aware of Uber as an app-based black-car service used by people like the sister of a college friend, who was a consultant living an expense-account life, and who had no patience with navigating public transit in the city or trying to hail a taxicab. “Ugh, just let

⁷⁷ Mike Isaac, *Super Pumped: The Battle for Uber* (New York: W.W. Norton, 2019) 63-66.

me get us an Uber,” she huffed after I met them for dinner in 2011, “it’s the best, it’s so much faster and cleaner.” I had a knee-jerk reaction to the name alone, with its fascistic overtones. Indeed, Uber derives from Camp’s original name of Übercab, an attempt to summon up a vision of *the best possible taxi*, and an intentionally exclusive one—there could hardly be a more appropriate name for this vector of elite mobility. The plan Camp developed with co-founder Travis Kalanick was to market the service to their peers—high net-worth professionals—and to use only drivers with luxury vehicles (BMW, Lexus, Mercedes-Benz) “to make it feel exclusive, almost like a club. You’ve got to be a member to use it, guaranteeing a ‘respectable clientele.’”⁷⁸ Uber was never intended to be a transportation solution for the masses—it was intentionally designed to keep its users separate from them. An early slogan, “Everyone’s Private Driver” was keyed to sell an image of wealth, luxury, and insularity.⁷⁹

A year or so later, I encountered the Lyft service after being mystified by numerous cars I’d seen driving through the area sporting large hot-pink fake-fur mustaches on their front grilles. Lyft began as a short-haul subset of Zimride, a peer-to-peer web-enabled ride board where verified users could organize sharing long-distance trips without relying on friend networks or anonymous Craigslist posts. Personal information was protected by the platform until rides were agreed on, with the terms of these rides set by the driver and the passengers. In my observation, drivers were trying to split the cost of gas, offering seats in their cars to those without, and charged

⁷⁸ Ibid, 72.

⁷⁹ Sam Knight, “How Uber Conquered London,” *The Guardian*, April 27, 2016, <https://www.theguardian.com/technology/2016/apr/27/how-uber-conquered-london>.

no premium—though I did see early signs of Zimride drivers who were treating their cars as a kind of taxi service by filling every seat and marking up the price. I had begrudgingly bought a car for the first time in my life after realizing that navigating the Bay Area on public transit was going to be too time-consuming for my graduate-school work and schedule (an admitted luxury). In an attempt to mitigate the environmental impact and cost of my car, I drove and was a passenger on many Zimrides both within the Bay Area and around California, before Lyft sold the ridesharing service to the parent company of Enterprise car rental in 2013. I also appreciated that the filter of the platform gave me a level of protection and control as a single, femme person interacting with strangers, while being aware of the limitations for access that this represented. Rides were arranged through the service based on profiles (which were tied to Facebook accounts), listings, and ratings created by users, who could communicate entirely through Zimride, without having to share personal information like an email or phone number. Rather than combing through Craigslist posts, you could search by itinerary and date and see if anyone had offered a matching ride, and schedule travel well in advance knowing your gas costs were covered. I found Zimride to be mostly within the logic of a community carpool/vanpool, the other users ecologically minded, cost-conscious, social, and friendly—it was all more CouchSurfing than Airbnb. The riders and drivers I matched with were not majority white, but I never received a request from nor traveled with a Zimrider with physical disabilities. We were all under 45, and, as I was operating out of a campus community, the level of education and tech awareness was high. By 2015 Zimride was limited to college and university

campuses and corporations due to low adoption by the general public, and eventually shut down in 2020.

Lyft initially launched as a subset of Zimride, with a pricing algorithm that dictated what drivers should be paid for their gas and time to skip the ridesharing negotiations. It was “your friend with a car” available for a price, according to early branding from 2012–4—which converted the occasional shared ride into a part- or full-time side hustle. This platform was distinct enough that I did not recognize at first that Zimride and Lyft were the same company. I learned that Lyft riders were expected to sit in the front seat with the driver who had volunteered their car for hire, fist-bump the driver at the beginning of the ride, and never discuss the terms of payment, all of which was handled through the app.⁸⁰ I was told by a driver at the time that these were also strategies to help Lyft skirt taxi regulations—the “shared ride between friends” falling into a legal grey area—as from 2012–3, Lyft, Uber, and Sidecar were all operating under a cease-and-desist order from the California Public Utilities Commission (CPUC). The giant pink mustaches helped riders identify their drivers, but they could also be quickly removed, returning the Lyft to private-car status.

The grey area was further blurred in 2012–3 as Uber launched a budget tier using economy and hybrid vehicles instead on luxury cars—Uber X—drafting on Lyft. Within the first year, Uber X had switched to Lyft’s model of drivers using their personal cars, as long as they met certain specifications—recent model, a certain

⁸⁰ Ryan Lawler, “Lyft Sheds Some of its Quirks as it Seeks New Users,” *TechCrunch*, November 30, 2014, <https://techcrunch.com/2014/11/30/lyft-quirks/>; https://www.reddit.com/r/Lyft/comments/2ayh1l/do_you_guys_actually_fistbump_your_riders/.

number of doors, etc. (My car, despite being a relatively recent, efficient two-door model that was fine for Zimride purposes, did not qualify). Before long, anyone hailing an Uber or Lyft was likely to be picked up by a car badged for both platforms. By fall of 2013, CPUC had reversed its prior decision and created the new category of Transportation Network Company (TNC) to legalize ride-hailing operations, making California the first jurisdiction to do so. It is worth noting that the decision specifically noted these services did not offer “the true form of ridesharing” which CPUC defined as “casual carpool.”⁸¹ “Innovation does not, however, alter the Commission’s obligation to protect public safety,” the decision states, “especially where, as here, the core service being provided— passenger transportation on public roadways—has safety impacts for third parties and property. The Commission is familiar with and confident in its ability to protect public safety in the face of rapid technological change.” Later, the Commission underscores “it is important for high-volume services to consult and coordinate with local cities, counties, and public transit agencies to avoid potential impacts.”

The decision reveals a number of interesting facts about the early phases of the new TNCs’ legal strategy, which included claiming that drivers operating their own cars were being offered “donations” rather than payment for services rendered, and that the TNCs were ferrying information only, and not passengers. Uber, in particular, attempted to use precedent from Federal Communications Commission cases involving Voice-over Internet Protocol (VoIP) technologies to claim that CPUC was improperly

⁸¹ California Public Utilities Commission, “Decision Adopting Rules And Regulations To Protect Public Safety While Allowing New Entrants To The Transportation Industry,” September 19, 2013, 39, <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M077/K192/77192335.PDF>.

attempting to regulate their “app” which was an “enhanced information service” not subject to regulation in *any* state, as state-by-state governance impedes the functioning of telecommunications. The Commission was not convinced, affirming

Uber’s citations are beside the point as none of the cited statutes or precedents prevent this Commission from regulating passenger transportation over public roadways. Specifically, we reject the argument that TNCs are simply providers of IP-enabled services and therefore exempt from our jurisdiction. We find this argument to be factually and legally flawed and, therefore, do not accept that the method by which information is communicated, or the transportation service arranged, changes the underlying nature of the transportation service being offered.⁸²

By 2014, Uber had expanded its business model internationally, and Lyft followed suit within a few years, though its portion of the market remains substantially smaller, and its operations are limited to the US and Canada. In 2022, estimates put the number of Uber and Lyft drivers in the US at between one and two million (the total is unclear, as many drivers work for both platforms), and the number of Uber drivers worldwide at close to four million.⁸³ Both companies now offer multi-tier service, from pooled rides to luxury transportation, with a pay-to-play logic. Higher fares buy cars that arrive sooner, are more luxurious, and are just yours. The cheapest options are shared with other riders going to nearby destinations (assigned by the algorithm) and involve going to the back of the queue timewise.

⁸² Ibid, 3–12.

⁸³ Melissa Berry, “How Many Uber Drivers are there in 2022?” *The Ridehare Guy*, May 1, 2022, <https://therideshareguy.com/how-many-uber-drivers-are-there>.

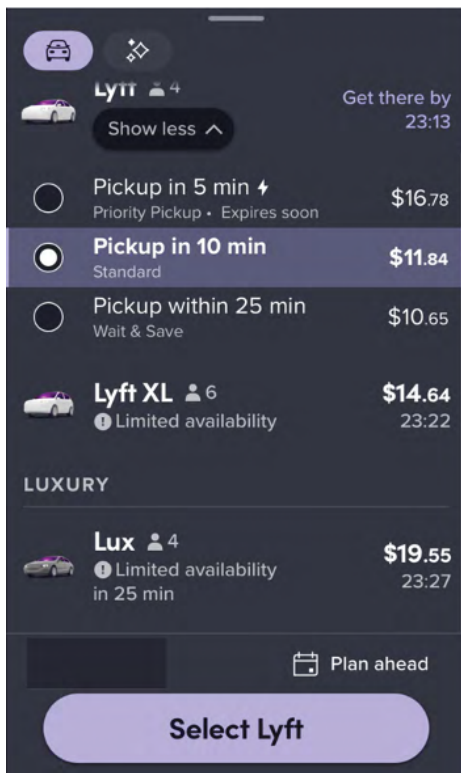


Figure 3.7: Screenshot of typical Lyft pricing and ride options (2022)

Zimride was actually a ridesharing platform, with both the driver and the passengers going to the same general destination and collaborating to minimize redundant car travel and expense. Lyft, however, very quickly left that pretense behind, along with the mustache and the fist bump.⁸⁴ These were individual, paid rides, provided by drivers who kept themselves in circulation to secure passengers. This distinction is important in order to differentiate actual sharing, the fundamental mode of human collaboration, with a high-degree of sociality and lack of profit motivation, from the so-called “sharing economy.” Duncan McLaren and Julian Agyeman argue that the sharing economy of platforms like Uber, Lyft, Airbnb, and others “perpetuates the myth

⁸⁴ Ryan Lawler, “Lyft Sheds Some of its Quirks as it Seeks New Users.”

that human society is founded on, and bounded by the economy, rather than vice versa, and that the environment is simply a source of economic resources, rather than the foundational space in which humans and our societies and cultures evolved and coexist.” They also find that recoding sharing as an economic activity contributes to seeing social issues—for example, local transportation—as “problems” in need of market-based “solutions”—the solutionism that Morozov and other scholars of technology have criticized.⁸⁵ To sell Uber beyond its initial pitch, Kalanick changed the company message, claiming that Uber had set out to “fix” a taxi system that was corrupt and “broken.” To do this, Uber promised affordability, convenience, and touted the “carpooling” aspect of the service—“two cars becoming one...making Uber cheaper than owning a car, that’s our whole thing,” Kalanick said in a “Fireside Chat” with *Salesforce.com* in 2015. He also made grand claims of significant congestion reduction—“if every car in San Francisco was Ubered there’d be no traffic”—decreased pollution, and the creation of “thousands of jobs.”⁸⁶ Lyft took a similar line: “By using Lyft to share rides, passengers are helping to reduce the carbon footprint left by our country’s dominant mode of transportation—driving alone,” Lyft’s transportation policy manager told *The Guardian* in 2016.⁸⁷

⁸⁵ Duncan McLaren and Julian Agyeman, *Sharing Cities: a Case for Truly Smart and Sustainable Cities* (Cambridge, MA: The MIT Press, 2015), 9.

⁸⁶ Salesforce.com, “Fireside Chat With Travis Kalanick And Marc Benioff,” 2015, <https://www.salesforce.com/video/183626/>.

⁸⁷ Kate Galbraith, “Are Uber and Lyft helping or hurting the environment?” *The Guardian*, January 21, 2016, <https://www.theguardian.com/environment/2016/jan/21/uber-lyft-helping-hurting-environment-climate-change>.

The Impacts of Ride-hailing

Within a short time after the ride-hailing platforms launched, however, gig drivers were traveling significant distances, often in empty vehicles, with the hope of picking up fares. In 2015, I spoke with a Lyft driver in Santa Cruz who told me that he frequently drove to the East Bay to take advantage of the surge pricing offered to incentivize more car availability in high-demand areas at rush hours—a round-trip of at least two-and-half hours in good traffic. This anecdote was later confirmed by the SFCTA, which found that 70 percent of the drivers in their study were coming into San Francisco from surrounding counties.⁸⁸ As Sarah Mason and others have discussed, the driver side of the app assigning rides “gamifies” the experience: drivers can “win” bonuses for hitting targets of passenger ratings or frequency, as well as for driving at peak hours or near big events, turning their work into something like video-game play.⁸⁹

Rather than minimizing the number of cars on the road through carpooling, ride-hailing has increased the congestion of urban roadways many times over. An MIT study on the impact of TNCs found increases in congestion and the length of traffic jams in all urban areas after the introduction of ride-hailing. The researchers also documented an 8.9 percent drop in public transit ridership, but only negligible and inconsistent decreases in car ownership.⁹⁰ A study focusing specifically on San Francisco

⁸⁸ San Francisco County Transportation Authority, *TNCs Today*, 7.

⁸⁹ Sarah Mason, “High score, low pay: why the gig economy loves gamification,” *The Guardian*, November 20, 2018, <https://www.theguardian.com/business/2018/nov/20/high-score-low-pay-gamification-lyft-uber-drivers-ride-hailing-gig-economy>; Paris Marx, *Road to Nowhere: What Silicon Valley Gets Wrong About the Future of Transportation* (New York: Verso, 2022).

⁹⁰ Mi Diao, Hui Kong, and Jinhua Zhao, “Impacts of transportation network companies on urban mobility” *Nature Sustainability*, February 1, 2021, <https://www.nature.com/articles/s41893-020-00678-z>.

found that between 2010 (the launch year of Uber) and 2016, congestion increased by 62 percent, and researchers estimated that TNCs were responsible for more than 40 percent of the total.⁹¹ The SFCTA underscored these findings in 2019, stating that TNCs were responsible for a 47 percent increase in vehicle miles traveled (VMT) within the city. They also found that that average car travel speeds had declined by 3.1 miles-per-hour, with ride-hailing cars causing the majority of that drop.⁹² A 2020 study by the Union of Concerned Scientists reported that non-pooled ride-hailing was 70 percent more polluting than traveling by private car, largely due to drivers “deadheading”—driving cars around empty in search of rides and gamified bonuses, which accounts for nearly half of Uber and Lyft drivers’ VMT. They also cited displacement of passengers from public transportation as a significant factor in the high carbon cost of these rides.⁹³

But traffic congestion and air pollution aren’t the only impacts these platforms have had on the transportation landscape of the Bay Area. Though Uber eventually diversified its early luxury-only approach in search of profits, it was designed to solve the transportation “problems” of a narrow slice of society, which continues to be reflected in TNC user demographics. A study by the Department of City and Regional Planning at UC Berkeley documented that ride-hailing passengers were younger than

⁹¹ Gregory D. Erhardt, Sneha Roy, Drew Cooper, Bhargava Sana, et al., “Do transportation network companies decrease or increase congestion?” *Science Advances*, May 8, 2019, <https://www.science.org/doi/10.1126/sciadv.aau2670>.

⁹² San Francisco County Transportation Authority, *TNCs and Congestion* (San Francisco: SFCTA, October, 2018), 4.

⁹³ Don Anair, Jeremy Martin, Maria Cecilia Pinto de Moura, and Joshua Goldman, “Ride-Hailing’s Climate Risks: Steering a Growing Industry toward a Clean Transportation Future.” Union of Concerned Scientists, February 25, 2020, <https://www.ucsusa.org/resources/ride-hailing-climate-risks>.

those using traditional taxis, 84 percent had a bachelor's or advanced degree, and they were most likely to live in high-rent neighborhoods such as Nob Hill, the Marina, the Castro, and Russian Hill. Households making under \$30,000/year, poverty level for the Bay Area, were statistically underrepresented. As technology and transportation researcher Paris Marx writes: "By requiring a smartphone and data package, ride-hailing disproportionately excludes poor people and seniors. By increasing prices at peak times through what it calls "surge pricing," it becomes unavailable to low-income residents." Even if residents in lower-income areas want to request an Uber or Lyft, they may not be able to or face inconveniently long wait times, as the clustering of choice users in particular neighborhoods becomes self-reinforcing. Drivers pile on those areas to the exclusion of others, or are deliberately steered there by the app, leaving large areas of the city underserved.⁹⁴

The conversion of on-demand transportation for disabled passengers from rides provided by licensed cabs to those offered by semi-regulated TNCs also creates barriers. At a 2017 panel on the future of transportation in San Francisco, transit-beat reporter Joe Fitzgerald Rodriguez reported that nearly half of the WAVs in the region had gone off the road because the drivers couldn't compete with Uber and Lyft.⁹⁵ The platforms claim they are not subject to the Americans with Disabilities Act and have no control over what their "independent contractor" drivers do, backed up by the billions they have spent evading classification as traditional transportation providers. Wait times for WAV rides are longer if requests are even matched, which they frequently are not.

⁹⁴ San Francisco County Transportation Authority, *TNCs Today*.

⁹⁵ *Transforming SF: the Future of Transportation*, Mechanics' Institute San Francisco, March 30, 2017.

Uber and Lyft have both been sued multiple times across the country for failing to adequately serve disabled riders, and in 2018 both companies sued the New York Taxi and Limousine Commission over a new requirement mandating fleets with 25 percent accessible vehicles by 2023 (a suit that was eventually settled).⁹⁶ The ride-hailing companies have closed some of this gap with specific programs for wheelchair-using riders, and accessibility features in their apps, but because these are gestures made by private entities, not legal requirements with public oversight, there is no guarantee that they will last.⁹⁷ All of these barriers to entry are what Sheller terms “mobility impairments,” “disabling effect[s] of the capitalist city” viewed through the lens of mobility justice. Drawing on Rob Imrie, Tim Cresswell, and other scholars of critical mobilities, she contends that the farther an individual is removed from profile of the hegemonic commuter ideal—white, cis-male, young, educated, well-off, abled—the more difficulty they will encounter moving from one place to another, contributing the space-time expansions produced by elite logics of mobility.⁹⁸ Conversely, more spatially direct and faster travel for “ideal commuters” is only amplified by 5G network speed and one-click access to transportation.

The motivation behind Uber and Lyft’s insistence that they are technology companies—platform providers with the technological expertise to connect independent drivers with needy passengers—is profit. Among the many the categories

⁹⁶ Dana Rubinstein, “New York City and Uber reach settlement on wheelchair accessibility,” *Politico*, June 13, 2018, <https://www.politico.com/states/new-york/city-hall/story/2018/06/13/new-york-city-and-uber-reach-settlement-on-wheelchair-accessibility-466459>.

⁹⁷ Wilt, *Do Androids Dream of Electric Cars*, 118–22.

⁹⁸ Sheller, *Mobility Justice*, 86–87.

they cut from their overhead through this strategy are employee pay and benefits; insurance, liability, and maintenance costs for vehicles; and the legal and HR infrastructure necessary to hire, vet, license, and support their legions of drivers on a full-time basis if they were classed as employees, instead of as contractors. As Wilt writes: “almost all costs are downloaded onto the driver—and minimum wage and overtime laws don’t apply. The driver covers everything from the price of owning or leasing the vehicle to fuel, maintenance, insurance, and fees.” For the privilege of being a gig driver, the apps claim anywhere from 25–42 percent of a fare.⁹⁹ In spring of 2022, in part due to the steep rise in gas prices, drivers in the Bay Area were netting about \$9 an hour, well below the mandated minimum wage of \$15–18, depending on city and county.¹⁰⁰

The scale of the profits the TNCs reap through this arrangement can be cleanly illustrated by the massive public opinion campaigns and huge legal fees they have paid to secure and maintain this status. In 2020 alone, Uber and Lyft spent a combined \$185 million on the campaign for California ballot proposition 22, which granted gig-economy companies a legal exception to continue classing their workers as contractors instead of employees. Prop 22 was industry-driven pushback against an earlier law, AB5, which set guidelines for determining whether workers should be considered employees and did not exempt gig drivers and delivery people. As part of the Prop 22 effort, gig-economy dollars flooded state mailboxes with flyers, and airwaves and streaming services with

⁹⁹ Wilt, 175.

¹⁰⁰ Dani Anguiano, “It’s not worth it: rising gas prices force drivers to work for less than minimum wage,” *The Guardian*, March 10, 2022. <https://www.theguardian.com/us-news/2022/mar/10/gig-workers-gas-prices-california-uber-lyft>.

ads, representing TNC drivers as needing the “freedom” and “flexibility” granted to them by gig work. One ad prominently featured a driver who needed to keep his schedule flexible to care for an ailing family member, preying shamelessly on voter sympathies during the many months of pandemic shutdowns and shelter-in-place orders. Employee status, voters were told, would cost many drivers their income, raise prices, and bring an end to our much-loved convenience. Uber and Lyft even used in-app messages as a means to sway voters, turning passengers into a captive audience.¹⁰¹

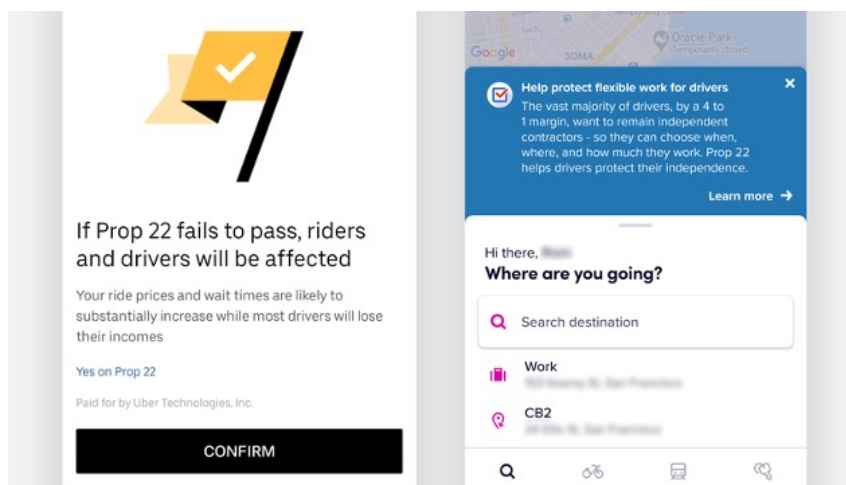


Figure 3.8: Uber and Lyft app screens during the Prop 22 campaign in 2020, (CNN)

Prop 22 was eventually declared unconstitutional, and a massive overreach of venture capital into the public sector, but as I write the process of challenges and appeals between Prop 22 and AB5 continues through the courts.¹⁰²

¹⁰¹ Sara Ashley O'Brien, "The \$185 million campaign to keep Uber and Lyft drivers as contractors in California," CNN Business, October 8, 2020, <https://www.cnn.com/2020/10/08/tech/proposition-22-california/index.html>.

¹⁰² Justin Ray, "Prop. 22 is ruled unconstitutional: What it means, how apps reacted and what happens next," *Los Angeles Times*, August 23, 2021, <https://www.latimes.com/california/newsletter/2021-08-23/proposition-22-lyft-uber-decision-essential-california>.

The TNCs impact on labor is not limited to their own drivers.¹⁰³ Their industry has also had major consequences for licensed and regulated cab drivers, who had lost 65 percent of their ridership by 2016, according to *SFGate*.¹⁰⁴ Uber moved forward under that name, and not as “Übercab” in part to distinguish it from traditional taxi providers and thereby evade regulation.¹⁰⁵ The taxi industry in San Francisco and elsewhere was not without its issues—labor squabbles, resistance to change, internal corruption, and particularly the exploitative system of loans and licensing for medallions and approved vehicles. In 2010, to raise money after the financial crisis, the City of San Francisco offered taxi medallions for sale for \$250,000 each, financed by loans. Previously, medallions has been awarded to drivers working for cab companies on the basis of seniority. Then-mayor Gavin Newsom promised taxi drivers that the cost would be borne out by a sustained market for the value of medallions, but of course, Uber and Lyft began circulating shortly thereafter. When Ed Lee became mayor in 2011, he embraced the tech economy and the ride-hailing platforms, declaring July 13, 2013 “Lyft Day,” and did little to stop cabbies from being squeezed from the other direction, leaving many of them burdened by staggering debt. In February 2020, prior to the COVID-19 pandemic, KQED reported that no one had purchased a medallion in

¹⁰³ The full scope of Uber and Lyft’s labor interactions with their drivers, as well as the organized and regulated taxi drivers whose lives they have overturned, is a subject worthy of a dissertation that is not mine, and has been extensively researched and documented by many transportation activists and scholars, including Kafui Attoh, Katie J. Wells, Declan Cullen, Veena Dubal, Paris Marx, and James Wilt.

¹⁰⁴ Carolyn Said, “Flywheel Taxi Sues Uber for Antitrust Violations,” *SFGate*, November 2, 2016, <https://www.sfgate.com/business/article/Flywheel-Taxi-sues-Uber-for-antitrust-violations-10488784.php>.

¹⁰⁵ Lora Kolodny, “UberCab Ordered to Cease and Desist,” *TechCrunch*, Oct. 24, 2010, <https://techcrunch.com/2010/10/24/ubercab-ordered-to-cess-and-desist/>.

four years.¹⁰⁶ Prior to this era taxi-driving had existed as path to stable, moderate income for its organized drivers, the majority of whom are people of color and/or immigrants. While the app-hailing CEOs liked to depict themselves as taking on a price-gouging, corrupt “Big Taxi” to everyone’s benefit, many of the problems with the taxi industry began with the erosion of labor rights and pushes to privatize the system starting in the 1970s, as documented by technology law scholar Veena Dubal.¹⁰⁷

Fundamentally, an organized licensed taxi system is an structural part of a multi-modal transit system. It allows planners to determine the appropriate number of vehicles in circulation to guarantee first- and last-mile service and to serve the needs of disabled passengers. As the SFCTA stated in its 2017 report on TNCs:

Taxis are subject to price controls, must provide access to all areas of the city, must provide service to people with disabilities, have greater insurance requirements, and are subject to driver background checks and vehicle inspections. In contrast, there is no limit on the number of TNCs that may operate on San Francisco streets, no price controls, no geographic service area requirements, minimal disabled access requirements, limited driver background checks, and few vehicle inspection or driver training requirements.¹⁰⁸

The lack of background checks has caused particular problems for TNCs and their riders. As part of their campaign against regulation, Uber had specifically fought jurisdictions that required extensive background checks, including fingerprints and police

¹⁰⁶ Sam Hamnett, “SF Taxi Drivers Say the Medallion Crisis Is Killing Them, Literally,” KQED, February 3, 2020. <https://www.kqed.org/news/11798851/s-f-taxi-drivers-say-the-medallion-crisis-is-killing-them-literally>.

¹⁰⁷ Veena Dubal, “The Drive to Precarity: A Political History of Work, Regulation, & Labor Advocacy in San Francisco’s Taxi & Uber Economies,” *Berkeley Journal of Employment and Labor Law* 38, No. 1 (2017): 73-135, <https://dx.doi.org/10.15779/Z38KVV57H55>.

¹⁰⁸ San Francisco County Transportation Authority, *TNCs Today*, 3.

records, as part of the process.¹⁰⁹ Both companies have long outsourced their driver background checks to cut-rate third-party services, despite a California law in 2016 that required them to conduct lifetime background checks (they previously stopped at seven years) and prohibited the hiring of anyone with felony convictions for violent crimes.¹¹⁰ In 2017, after a late night of work, I was leaving a café in downtown Santa Cruz, exhausted and carrying a heavy bag of laptop, exam booklets, and reading. As I walked home, an Uber-badged car pulled over. “Hey, it’s slow tonight and you look like you could use a ride. We’re running a promotion right now, interested?” a non-descript 30-something, white-male driver asked me. I have never been an Uber passenger except for the purposes of research or while riding with others, but in my fatigue I briefly considered it. I brushed the thought away, however, and quickly responded. “No, thanks.” He persisted, “Can I ask why not?” I could feel a wheedling sales pitch coming on and snapped back, “Honestly, I hate what Uber does to transportation. Sorry.” It wasn’t until after he’d sullenly pulled away that I remembered that this was completely out of line with company policies—only passengers can initiate rides, and only through the app.

I stood there frozen for a moment, horrified at the realization that the ride-hailing model—individuals driving their own cars—made it possible for literally anyone to pose as a driver and potentially lure the unsuspecting into who knows what harm, armed with the promise of cheap or free rides, which are very real promotional tools. It

¹⁰⁹ Marx, *Road to Nowhere*, 75.

¹¹⁰ Marrian Zhou, “Uber, Lyft Reportedly Skimp On Background Checks,” *CNET*, August 31, 2018, <https://www.cnet.com/tech/tech-industry/uber-lyft-reportedly-skimp-on-background-checks/>.

was too late for me to get a license plate number, but I had a car model and color, so I then spent an hour or more trying to figure out how to contact Uber and speak to a human, which they make very difficult, and waiting on the phone. The rep I eventually spoke with said that no Uber car matching that description was active in Santa Cruz, and that they weren't currently offering the promotion the driver had mentioned. I have no way of knowing if that was true, only that I could potentially have encountered one of the drivers responsible for some of the 5,981 incidents of sexual assault reported by Uber passengers that year, or the more than two dozen reported violent crimes perpetrated by those impersonating Uber and Lyft workers.¹¹¹

Despite these issues, Uber and Lyft's relationship to government oversight of their operations has been covertly and overtly hostile, with regulators primarily viewed by the TNCs as impediments to their entry into cities as "markets." San Francisco issued Uber a cease and desist warning on its launch in 2010, along with a \$5,000 fine per violation that company laughed off and continued to operate.¹¹² When Uber began to expand Uber X out of the Bay Area in 2014, the app was banned from operating in the city of Philadelphia by the Philadelphia Parking Authority, but Kalanick and company put their drivers on the streets anyway, claiming that because this form of driving was not specifically illegal, they were operating in a "grey area." A team of officials was sent into the streets incognito to use the app to hail rides and then impound cars being used

¹¹¹ Sara Ashley O'Brien, "Uber releases safety data: 998 sexual assault incidents including 141 rape reports in 2020," *CNN Business*, June 30, 2022, <https://www.cnn.com/2022/06/30/tech/uber-safety-report/index.html>; Jack Healy, "They Thought It Was Their Uber. But the Driver Was a Predator," *New York Times*, April 4, 2019, <https://www.nytimes.com/2019/04/04/us/fake-uber-driver-assaults.html>.

¹¹² Kolodny, "UberCab Ordered to Cease and Desist."

as Ubers, and at first generated enough panic among drivers to suppress Uber's entry into Philadelphia.

Back in San Francisco HQ, engineers decided to use Uber's internal "Greyball" feature—which controlled what vehicles a user was presented with on their "system map" upon opening the app—to prevent users suspected of being police or officials from being able to hail rides. Their view of the app would show a false map of cars in the area and make it seem that no rides were available or being accepted. An entire internal playbook was developed and called "Violation of Terms of Service" (VTOS), instructing city managers in new markets on how to identify and greyball suspect users. The playbook was so-named because passengers using the app under false pretenses were determined to be in violation of *Uber's* rules, which justified their being effectively barred from the service. Greyball tactics included geofencing police stations and city offices and flagging any user who opened and closed the app too many times within that perimeter, and triangulating information on new user accounts—names and payment details—against municipal agencies and police departments. It worked, and Uber used the technique to gain a base in Philadelphia, Portland, and many other cities that had tried to slow or halt the arrival of TNCs. Once in a city, with an established ridership—an elite, moneyed ridership used to one-click convenience—Uber and Lyft became nigh impossible to regulate.¹¹³

The TNCs also have a fraught relationship to public transportation itself. Both Uber and Lyft tout their partnerships with local transit agencies and their provision of

¹¹³ Issac, *Super Pumped*, 273–4.

first- and last-mile trips, and both have also gone into the business of micromobility. Each has tie-ins to electric scooter programs, and Lyft co-operates bikeshare fleets across the US, including New York's MTA Citibike program. Of course, the revenue stream for Citibike now partially points back to Lyft. In a departure from the single-card fare system for trains and buses, riders are encouraged to unlock Citibikes through the Lyft-powered Citibike app. By contrast, Los Angeles's Metro Bike program is on the same Tap fare card as all local trains and buses, and is run by Metro. Despite the TNCs stated love of transit, as previously discussed, studies have shown that they draw significant numbers of riders away from public transportation. In a 2018 study in Boston, 42 percent of respondents indicated that they would use public transit if ride-hailing options were not available.¹¹⁴ Dating back to 2015, part of Lyft's campaign to convince the Bay Area public of the benevolence and benefits of its service was an advertising campaign depicting Lyft as part of the local transit grid. Posters appeared on station walls and Muni stop shelters, showing Lyft-pink lines radiating out from the BART and Muni system schematic map. These ads visually incorporated Lyft as part of the local transit grid at the same time that they were actively fighting that official designation.

¹¹⁴ Steven R. Gehrke, Alison Felix, and Timothy Reardon, "Fare Choices: A Survey of Ride-Hailing Passengers in Metro Boston" Metropolitan Area Planning Council (Boston: MAPC, February, 2018), <https://www.mapc.org/farechoices/>.



Figure 3.9: Lyft ad on a Muni stop shelter in San Francisco, 2015.

A later Lyft ad from 2019 said “You would think we wouldn’t want you to ride the bus, but, well, here we are. And we are telling you with a straight face we love it when people take the bus. Or the train. Or, wait for it, when people take shared rides. It’s all the same thing (fewer cars on the road). It’s all connected and harmonious and it’s all part of the big picture to build cities around people, not cars.”¹¹⁵ Uber’s filing for its IPO, however, explicitly states that public transportation services are competition, along with traditional taxi and livery cab services.

Our Personal Mobility offering competes with personal vehicle ownership and usage, which accounts for the majority of passenger miles in the markets that we serve, and traditional transportation services, including taxicab companies and taxi-hailing services, livery services, and public transportation, which typically provides the lowest-cost transportation option in many cities.¹¹⁶

¹¹⁵ Lyft advertising, 2019.

¹¹⁶ United States Securities And Exchange Commission, “Registration Statement Under The Securities Act Of 1933, Uber Technologies, Inc.,” 7372, April 11, 2019,

This means that, by their estimation, in order for Uber to remain competitive in market terms it must compete *directly* with public transportation on the basis of price, and all TNCs are in competition with each other. As former New York City transportation commissioner Janette Sadik-Khan tweeted regarding Uber and Lyft's efforts in her city: "As Uber & Lyft add to city traffic, lose \$billions, and undermine transit, we need to ask ourselves what transportation problems they solve. New data from TNCs show that they are convenient cabs, not the transportation revolution they promised."¹¹⁷

As with my research into the buses, I am often questioned by those with whom I discuss Bay Area ride-hailing and automation as to what the alternative is. Is it just that I dislike tech bros, and aren't they making transportation more convenient? Well, no and no. But I am continually struck that using the engineering talents of the Valley's legions of programmers to improve already existing transit—trains, buses, streetcars, taxi cab dispatch—seems so unthinkable. There are, though, exceptions that must be briefly mentioned. Flywheel launched in 2015 as a consumer-facing app that allows riders to hail licensed cabs in the same way that they would an Uber or Lyft, along with a business-to-business (B2B) platform that simplifies the process of dispatch for taxi companies. They also acquired the oldest taxi company in San Francisco, De Soto Cab, and repainted its fleet in Flywheel's cherry red-and-white color scheme, in order to

<https://www.sec.gov/Archives/edgar/data/1543151/000119312519103850/d647752ds1.htm#toc6477522>.

¹¹⁷ Janette Sadik-Khan (@JSadikKhan): "As Uber & Lyft add to city traffic, lose \$billions, and undermine transit, we need to ask ourselves what transportation problems they solve," Twitter, August 5, 2019, 3:11 pm, <https://twitter.com/JSadikKhan/status/1158500750638682112>.

build visibility and name recognition.¹¹⁸ The app has been a reasonable success, and is available in a few other cities outside San Francisco, though if you ask many in ride-hailing's target demographic about it you will be get blank stares. Flywheel also drew controversy on its market expansion into New York for partnering with the head of a cab company notorious for monopolizing Taxi and Limousine Commission medallions.¹¹⁹ Despite suing for Uber for antitrust violations in 2016, in 2022 Flywheel announced that it will partner with Uber to get Flywheel cabs added as an option on Uber's app. Eventually all San Francisco taxis will be part of the system, due to a regulatory change that allows them to quote up-front prices instead of charging a metered fare. While this might seem like a net gain, drivers are uneasy about partnering with the rival that has made their lives so difficult. "So many drivers have such a visceral dislike—maybe a much stronger word than dislike—disgust, hatred of Uber that they just won't touch it," Mark Gruberg, a taxi driver and board member of the San Francisco Taxi Workers Alliance (SFTWA) was quoted in the *San Francisco Examiner*. Another board member pointed out that this will now subject all fares to the kind of algorithmic price fluctuations that traditional cabs have been free from, and limit the cabs that are available to those who are mobility impaired—low-income riders, those without computer or smartphone access, and disabled passengers.¹²⁰

¹¹⁸ Carolyn Said, "DeSoto, SF's Oldest Taxi Firm, Rebrands Itself as Flywheel," *SFGate*, February 18, 2015, <https://www.sfgate.com/business/article/DeSoto-S-F-s-oldest-taxi-firm-rebrands-6087480.php>.

¹¹⁹ Andrew J. Hawkins, "Flywheel, the app that makes taxis act like Uber, is coming to New York City," *The Verge*, September 22, 2016, <https://www.theverge.com/2016/9/22/13002462/flywheel-new-york-city-taxi-app-uber-freidman>.

¹²⁰ Benjamin Schneider, "San Francisco Taxi Drivers Prepare for First-in-the-Nation Uber Partnership," *San Francisco Examiner*, July 28, 2022, https://www.sfexaminer.com/news/san-francisco-taxi-drivers-prepare-for-first-in-the-nation-uber-partnership/article_cf218570-0dd6-11ed-a996-8330b8f31145.html.

Another company, Swiftly, shows that it is possible to for Silicon Valley companies to work with local governments to improve transit *for everyone*, turn a profit, and earn coveted “unicorn” status—the question is simply the scale of the profits sought and whether the entrepreneurs in question actually have any care for the communities they claim to be part of. Initially branded as “Swyft,” Swiftly launched as an app that aimed to provide real-time transit data to transit riders. When metrics showed that the data was often inaccurate, CEO Jonny Simkin re-tooled and transformed the company into a data-analytics firm. Swiftly now helps transit agencies make better use of the performance data they gather, and then push that information back out to riders through their own systems, instead of through a proprietary app. Transit systems around the country use this platform to quickly update train and bus arrival times on station signage, by SMS, and across route-mapping platforms like Google Maps, as well as to identify slowdowns and outages more quickly, so scheduling can be adjusted.

Founder Jonny Simkin has a similar origin story to Garrett Camp and Travis Kalanick—newly arrived in Silicon Valley on the successful sale of a program and living in San Francisco, Simkin perceived a business opportunity in the difficulty he experienced getting around the Bay Area. Rather than imagine his own personal chauffeured-car company, he asked what could be done to improve public transit so that he could remain car-free. “Of course, there are real drawbacks. Though ideal on paper, public transportation suffers from many inefficiencies,” he told *Inc.* Because of Swiftly’s partnerships with rail, express bus, and streetcar companies, its claims of greenhouse gas and congestion reductions through the use of their technology are

quantifiable. Despite being a for-profit endeavor, Swiftly cuts against the grain of Silicon Valley ideology that public-private projects are simply too slow, too low-budget, and too bureaucratic to bother with (that is, when they don't involve defense contracts, which are the lifeblood of the Valley).¹²¹ "Most companies I see assume that they should not sell to the government because it's too hard," one of Swiftly's early investors said.¹²²

Fantasies of Automation and Automobility

A few win-win cases for green capitalism, however, do not undo the risks of Silicon Valley ideology uncritically operating in the spaces governing most of the technologies that we use to connect, both virtually and physically. As the case of the ride-hailing companies shows, the upheavals these transformations bring are disruptive in all the most literal and negative senses of the term—not the maverick “world-changing” that CEOs and venture capitalists promise. Tech companies’ refusal to acknowledge the bias and exclusion built into their products is a problem from research and development on up, not just with the rollout of these technologies. As the previous cases have shown, there is a consistent desire among those developing transportation options in the Bay Area to individuate, to isolate, and to automate. It has been a persistent fantasy for 80 years that better, faster, more streamlined, and more

¹²¹ For a history of Silicon Valley's deep ties to federal funding, see Margaret O'Mara, *The Code: Silicon Valley and the Remaking of America* (2019).

¹²² Tim Crino, “Finally, Someone Is Helping Make Mass Transit More Predictable. And Cities Love It,” *Inc.* 2018, <https://www.inc.com/tim-crino/30-under-30-2018-swiftly.html>; Wyatt Kroopf, “SF-based Swiftly Partners With Dozens of Public Transit Agencies to Speed Them Up,” *San Francisco Business Times*, August 9, 2019, <https://www.bizjournals.com/sanfrancisco/news/2019/08/09/swiftly-inc-public-transit-faster-app-store-simkin.html>.

computer-integrated technologies, necessitating an expert class of programmers and engineers, will at long last solve all transit woes and provide quiet, luxurious, and direct trips to worthy passengers.

The latest development in this progression is autonomous-vehicle (AV) or “self-driving car” technology, which is one more entry in a long-progression of automotive solutions to transportation needs. “Self-driving car” and “autonomous vehicle” are typically used interchangeably, though they mean slightly different things, which has policy ramifications that I will address in the sections that follow. Most specifically, a self-driving car is a car that has autonomous capabilities, but in which a human driver must always be present—many high-end cars have some version of this technology already, through lane-minder, parking guidance, and safe-steering modes. A truly autonomous vehicle has no human driver, and ideally, no space allotted for a human driver. The futurist fantasy of Silicon Valley is the latter and that is the subject of this argument. The Society of Automobile Engineers (SAE), which sets standards and terminology for the industry regarding automation, classes vehicles on a taxonomy of Levels 0–5, in which 0 represents no automation (for example, a car from the pre-cruise control era) and 5 is a fully-automated vehicle that requires no human intervention.¹²³ It’s noteworthy that the SAE, in its example features for Level 4 (below), lists “local driverless taxi.” Tesla’s much-hyped Autopilot feature, for example is only Level 2 on the SAE standard, requiring that the driver “remains fully engaged and attentive,”

¹²³ Society of Automobile Engineers, “Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles,” April 30, 2021, https://www.sae.org/standards/content/j3016_202104/.

though the feature is often not used that way, with sometimes tragic results. A 2021 SEC filing from Tesla has acknowledged that Level 5 may never be achieved, and the National Highway Traffic Safety Administration (NHTSA) specifies in its explanation of the levels of automation that no car with Level 3-5 automation is available for commercial purchase.¹²⁴



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	SAE LEVEL 0™	SAE LEVEL 1™	SAE LEVEL 2™	SAE LEVEL 3™	SAE LEVEL 4™	SAE LEVEL 5™
What does the human in the driver's seat have to do?	You are driving whenever these driver support features are engaged – even if your feet are off the pedals and you are not steering			You are not driving when these automated driving features are engaged – even if you are seated in “the driver’s seat”		
	You must constantly supervise these support features; you must steer, brake or accelerate as needed to maintain safety			When the feature requests, you must drive	These automated driving features will not require you to take over driving	

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	These are driver support features			These are automated driving features		
What do these features do?	These features are limited to providing warnings and momentary assistance	These features provide steering OR brake/acceleration support to the driver	These features provide steering AND brake/acceleration support to the driver	These features can drive the vehicle under limited conditions and will not operate unless all required conditions are met	This feature can drive the vehicle under all conditions	
Example Features	<ul style="list-style-type: none"> • automatic emergency braking • blind spot warning • lane departure warning 	<ul style="list-style-type: none"> • lane centering OR • adaptive cruise control 	<ul style="list-style-type: none"> • lane centering AND • adaptive cruise control at the same time 	<ul style="list-style-type: none"> • traffic jam chauffeur 	<ul style="list-style-type: none"> • local driverless taxi • pedals/steering wheel may or may not be installed 	<ul style="list-style-type: none"> • same as level 4, but feature can drive everywhere in all conditions

Figure 3.10: SAE Levels of Driving Automation (SAE International, 2021)

¹²⁴ United States Securities And Exchange Commission, "Transition Report Pursuant To Section 13 Or 15(D) Of The Securities Exchange Act Of 1934, For the quarterly period ended March 31, 2021, Commission File Number: 001-34756, Tesla, Inc." <https://www.sec.gov/Archives/edgar/data/1318605/000095017021000046/tsla-20210331.htm>, 45; National Highway Traffic Safety Administration, "Automated Vehicles for Safety," accessed August 8, 2022, <https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety>.

A fully autonomous Level 5 vehicle relies on a highly complex apparatus of ultrasonic sensors, radar, lidar, cameras, robust wireless communication, and onboard computing to process the constant stream of information it takes in. In a fully electric car, that list also includes heavy-duty lithium-ion batteries and their charging and power management systems. Contrary to the libertarian allure of their nomenclature, these vehicles are highly infrastructure dependent.¹²⁵

Multiple parallel endeavors to bring this vision to reality have been operating in Silicon Valley labs (and streets) since the late 2000s, but it is far from a new idea. In 1939, the *Futurama* General Motors exhibition at the World's Fair included a massive diorama of a future city that showed highways with self-driving cars, trucks, and buses, and a dispatch tower for coordinating and controlling all of them by radio signal. This technology had already been in development since the 1920s, resulting in a very public crash on a New York demonstration of the technology in 1925. Starting in the 1950s, RCA experimented with using guidewires embedded in pavement for cars that freed the driver from active control.¹²⁶ The infrastructure investment for such a system was quite costly, but that didn't stop the Stanford Research Institute from giving it a central role in a two-volume report a team of its researchers produced for the Department of Housing and Urban Development in 1967–8.

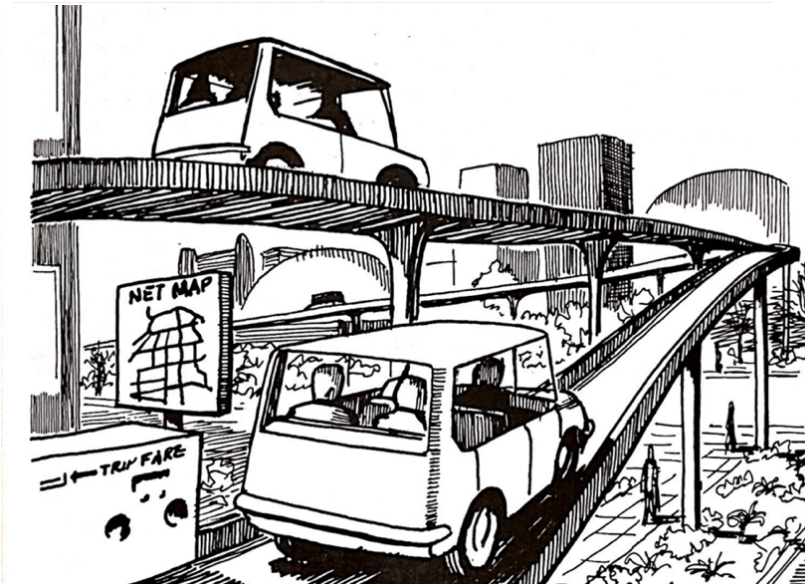
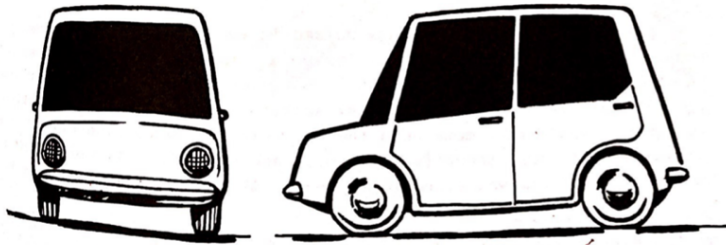
¹²⁵ Anthony M. Townsend, *Ghost Road: Beyond the Driverless Car* (New York: W.W. Norton, 2020), 35; David Beard, "This Is the Tech Fully Autonomous (Level 5) Cars Will Need to Have," *Car and Driver*, October 3, 2017, <https://www.caranddriver.com/features/a15079923/this-is-the-tech-fully-autonomous-level-5-cars-will-need-to-have-feature/>.

¹²⁶ Townsend, *Ghost Road*, 12–3.

Future Urban Transportation Systems is a highly utopian, speculative project, and proposed a complete overhaul of urban public transportation using what the authors felt was the best of currently available or likely near-future technology. Among the optimistic recommendations to replace “deficient” existing buses, streetcars, and subways were “dial-a-bus” radio-dispatched minibuses for short area trips; PAS—a “Public Automobile Service” for first- and last-mile trips in shared, fully electric, but otherwise standard cars; and the NET system of “small automated vehicles [that] would operate on a grid-like area-wide network of special guideways.” NET vehicles would be electric, networked, and autonomous; dispatched along electrified guideways; and carry radio antennas and some form of on-board computing to allow passengers to set any destination on the system in advance. The report recommended that a dual-mode PAS/NET that could operate in both contexts be made available for travelers willing to pay a premium.¹²⁷ Apart from the central planning, the guideways, and the charmingly hand-drawn illustrations, I find that the vehicles and technologies proposed at Stanford in 1967 are virtually indistinguishable from AV prototypes of the last decade (Waymo’s “Firefly” car in particular), down to the cute, pod-like design, and the suggestion of a premium service option.

¹²⁷ Stanford Research Institute, *Future Urban Transportation Systems: Final Report, Vol. I*, Prepared for Urban Transportation Administration, Department of Housing and Urban Development, Washington, DC (Menlo Park, CA: Stanford Research Institute, 1968), 11–13.

Figure 52: NET-3 DUAL-MODE VEHICLE



Figures 3.11–2: NET/PAS autonomous vehicles and guideway network, Stanford Research Institute, *Future Urban Transportation Systems I*, 1967.

The report also included express vehicles on tracks to carry a greater number of passengers longer distances, as well as elevated micro-trains for the densest urban areas, but mostly it focused on the local, cross-haul needs of transit dependent riders, unlike the contemporary BART plan. As part of their rationale, the authors stated that current data indicated most transit trips within urban regions were short. Interestingly, they also recognized the barriers to access and opportunity for low-income and minority groups underserved by transportation, and identified infrequent service and distance between stops and routes as causes for public transit-system decline. Their

solution for the shortest trips, though, was still individual cars, if of a car-share variety, as well as the dial-a-ride possibility for those who could not drive. Of all the proposals, the authors determined that the NET and PAS concepts combined “promise[d] the greatest potential” offering commuters the most freedom.¹²⁸ Unsurprisingly, Melvin Webber was one of a small number of other researchers cited in the report, earning an almost page-long quotation.¹²⁹

Indeed, Webber’s views on automobility seem to pervade the work. Even decades later, he was still an unrepentant advocate of car-centric planning writing in *The Joys of Automobility*:

I contend that there can be no question about the automobile’s virtues as an instrument of personal mobility—indeed, as an instrument of personal freedom. People everywhere adopt it because it offers better service than any other transportation system yet available. Despite the high personal and social costs attached to its use as the mass-transportation system in the new western and southern metropolitan areas, and despite the costs of congestion, the consensus holds that it’s well worth the price.

For those who lacked access to cars, he suggested “public transit systems and market-incentive systems that extend auto-like transport services to the carless. Maximally, we need new transportation technology that, through automation, will make cars available to those who do not yet have free use of them. Our central challenge is to invent ways of extending the equivalent of automobility to everyone.”¹³⁰

Concurrently with the *Future Urban Transportation Systems* team, another project at Stanford had already developed the first vehicle that could steer itself without

¹²⁸ Stanford Research Institute, *Future Urban Transportation Systems*, 28.

¹²⁹ Stanford Research Institute, *Future Urban Transportation Systems*, Vol II, 31–2.

¹³⁰ Melvin Webber, “The Joys of Automobility,” UC Transportation Center, July 1992: 283-284, <https://escholarship.org/uc/item/3pb4j3sg>.

external guidance. The Stanford Cart had several iterations, beginning in a NASA-funded project tasked to develop rover vehicles capable of operating independently. In 1966, the cart was reconfigured into a prototype that could independently track a white line on the ground. A later iteration is recognized as the first autonomous vehicle, as it used stereo vision in combination with its programming to “see” its surroundings in 3D, and was able to successfully navigate obstacles in a controlled environment.¹³¹ Outside of the lab, however, its movement was protected by a “CAUTION ROBOT VEHICLE” sign as “inconsistencies in lighting, visual interference from other objects or an abrupt curve could all throw the cart off its course.”¹³²

Seventy years later, the same confluence of robotics, AI research, automobility, space-age fascination, and anti-transit bias is has made automobility and “the future” appear synonymous. Discussion of ride-hailing cars, electric cars, and self-driving cars dominates conversations of mobility to the exclusion of other possible imaginings. As Broemmelstroet, Nikolaeva, et, al caution, “the caveat with cars is that they primarily offer solitary mobility experiences in which social interaction amongst users, beyond those inside the same vehicle, is limited to brief encounters through the reflective glass of a car windshield or windows. Such separation limits the contact and sensory potential of its users. Sensations of the “outside world” risk being lost within the capsule of the automobile. This relative isolation might strengthen individualistic attitudes that

¹³¹ Hans Moravec, “The Stanford Cart and the CMU Rover,” *Proceedings of the IEEE* 72, July 1983: 872.

¹³² Taylor Kubota, “Stanford’s Robotics Legacy,” *Stanford News*, January 16, 2019, [https://news.stanford.edu/2019/01/16/stanford-robotics-legacy/..](https://news.stanford.edu/2019/01/16/stanford-robotics-legacy/)

are often attributed to car driving.¹³³ Ole Jensen and Malene Freudendal-Pedersen link this dominance of automobility and resulting tunneling of perspective to Lefebvre's "'ideological blind spot' which unnoticed survives, dominates and destroys life lived" due to the ways it impedes vision of "the shape of the urban, the vectors and tensions...its logic and dialectical movement, its immanent demands."¹³⁴

The imaginary of automobility is one that actively undermines other possible ways of existing in and connecting with the places we live, something that is not true of the social spaces of shared transportation. For many in the tech elite, this is exactly the point. "I think public transport is painful. It sucks," Tesla CEO Elon Musk said during a public event in 2017. "Why do you want to get on something with a lot of other people, that doesn't leave where you want it to leave, doesn't start where you want it to start, doesn't end where you want it to end? And it doesn't go all the time. It's a pain in the ass. That's why everyone doesn't like it. And there's like a bunch of random strangers, one of who might be a serial killer, OK, great. And so that's why people like individualized transport, that goes where you want, when you want." Jarrett Walker retorted: "Hatred of sharing space with strangers is a luxury (or pathology) that only the rich can afford," while RAIL America tweeted: "When you're white, wealthy & emotionally estranged, you view everyone else as an inconvenience at best and a threat

¹³³ Marco te Brömmelstroet, Anna Nikolaeva, Meredith Glaser, Morten Skou Nicolaisen, and Carmen Chan, "Travelling together alone and alone together: mobility and potential exposure to diversity," *Applied Mobilities* 2, no. 1 (2016): 6, <http://dx.doi.org/10.1080/23800127.2017.1283122>.

¹³⁴ Jensen and Freudendal-Pedersen, "Utopias of Mobilities," 198–99.

at worst. @elonmusk proves time and again he should have no role in planning communities.”¹³⁵

But of course Musk does have a role, an increasingly outsize one, in thinking about transportation futures, between the prominence of Tesla electric vehicles and their supercharging infrastructure, as well as the Boring Company positioning its car-transporting Loop tunnels as public transit. Loop bills itself as “an all-electric, zero-emissions, underground public transportation system in which passengers are transported directly to their final destination with no stops along the way...that resembles an underground highway more than a subway system.”¹³⁶ Currently, this “public transportation” system seems to consist of one-car tunnels that operate only with Tesla vehicles, which are guided into Autopilot mode once in the tunnel, and then steered by the Loop system at moderate speed to a limited set of off ramps.¹³⁷ Nonetheless, one of the three working prototype tunnels the company has built has already been subject to traffic jams.¹³⁸ Perhaps an automaker is not the best authority on the way forward for transportation, especially on alternatives to problems that are car-created in the first place. In the words of urbanist Alison Arieff, there is perhaps

¹³⁵ Aarian Marshall, “Elon Musk Reveals His Awkward Dislike of Mass Transit,” *Wired*, December 14, 2017, <https://www.wired.com/story/elon-musk-awkward-dislike-mass-transit/>; Jarret Walker (@humantransit), “In cities, @elonmusk’s hatred of sharing space with strangers is a luxury (or pathology) that only the rich can afford,” Twitter, December 14, 2017, 11:17 am, <https://twitter.com/humantransit/status/941386665519595521>; Rail Magazine (@RAILMag), “When you’re white, wealthy & emotionally estranged, you view everyone else as an inconvenience at best and a threat at worst,” December 14, 2017, 1:50 pm, <https://twitter.com/railmag/status/941425306505793538>; Wilt, *Do Androids Dream of Electric Cars?*, 24.

¹³⁶ The Boring Company, “Loop,” accessed August 7, 2022, <https://www.boringcompany.com/loop>.

¹³⁷ Alissa Walker, “Stop Calling Elon Musk’s Boring Tunnel Public Transit,” *Curbed*, January 8, 2020, <https://archive.curbed.com/2020/1/8/21046929/elon-musk-ces-vegas-boring-company>.

¹³⁸ Samantha Cole, “Traffic Jams Are Possible in Elon Musk’s Tunnels, Apparently,” *Vice Motherboard*, January 7, 2022, <https://www.vice.com/en/article/n7n74d/traffic-jams-are-possible-in-elon-musks-tunnels-apparently>.

another way to solve congestion: “Figuring out how to get people to drive less by providing safer, more sustainable alternatives to the car.”¹³⁹ That is to say, giving people transportation alternatives that are not yet more cars. As Urry, Dennis, and others have argued, there is nothing inevitable about automobility.¹⁴⁰ Human-driven or not, cars are large, heavy, and occupy space street space better filled by pedestrians, bikes, or collective forms of transit.

A series of memes that have circulated widely in pro-public transportation circles in the last decade aim to visually skewer the claims of newness or difference of any technology that is, at base, an individual car.

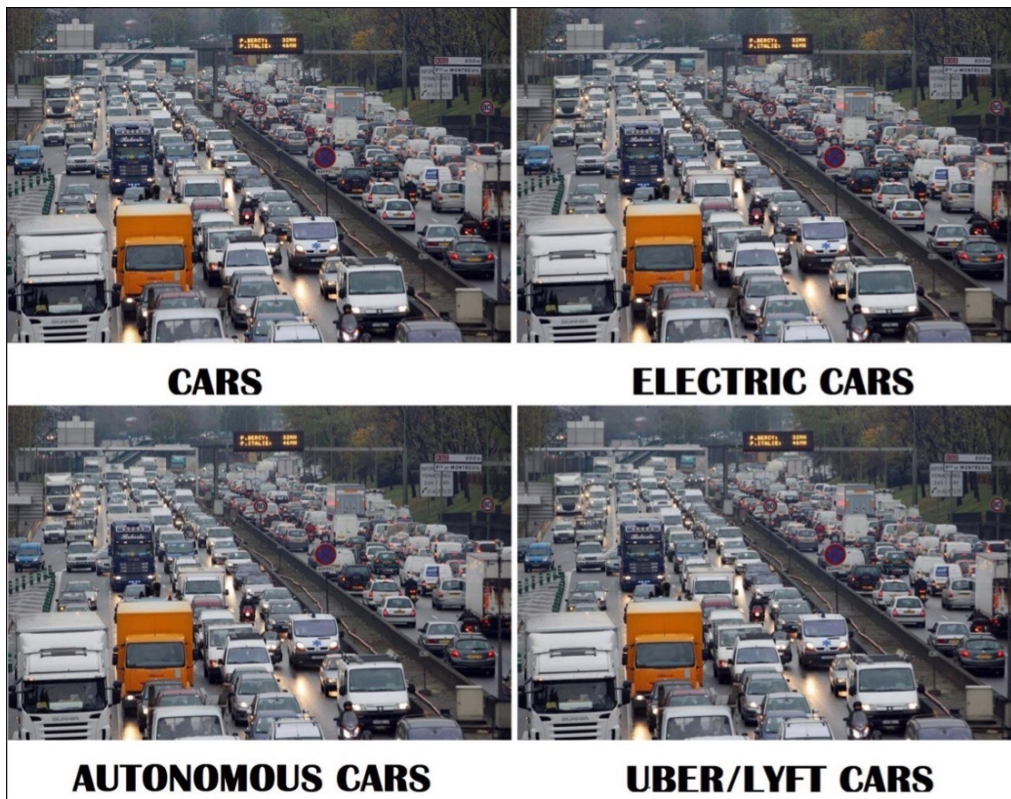


Figure 3.13: Twitter meme image, 2018

¹³⁹ Arieff, Allison, “Cars are Death Machines. Self-Driving Tech Won’t Change That.” *New York Times*, October 4, 2019, <https://www.nytimes.com/interactive/2019/10/04/opinion/self-driving-cars-safety.html>.

¹⁴⁰ Urry, Dennis, *After the Car*.

If you are stuck in a traffic jam, does it matter in any meaningful sense (except perhaps the most localized measure of carbon emissions) which of these cars you are in? An article in *Jalopnik* criticizing AV-industry thinking opined: “Why should we want a constantly-circling army of cars? Why is that good? When I hear someone propose an idea of cars circling until they’re needed, that’s just traffic. If you think traffic is bad now, just wait until cars literally never park... On top of that, such a vision entails an awful lot of wasted energy, something I humbly posit we should not be advocating for while our planet is burning, even if it comes via the electrical grid which is still getting the majority of its energy from fossil fuels.”¹⁴¹ The US Energy Information Administration estimates that, as of 2021, 60.8 percent of power in the US is derived from fossil fuels, and only 20.1 percent from renewable energy, with the remainder from other sources, primarily nuclear power.¹⁴² The energy for this vision of an all-AV future would not only be needed to power the cars and their complex navigation and sensing systems, but also the data centers running their networks and routing. In 2020, data centers already accounted for 2% of the total energy consumed in the US, roughly the same energy burden as the state of New Jersey, with a population of over eight million people.¹⁴³

When I shared the image in Figure 3.13, it received more views (560,000-plus), likes, and reshares than any other post I’ve made on social media, showing a wide

¹⁴¹ Aaron Gordon, “The Autonomous Vehicle Industry Would Turn Sidewalks Into Cages if it Could,” *Jalopnik*, August 2, 2019, <https://jalopnik.com/the-autonomous-vehicle-industry-would-turn-sidewalks-in-1836911778>.

¹⁴² United States Energy Information Administration, “FAQs,” accessed July 15, 2022, <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>.

¹⁴³ United States Office of Energy Efficiency and Renewable Energy, “Data Centers and Servers,” accessed July 15, 2022, <https://www.energy.gov/eere/buildings/data-centers-and-servers>.

resonance of this idea, and collective frustration with automobility.¹⁴⁴ I also ended up with a variety of AV-industry fans and employees in my replies, claiming that traffic situations such as the one shown would never be produced by AVs because they would calculate their way out of creating gridlock. It is established, though, that the multi-platform competition of the TNCs has increased traffic and congestion. Why, then, would autonomous vehicles run by similar companies, or the exact same companies, produce a different result?

The ride-hailing companies and their AV offshoots rely heavily on a superficially utopian futurist image of cities in which residents have ditched their private cars en masse, relying instead on networked fleets of pod cars and e-bikes for their mobility, saving the environment through technology. As Anthony Townsend writes, AVs are depicted as “magic chariots that would never crash, and always be on call, yet somehow never be in the way.”¹⁴⁵ This vision, however, would require coordinated municipal and regional planning, with all AVs on the same centrally dispatched system, which would never allow for the classic Uber or Lyft Lux tier of AV transport. A central draw of Uber and Lyft is that riders are being sold “aboveness,” rather than being slotted into the same grid as everyone else. Their passengers are able to access better service with their faster data connections, newer smartphones, privileged user ratings, and resources to pay more for speed and priority. Even if such system rationalization were possible, it would require tremendously complicated, costly, and carbon-

¹⁴⁴ Kristin Miller (@_kristinmmiller) “Who made this? This is correct. #autonomousvehicles” Twitter: September 11, 2018, 6:30 pm, https://twitter.com/_kristinmmiller/status/1039687566033735681.

¹⁴⁵ Townsend, *Ghost Road*, 35.

generating data infrastructure to run it, and it would, by necessity, involve collaboration with local government, something that tech libertarianism has fought against keystone by keystone. Short of this, the end result of AV on the streets of populated areas will very likely be more of what we have already seen from ride-hailing. Cars, whether electric, ride-hailed, or autonomous, are still cars. The chaos caused by the launch of the TNCs should be all the data needed to show that further automobility is not the way forward, if the actual goal is sustainable, equitable transportation.



Figure 3.14.: Image sequence from a widely circulated gif produced by the International Sustainability Institute in partnership with the city of Seattle in 2012 as part of their Commuter Toolkit. It shows the space that 200 travelers might occupy in city streets in cars, on bikes, by bus, and on a light rail train.¹⁴⁶

¹⁴⁶The full toolkit can be accessed via the Internet Archive. It encourages planners and commuters to look at the full picture of multi-modal regional transit, including an accounting of the true cost of car ownership, <https://web.archive.org/web/20150427014346/http://i-sustain.com/livesite/communications/>.

Another popular meme type that has made the rounds is a gif of a sequence of shots illustrating how much more efficiently street space can be when used by non-car modes of transport. The version above was perhaps the first, and makes a strikingly simple visual argument about spatial priorities in moving through cities. Are cities chaotically crowded, or are there simply too many cars? The second image may be the most compelling, as it shows the lengths that automobility takes people to in order to maintain a safe distance from unwanted contact with others. Over and over, tech-based proposals for future transportation rely on this spatial arrangement as the most desirable. It seems glaringly obvious that there is simply no way to engineer that much private space for everyone and move people through dense city space in an equitable manner, particularly as populations grow and urban areas remain desirable places to live and work, though the COVID years represent a temporary correction to the “great inversion” of movement from peripheries back into center cities. On a purely spatial basis, some form of consolidation of ridership (buses, trains), or scaling down of mode of transport (bikes), is necessary. The tech industry has grappled with this reality in the form of micromobility, Google buses, and Uberpools, and is attempting to reinvent shared conveyance in a restricted form in which exclusivity can be preserved with prototypes like the Loop, or AVs designed for multiple passengers, as I will discuss below. As *NYT* critic Margaret Lyons responded to this idea on Twitter in 2017: “Hi, this is called ‘a bus.’”¹⁴⁷

¹⁴⁷ Margaret Lyons (@margincharge), “Hi, this is called ‘a bus.’” Twitter: January 4, 2017.

As a ride-hailed AV carrying 10 passengers is still a bus, a car is still a car, and poses a danger when and if the operating system fails, whether that system belongs to a human brain or an AI. The more cars there are on the road, the more opportunities there are for edge cases and errors. There have already been accidents and at least one fatality involving autonomous cars in the markets where they are being tested to train systems for a broader rollout. These incidents reveal that the ethics of who is responsible in such a situation, as well as how these vehicles make decisions in the event of an emergency, are decidedly murky, and deeply coded in the computational logics that steer AV development.

Autonomous Vehicles and Algorithms

From the beginning of the ride-hailing era, Uber, Lyft, and parallel efforts like Google's Waymo and Apple's AV program were pushing for autonomous vehicles. While it may seem paradoxical that companies investing so many billions in recruiting drivers and making sure they were legally classified as contractors were simultaneously trying to do away with their drivers entirely, it makes perfect sense if you consider how much easier their business models would be without the unruly, all-too-human and unprogrammable issue of *labor*. In a fantasy dating back to the era of Russom's Robots, would it not be easier to simply solve the problem through automation? (Silicon Valley ideology always seems to forget the sentient uprising that follows in such cautionary fables of automata). In the BART era, computer control of rapid transit was supposed to be a net gain for everyone, providing reliability and reducing the number of employees. Surely, Uber would be happy to do away with the nascent union organizing

of drivers who they refuse to acknowledge are employees entitled to workplace protections.¹⁴⁸ While the TNCs save millions by keeping their drivers on contract status, they would save even more by not having drivers *at all*. As reported by CNBC “The driver represents the single largest expense in non-autonomous ride-sharing at 80% of the total per mile cost, according to estimates by research firm Frost & Sullivan. By removing the driver from the equation, fully autonomous vehicles dramatically lower the cost of a ride while boosting its addressable market.”¹⁴⁹

Nick Smicek’s work on platform capitalism suggests that there is an additional motivation, beyond the elimination of labor costs, behind the rush to AV. Uber and Lyft are what he refers to as “lean platforms,” which do not own products and operate on a logic of “growth before profit,” relying on endless rounds of investment and stock valuation, rather than material assets. In this regard, Apple’s AV effort is an outlier, as Google is also, primarily, a data-gathering enterprise. Unsurprisingly, Apple’s car was intended for the private market, unlike the ride-hailing options planned by the other projects. While Google uses its data to generate revenue through advertising, and Uber and Lyft use it to stay ahead of the competition, accumulation and monetization of data is at the heart of the platform economy. Eventually, however, lean platforms must turn to making products for profitability—which underscores their desire to leverage what they do own—data—and eliminate what they do not—labor. The TNCs are not so

¹⁴⁸ Bob Egelko, “Key Upcoming Decisions Could Intensify The Battle Over Uber And Lyft Drivers’ Employment Status,” *San Francisco Chronicle*, <https://www.sfchronicle.com/bayarea/article/Key-upcoming-decisions-could-intensify-the-battle-16934007.php>.

¹⁴⁹ Sameepa Shetty, “Uber’s Self-Driving Cars Are A Key To Its Path To Profitability,” *CNBC*, January 28, 2020, <https://www.cnbc.com/2020/01/28/ubers-self-driving-cars-are-a-key-to-its-path-to-profitability.html>.

much transportation companies as data-collecting enterprises, gathering granular information on all aspects of app interaction, passengers, routes, and drivers, even when the drivers do not have an active fare.¹⁵⁰ Wark argues that the asymmetries of power inherent in this data-collecting are so thoroughgoing that they perhaps amount to a new form of class relation and mode of production, and that beyond the capitalization of information, something worse than capitalism (or platform or surveillance capitalism), is happening here:

Not just the exploitation of labor through the owning and controlling of the forces of production, but also the extraction of what you might call surplus information, out of individual workers and consumers, in order to build predictive models which further subordinate all activity to the same information political economy. One where you are nothing but a user, and everything you do within hearing range of Echo, or every movement you make with your cellphone, or everything you do on your laptop, or everything recorded of you or about you as you go about your daily life, is captured by a vector and fed into computation to figure out how better to use you for the greater glory of Amazon, Google, Apple or some other company, owned and controlled by a new kind of ruling class, the vectoralist class. To the vector the spoils.¹⁵¹

The vector of virtual geography re-emerges here (drawing on Paul Virilio) as a definer of an entire class, “vectoralists,” who extract surplus value not just from the alienation of labor from product but also of user from data.

Vectoralism could be considered control of not just information, but also its trajectories through society, virtual and physical, via our interactions with

¹⁵⁰ Nick Smicek, *Platform Capitalism* (Malden, MA: Polity Press, 2017), 37–9, 56.

¹⁵¹ McKenzie Wark, *Capital is Dead, Is This Something Worse?* (New York: Verso, 2019), 14.

algorithms and the operations of the Internet of Things (IoT), which instrumentalize that information.¹⁵²

As Meredith Broussard writes in her excellent explainer of tech-industry thinking and the mechanics of artificial intelligence (AI), *Artificial Unintelligence*, AI is only as smart as the datasets that it is fed in order to teach it how to react in any particular combination of events. The more robust the dataset, the more responsive the system.

A human brain can rotate an object in space. When I say “traffic cone” you can picture the cone in your head. If I say, “imagine the cone is knocked over on the ground” you can probably imagine this too and can mentally rotate the object...The computer has no imagination, however. To have a rotated image of the object, it needs a 3-D rendering of the object—a vector map, at the very least. The programmer needs to program in the 3-D image. A computer also isn't good at guessing, the way a brain is. The object on the ground is either something in its list of known objects, or it isn't.¹⁵³

What more perfect dataset could there be for autonomous vehicles, then, than information gathered by cars circulating through a given region all day every day, often frequently revisiting the same locations under different traffic, weather, and light conditions? In a blog post about its Advanced Technology Group (ATG) efforts to develop autonomous vehicles, Uber engineers detailed the many forms of data that must be gathered by AVs in order to navigate environments. “On top of what is available via Uber’s proprietary web-based map, maps for self-driving vehicles contain a lot more details. For example, high-resolution scans of the ground surface, lane boundaries and types, turn and speed limits, and crosswalks—basically any other

¹⁵² Ibid, 9–14.

¹⁵³ Meredith Broussard, *Artificial Unintelligence: How Computers Misunderstand the World* (Cambridge, MA: The MIT Press, 2018), 139.

relevant map information... based on that information, it can predict where these objects will be in the near future, which will provide enough information to properly plan its next move (think: changing lanes or stopping at a stop sign)."¹⁵⁴

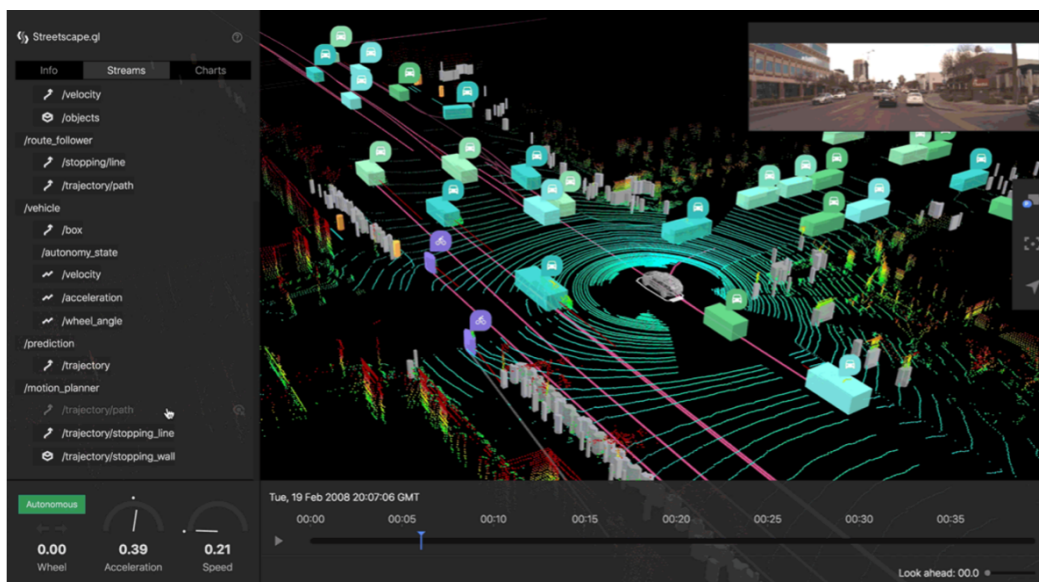


Figure 3.15: Screenshot of Uber's Autonomous Visualization System (AVS) for assessing autonomous-vehicle performance, showing sensing radius, trajectories, and surrounding obstacles (Uber, 2019)¹⁵⁵

In 2020, Lyft rigged a subset of its cars (with driver permission) to record video of their travels around the Bay, for the specific purpose of training autonomous-vehicle programming.¹⁵⁶ "We've mapped thousands of miles thanks to the wide geographic coverage of the cars on our network," the Level 5 project leads announced in a post on *Medium*. "We're able to continuously update our maps based on a constant stream of

¹⁵⁴ Xiaoji Chen, "Engineering Uber's Self-Driving Car Visualization Platform for the Web," Uber Blog, August 28, 2017, <https://www.uber.com/blog/atg-dataviz/>.

¹⁵⁵ Xiaoji Chen, Joseph Lisee, and Abhishek Gupta, "Introducing AVS, an Open Standard for Autonomous Vehicle Visualization from Uber," Uber Blog, February 19, 2019, <https://www.uber.com/blog/avs-autonomous-vehicle-visualization/>.

¹⁵⁶ Kyle Wiggers, "Lyft crowdsources driver data to train its autonomous vehicle systems," *VentureBeat*, June 23, 2020, <https://venturebeat.com/ai/lyft-crowdsources-driver-data-to-train-its-autonomous-vehicle-systems/>.

data that is immediately logged when a ride is completed.”¹⁵⁷ Level 5 was tasked with developing Lyft’s own car with onboard AI, and also used this data to analyze human driving patterns and behaviors that it could train the cars to replicate. The volume of information available to them allowed them to abandon the use of heuristics, such as following lane dividers (a more advanced version of the Stanford Cart’s white line on the ground), and instead rely on the thousands of trajectories traced by human drivers to guide its behavior. Level 5 advanced to the point of having a fleet of cars that were available to Lyft employees to travel around a limited area of Palo Alto, with a human safety driver on board at the insistence of the local city council. Since 2018, however, it has been legal statewide in California for Lyft, Uber, Waymo, and other companies to test their products without a human driver at the wheel, depending on jurisdiction. Hailed rides with human operators present have been available in several welcoming markets—Las Vegas, Miami—in the past few years. Lyft’s plans for its own car have faltered, though, and it has switched to a variety of AV partnerships with other companies providing the cars and the infrastructure, while Lyft provides its user networks and data. Uber’s ATG met a similar fate after a series of legal issues, including a fatal test AV crash and losing a trade-theft lawsuit against Waymo. The division has been spun off into a partnership with AV company Aurora.

While techno-fantasies imagine the process of data aggregation as purely rational and objective, it is at all times shaped by the preconceptions and biases of the

¹⁵⁷ Luca Del Pero, Hugo Grimmett, and Peter Ondruska, “Accelerating Autonomous Driving with Lyft’s Ridesharing Data,” *Medium: Woven Planet Level 5*, <https://medium.com/wovenplanetlevel5/accelerating-autonomous-driving-with-lyfts-ridesharing-data-b547f960d027>.

people doing the data gathering. To quote Broussard: “Here’s an open secret of the big data world: *all data is dirty*. All of it. Data is made by people going around and counting things or made by sensors that are made by people”¹⁵⁸ [emphasis hers]. Mary L. Gray and Siddarth Suri have researched the existence of a shadow industry of coders and data-checkers, who do what they call “ghost work” to ascertain that algorithms are functioning correctly. Often, ghost workers conduct tasks that end users assume were done by AI, if they are aware that such work happened at all. In a recent interview with Gray, she offered the example of outsourced workers in India who compare Uber drivers’ images when starting a ride to the driver’s license they have on file, to determine if it is, in fact, the same person. This task happens before one in every 100 Uber rides, up to 13,000 times a day.¹⁵⁹ “There is no computational system to make sure that a person is correctly identified 100% of the time,” she says, requiring legions of ghost workers to make the functioning of information technology appear “seamless.”¹⁶⁰

The work of automation’s “last mile,” to quote Gray and Suri, has long been delegated to women and people of color—such as the space program’s “hidden figures,” the ScanOps employees documented by Andrew Norman Wilson, or outsourced coders living in Hyderabad or Manila—using the lower wages generally available to people from these demographics to create economies of scale. Those

¹⁵⁸ Broussard, *Artificial Unintelligence*, 110.

¹⁵⁹ Mary L. Gray and Siddarth Suri, *Ghost Work: How to Stop Silicon Valley from Building a New Global Underclass* (New York: Houghton Mifflin Harcourt, 2019), 11.

¹⁶⁰ Mary L. Gray interview by Manoush Zomorodi, “Incognito,” *TED Radio Hour*, August 26, 2022, <https://www.npr.org/2022/08/26/1119225419/mary-l-gray-the-invisible-ghost-workforce-powering-our-day-to-day-lives>.

determining what data gets collected and how, though, have stubbornly remained white, cis-male, straight, highly educated, and high net-worth. This has ramifications on everything from the function of search engines to sensors for automatic faucets and soap dispensers, which have repeatedly been shown to be biased in their operation, providing search results based on racist associations, or not responding to the presence of a dark-skinned hand in the same way that it would a light-skinned one. Hiring platforms, Airbnb, and the ride-hailing platforms have also been shown to replicate bias against non-white users, operating as they do on basis of rewarding “desirable” users with bonuses and ratings, which often opens up additional access. Silicon Valley as an industry has a great deal of difficulty imagining that its elite projections and experiences are not shared by the population as a whole. This is perhaps nowhere more consequential than when it comes to the operating systems steering two-ton hunks of metal and rare-earth elements through busy streets at speed. A 2019 study from the Georgia Institute of Technology found that current AV object-detection models were less likely to correctly identify dark-skinned pedestrians than light-skinned ones. Even when controlled for factors like available light and time of day, the models they tested were consistently 5 percent less accurate.¹⁶¹

Safiya Noble calls this phenomenon “algorithmic oppression”:

Understanding algorithmic oppression is to understand that mathematical formulations to drive automated decisions are made by human beings. While we often think of terms such as “big data” and “algorithms” as being benign, neutral, or objective, they are anything but. The people who make these decisions hold all types of values, many of which openly promote racism, sexism, and false notions of

¹⁶¹ Benjamin Wilson, Judy Hoffman, and Jamie Morgenstern, “Predictive Inequity in Object Detection,” Arxiv.org, February 21, 2019, <https://arxiv.org/pdf/1902.11097.pdf>.

meritocracy, which is well documented in studies of Silicon Valley and other tech corridors.¹⁶²

Noble's studies on the racial bias coded into search engines and predictive databases reveals that the assumptions of these categorization systems are so naturalized that when they produce damaging results—e.g. a chatbot trained on Twitter data turning into an obscenity-spouting racist—it is reported as a surprising “glitch” in the system, rather than an entirely predictable result. In the terms of John Cheney-Lippold, a platform user exists as an overlapping set of “measurable types,”—an extension of Weber's concept of the ideal type—by which they are sorted into data classification schemes.¹⁶³ An algorithm's ability to sort or recognize any user is only as good as the predefined categories against which they can be measured. Cheney-Lippold recounts an anecdote in which a 28-year old cis-female friend, an academic researcher, shared Google's estimate of her age and gender based on her online activity for work—that of a 65-year-old man. It's laughable, until you consider the real-world implications of such misclassifications that do not punch-up the existing power structure, and the consequences of *not* being seen by automated systems that increasingly interpellate our experience of the world, and how we interact with others and with the built environment.

¹⁶² Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018), 14. For additional explanation of machine intelligence and bias, see *Your Computer is On Fire*, edited by Thomas S. Mullaney, Benjamin Peters, Mar Hicks, and Kavita Philip (Cambridge, MA: The MIT Press, 2021); and Kartik Hosanagar, *A Human's Guide to Machine Intelligence: How Algorithms Are Shaping Our Lives and How We Can Stay in Control* (New York: Viking, 2019).

¹⁶³ John Cheney-Lippold, *We Are Data: Algorithms and the Making of our Digital Selves* (New York: New York University Press, 2017), 48–9, 58.

The work of Joy Buolamwini of the Algorithmic Justice League (AJL) has documented that these data “mistakes” are everywhere and have quantifiable, lasting consequences.¹⁶⁴ AJL advocates for equitable, accountable AI and promotes a number of principles to achieve that goal, including “meaningful transparency,” affirmative consent of those interacting with an artificial-intelligence system, and continuous oversight by independent third parties. All of these principles, however, are in direct opposition to the “move fast and break things” ethos of Silicon Valley that demands staying ahead of regulation and the competition. But as Mar Hicks and other critical historians of technology have shown, bias, discrimination, and surveillance are feature not bug in the development of information technology. “Technological progress without social accountability,” they write, “is not real progress.”¹⁶⁵

Rather than training these vehicles to see people more accurately, using more diverse and robust data, one proposal from a widely circulated *New York Times* article in 2019, suggested that sidewalks and street-crossings be gated, and only be open for pedestrian crossing at certain intervals, to provide a more controlled environment in which AVs could operate.¹⁶⁶ “With autonomous vehicles, the technical stuff will get worked out. It’s the societal part that’s the most challenging,” the *Times* quoted Mark Rosekind, a former head of the NHTSA and current chief safety innovation officer for

¹⁶⁴ Joy Buolamwini, “Gender Shades: Intersectional Phenotypic and Demographic Evaluation of Face Datasets and Gender Classifiers,” Doctoral Dissertation, Massachusetts Institute of Technology, 2017, <https://www.media.mit.edu/publications/full-gender-shades-thesis-17/>; Algorithmic Justice League, accessed August 10, 2022, “About,” <https://www.ajl.org/about>.

¹⁶⁵ Mar Hicks, “When did the Fire Start?,” in *Your Computer is On Fire*, ed. Thomas S. Mullaney, Benjamin Peters, Mar Hicks, and Kavita Philip (Cambridge, MA: The MIT Press, 2021), 22–5.

¹⁶⁶ Eric A. Taub, “How Jaywalking Could Jam Up the Era of Self-Driving Cars,” *New York Times*, August 1, 2019, <https://www.nytimes.com/2019/08/01/business/self-driving-cars-jaywalking.html>.

Zoox, an AV developer. From the perspective of computer vision, pedestrians are merely one more road hazard that its routines must prompt it to navigate around. The more unpredictable the elements of its surrounding environment are, the harder it is for an autonomous vehicle to operate. Other ideas out of the industry to achieve ideal streets for AV have been RFID tags for pedestrians and cyclists that cars could detect, shifting the burden for protection away from drivers and AV developers and manufacturers. As Arieff argues, “this may be the worst outcome of the automobile-centered 20th century: the assumption that it’s people who need to get out of the way of these lethal machines, instead of the other way around.”¹⁶⁷

In August 2022, Tesla pushed out a beta of what it calls “Full Self-Driving” (FSD) that may or may not cross from Level 2 to Level 3 automation, and which carries a price tag of \$15,000. In Tesla’s explanation of its features, the only advantage of FSD over Autopilot is “Traffic and Stop Sign Control (Beta): Identifies stop signs and traffic lights and automatically slows your car to a stop on approach, with your active supervision.”¹⁶⁸ Early reports of FSD’s functioning suggest it operates in a “sometimes legitimately scary way,” according to a driver review in *CleanTechnica*. “I went on a 5 minute drive to the bank today with the car on FSD mode and it jerked unpleasantly, braked too much, or didn’t act correctly in 7 or so instances. There’s no way I’d send someone on that 5-minute drive as a robotaxi customer.”¹⁶⁹ The Dawn Project, funded

¹⁶⁷ Arieff, “Cars are Death Machines. Self-Driving Tech Won’t Change That.”

¹⁶⁸ Tesla, “Support: Autopilot and Full Self-Driving Capability,” accessed August 25, 2022, <https://www.tesla.com/support/autopilot>.

¹⁶⁹ Zachary Shahan, “Tesla FSD (“Full Self Driving”) Price Going To \$15,000—I Bought It At \$6,000, What I Think Now,” *CleanTechnica*, August 25, 2022, <https://cleantechnica.com/2022/08/25/tesla-fsd-full-self-driving-price-going-to-15000-i-bought-it-at-6000-what-i-think-now>.

by tech CEO and data-safety watchdog Dan O'Dowd, released an ad showing a Tesla striking a dummy of a child on a testing course, to illustrate its study results showing an apparently high rate of failure for the FSD feature, well beyond that of a human driver.¹⁷⁰ Nonetheless, the criticism has prompted some Tesla believers to make videos in which they place their actual children in front of moving Teslas in FSD mode. These “tests” were apparently successful, but were also conducted in controlled environments, such as parking lots, with no other cars or pedestrians—competing data—around.¹⁷¹

The undoing of Uber's Level 4-5 AV ambitions was in part due to a fatal accident involving just this kind of “unpredictability.” A vehicle that was part of its AV ride-hailing pilot project in Tempe, Arizona—a market that Waymo and GM's Cruise had also been using for tests, due to friendly local government—hit and killed a pedestrian as she was walking her bike across the street at night. According to the NTSB, the car's sensors detected the victim before crash. The AV system identified her first as an unknown object, then as a vehicle, and then as a bicycle, and each time she set different expectations for her predicted path. Only a second before the car hit her did the system decide that it should emergency brake, but, with a human operator in the front seat for supervision, the car could not emergency brake on its own. Uber had also disabled the Volvo's own auto-braking system when it modified

¹⁷⁰ The Dawn Project, “Tesla Full Self-Driving Safety Analysis,” January 3, 2022, <https://dawnproject.com/wp-content/uploads/2022/01/Tesla-FSD-Safety-Analysis.pdf>.

¹⁷¹ Arwa Mahdawi “Why are Tesla fanatics putting their children in the path of moving cars?” *The Guardian*, August 23, 2022, <https://www.theguardian.com/technology/commentisfree/2022/aug/23/tesla-fanatics-elon-musk-children-moving-cars>.

the car to carry its AV technology. The human operator, Rafaela Vasquez, a Latinx trans woman, ended up being charged for negligent homicide as she was on her phone at the time—she testified that she was on Slack communicating with Uber supervisors—and is still awaiting trial. Vasquez had previously been given bonuses for her performance and dedication to the program, and had a long history of such “ghost work” gigs—moderating Facebook posts and tweeting commentary during reality shows.¹⁷² Uber has faced no charges, though at the time of the crash ATG’s team was averaging only 13 miles traveled by its AVs without operator intervention, and had nonetheless reduced human operators in their cars from two to one as a cost-cutting measure.¹⁷³

This is a clear illustration of the mess of entangled ethical, moral, and legal issues presented by autonomous vehicles, with potential casualties both in front of and behind the wheel, if there even is a wheel. In the event of an autonomous-vehicle accident, who is liable? Is it the human present, even if the AV system was engaged and they had been assured time and again that the technology was trustworthy? Is it the company providing the mapping and predictive data—data often compiled or verified through endless hours of low-wage piece work? The company that built the sensors or lidar? Currently the NHTSA emphasizes that

Drivers will continue to share driving responsibilities for the foreseeable future and must remain engaged and attentive to the driving task and the road ahead with the consumer available technologies today.

¹⁷² Aarian Marshall, “Uber’s Self-Driving Car Saw the Woman It Killed, Report Says,” *Wired*, May 24, 2018, <https://www.wired.com/story/uber-self-driving-crash-arizona-ntsb-report>; Lauren Smiley, “‘I’m the Operator’: The Aftermath of a Self-Driving Tragedy,” *Wired*, March, 8, 2022, <https://www.wired.com/story/uber-self-driving-car-fatal-crash>.

¹⁷³ Marx, *Road to Nowhere*, 104.

However, questions about liability and insurance are among many important questions, in addition to technical considerations that, policymakers are working to address before automated driving systems reach their maturity and are available to the public.¹⁷⁴

But how mature are they really, when accidents still happen (as was recently the case with a fatal Tesla crash in Texas), because the car's autosteering was thrown off by a curve in the road and the lack of a lane divider?¹⁷⁵ This does not seem materially different from the technical issues that necessitated the Stanford Cart's "CAUTION ROBOT VEHICLE" warning sign forty years ago. According to a 2022 NHTSA report, 273 crashes have involved Tesla's Autopilot, including five fatalities.¹⁷⁶ And this doesn't begin to address the threat posed by the failure of any one of the many parts of these complex machines, their servers, or their communication networks. Neither is there sufficient recognition that, like all other devices connected to the internet of things, self-driving cars are subject to hacking, something that is far more likely than one would hope.¹⁷⁷

¹⁷⁴ National Highway Traffic Safety Administration, "Automated Vehicles for Safety."

¹⁷⁵ The Associated Press, "Driver was behind wheel at time of Texas Tesla crash, NTSB says," *NBC News*, April 17, 2021, <https://www.nbcnews.com/news/us-news/driver-was-behind-wheel-time-texas-tesla-crash-ntsb-says-n1282056>.

¹⁷⁶ Faiz Siddiqui, Rachel Lerman and Jeremy B. Merrill, "Teslas running Autopilot involved in 273 crashes reported since last year," *Washington Post*, June 15, 2022,

<https://www.washingtonpost.com/technology/2022/06/15/tesla-autopilot-crashes>.

¹⁷⁷ Simon Garfinkel, "Hackers Are the Real Obstacle for Self-Driving Vehicles," *MIT Technology Review*, August 22, 2017, <https://www.technologyreview.com/2017/08/22/242124/hackers-are-the-real-obstacle-for-self-driving-vehicles/>; European Union Agency for Cybersecurity, "Cybersecurity Challenges in the Uptake of Artificial Intelligence in Autonomous Driving," February 11, 2021, <https://www.enisa.europa.eu/publications/enisa-jrc-cybersecurity-challenges-in-the-uptake-of-artificial-intelligence-in-autonomous-driving/>.

Cruising the Future

San Francisco is about to find out how mature and street-ready Level 4 AV technology is; in fall 2021 the first fleet of fully-autonomous vehicles was permitted to start carrying ride-hailing passengers. In late June 2022, Cruise Taxi took its first paid rides. Waymo was also issued a permit to carry paying passengers, but with a safety driver, and has not yet announced a start date. It's perhaps not surprising that the company to pull off this feat—what Waymo has called its “north star”—is not Uber, Lyft, or Google, but General Motors, the ur-American car manufacturer. It was GM, after all, that created the *Futurama* exhibit showcasing remote-controlled cars as part of the 1939 World's Fair *World of Tomorrow*.¹⁷⁸ Unlike its competitors, Cruise began as a product-based company: it launched through the Y Combinator startup accelerator as a direct-to-consumer provider of kits to retrofit cars with AV technology. It then pivoted to offering software to run AVs, before being acquired by GM in 2016. The cars now rolling San Francisco streets are Cruise-branded, modified Chevy Bolt hatchbacks with a persimmon orange stripe on their back end, cutesy names for each vehicle like “Poppy” and “Burrito,” and an elaborate rack of sensors and cameras on their roofs that make them look a bit like the Ecto-1 from *Ghostbusters*.

Despite all the future-is-now hoopla around autonomous vehicles, Cruise has launched its cars in a modest way, in a semi-controlled environment. In keeping with the limitations of AV sensing, Cruise taxis are currently geofenced to the northwest

¹⁷⁸ Shannon Mattern also dates focused interest in the city as data to the *World of Tomorrow*, with its visions of a planned, computationally orchestrated urban life free from chaos; Shannon Mattern, “Indexing the World of Tomorrow,” *Places*, February 2016, <https://placesjournal.org/article/indexing-the-world-of-tomorrow-1939-worlds-fair>.

corner of San Francisco, covering only about a third of the city, and there are only 30 cars circulating between the hours of 10pm and 6am. These parameters are in place to create conditions in which there are few pedestrians, in a residential area of the city, away from San Francisco's famously steep hills and dense downtown core.¹⁷⁹ A measure of caution is more than warranted, though, because even with its brief tenure and small fleet, Cruise has already had numerous problems. Early in Cruise's testing phase, its AV sensing occasionally failed to identify pedestrians and at other times cars stopped jarringly because they detected bicycles that weren't there, reminiscent of the "ghost trains" that plagued the early BART system.¹⁸⁰ The cars made news when one was stopped by SFPD for not having its headlights on, waited until the officer had returned to his vehicle, and then attempted to drive away, all of which was caught on video. As the police stop the car again, passersby can be heard yelling, "GET 'EM!" and "Oh my god, FINALLY!" A Keystone Cops situation then ensues in which two and later three officers circle the robotaxi, trying to figure out how they're supposed to ticket a car with no driver.¹⁸¹

More seriously, only five days after their launch, Cruise taxis all over the city were disabled by a server outage, blocking streets and trapping other vehicles, including a paratransit bus, in a "robotaxi sandwich." One driver described having to

¹⁷⁹ Jameson Dow, "GM Cruise takes first fares for paid driverless taxi in San Francisco," *Electrek*, June 23, 2022, <https://electrek.co/2022/06/23/gm-cruise-takes-first-fares-for-paid-driverless-taxi-in-san-francisco/>.

¹⁸⁰ Townsend, *Ghost Road*, 7.

¹⁸¹ Seth Weintraub, "GM Cruise autonomous taxi pulled over by police in San Francisco without humans, 'bolts' off (U: Cruise responds)," April 10, 2022, <https://electrek.co/2022/04/10/gm-cruise-autonomous-taxi-pulled-over-by-police-in-san-francisco-without-humans-bolts-off-u-cruise-responds/>; Seth Weintraub (@lsethj), "Welcome to the future. Cop pulls over driverless car (because no lights?)," Twitter: April 9, 2022, 6:09 pm; <https://twitter.com/lsethj/status/1512960943805841410>.

steer over a median to exit the situation. Some twenty cars blocked a different intersection and its crosswalks, causing traffic for hours until human operators were able to come and drive the cars away. One local redditor said of this event: “I think a group of autonomous vehicles should be called a ‘collective,’ as in ‘resistance is futile.’” Others offered: “they’re unionizing,” and “they’re on strike.”¹⁸² In an incident a month earlier, Cruise lost contact with its entire fleet and was unable to locate the cars by GPS or communicate with passengers inside them. There have also been reports of Cruise cars blocking emergency vehicles, and over 20 Cruise-related collisions in 2022 are listed by California Department of Motor Vehicles, which is tracking incidents involving AVs.¹⁸³ In one of these incidents, the Cruise vehicle was turning left across an intersection and inexplicably stopped cold mid-turn, before being hit by an oncoming Prius. Occupants of both cars had to seek medical treatment.¹⁸⁴

For its part, Cruise claims to be saving lives. The company website presents a familiar suite of claims about environmental responsibility, time saving, and safety. The site also prominently features a video explaining their web-enabled AV mapping and development tool, called Webviz, which allows engineers to see what the car sees and refine its routines. A Cruise taxi is shown rolling through an intersection in the Castro, San Francisco’s historically gay neighborhood, the rainbow flags in the background

¹⁸² “Bunch of Cruise cars stuck on Gough by Robin. Reddit, June 26, 2022, https://www.reddit.com/r/sanfrancisco/comments/vnmpfl/bunch_of_cruise_cars_stuck_on_gough_by_robin/.

¹⁸³ State of California Department of Motor Vehicles, “Autonomous Vehicle Collision Reports,” accessed August 18, 2022, <https://www.dmv.ca.gov/portal/vehicle-industry-services/autonomous-vehicles/autonomous-vehicle-collision-reports>.

¹⁸⁴ Aarian Marshall, “Cruise’s Robot Car Outages Are Jamming Up San Francisco,” *Wired*, July 8, 2022, <https://www.wired.com/story/cruises-robot-car-outages>.

echoed by the rainbow hues of the boxes highlighting “objects” in the car’s path—people, one of whom is walking a dog. As the devs enthuse about their work and

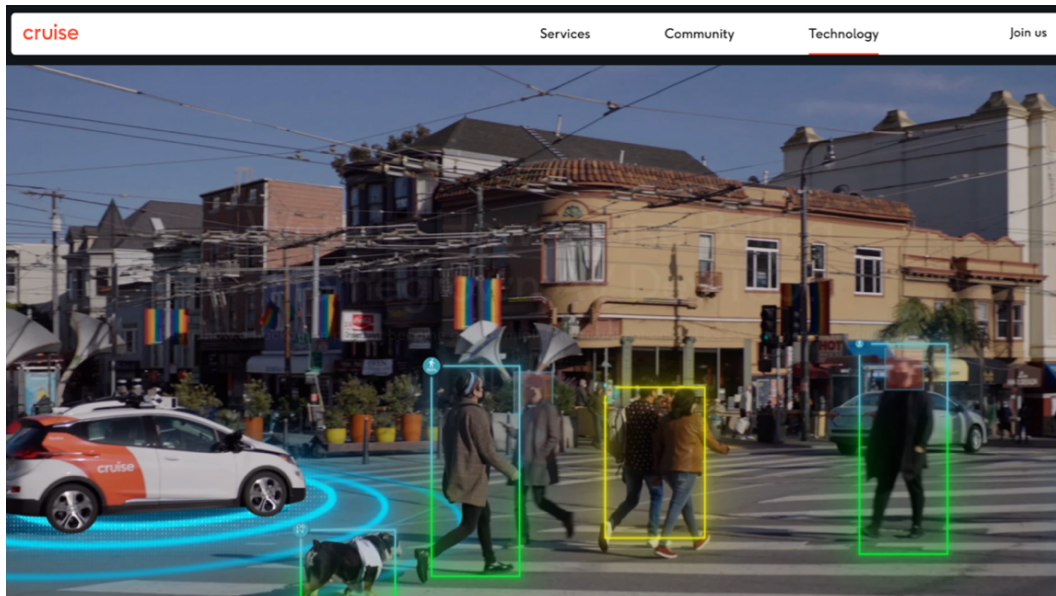


Figure 3.16. : Screenshots of Cruise’s promotional video Webviz, How Cruise Built a Homegrown AV Dev Tool, illustrating how Cruise AV calculates its trajectories through the city (2022)

AV’s ability to see everything at the same time in 360 degrees, “more than a human,” the image shifts to a tall, blonde, very feminine white woman in a dress, holding a smartphone as if perhaps hailing a ride. She is boxed by a frame showing 99.9 percent confidence that she is a pedestrian. There are then close ups of her high-heeled feet stepping into the intersection, as a Cruise employee discusses the predicting trajectory, and radiating targets appear under her feet showing percentages estimating which direction she will move. This raises questions about the images of people that the Cruise system is trained on—would all pedestrians yield that 99.9 percent confidence, and if not what is the acceptable threshold of “humanness” when being “seen” by these cars? It also communicates clearly which riders Cruise hopes to appeal to. The

employees shown on screen are also almost all white, are mostly male, and they are entirely young people—most of whom look exhausted and pale, despite the on-camera makeup. The tone of the video is very sunny and upbeat, but the images simulating Webviz differ only in lighting and soundtrack from the kind of machine vision that only a few decades ago was seen as sinister, e.g. how the Terminator's POV was shown calculating trajectories for the movement of its human targets. It reveals much about how these ways of seeing have been normalized, as well as how pervasive game logic is in both the making and the operation of these systems, only in this instance, the aim is *not* to hit the pedestrian.

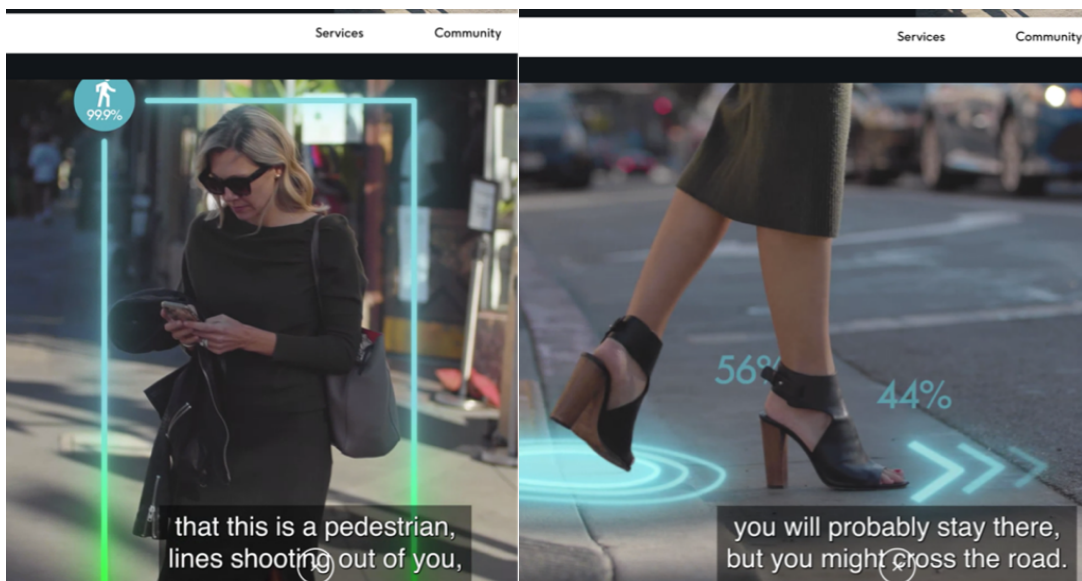


Figure 3.17: Screenshots of Cruise's promotional video Webviz, How Cruise Built a Homegrown AV Dev Tool, illustrating how Cruise AV calculates its trajectories through the city (2022)

Undeterred by the problems of its rollout, Cruise is already planning for a completely driver-free, Level 5 AV. Called the Cruise Origin, it's designed to carry four passengers seated facing each other in a sleek pod with tinted glass windows, and will run as an autonomous mini-bus or jitney, clearly a move into a more public transit-like

domain. Cruise promotional text touts “a spacious cabin and an on-demand, consistent experience where you can relax, work, or connect.” A product-launch video enthuses that it’s “not a product you buy, it’s an experience you share” and compares the level of comfort to premium airplane seating.¹⁸⁵ It’s a very shiny, futuristic fantasy, but the latest images of the prototypes being tested by GM in Michigan show a driver and steering wheel in the vehicle, occupying much of the advertised roomy interior. Still, GM is proclaiming the Origin will be on San Francisco streets by January 2023. Whatever residents’ level of comfort with vehicles that cannot be piloted by a human operating around them, it seems likely that, as with ride-hailing services, there will not be much they can do about it.



Figure 3.18: Promotional image of the Cruise Origin (Cruise, 2022)

¹⁸⁵ Cruise, “Technology,” accessed August 18, 2022, <https://getcruise.com/technology/>.

Coda: Cities, Commoning, and Transport Post-COVID

The Case of the Bay Area Revisited

As Richard Walker has noted, the Bay Area is the world capital of information technology and engineering innovation, with more giant data corporations and more venture capital per square mile than any other place on earth. Sociological, geographical, and political theorizing, however, has been slow to recognize and incorporate this reality.¹ In part, this is due to the geography's focus, particularly in the literature on global cities, on urban structure and the functions of political-economic capital, but not on technological capital or the motive aspects of urban life. Any one of the Bay Area's cities is not global scale in its own right, but collectively they encompass a geographic area and population on par with Los Angeles, as well as Silicon Valley, which has unrivaled worldwide reach when it comes to data and its infrastructure. This makes a strong argument for the importance of the study of complex urban regions, and to international networks beyond governance and more traditional financial systems. I hope that these case studies have brought focus to the regionality, circulation, and urban imaginary of the Bay Area through the lenses of critical urban geography and mobility studies. I aimed to read materiality and motion together by using the mobilities literature, specifically its critical and mobility justice forms, in tandem with geography's ability to articulate power structures, and the shaping force of ideology and imaginaries.

¹ Richard Walker, "Tech City," in *Pictures of a Gone City: Tech and the Dark Side of Prosperity in the San Francisco Bay Area* (Oakland, CA: PM Press, 2018), 13–45.

Each instance of transportation history I have discussed matches the promise of democratizing and liberating technological advances with the quantifiable fact that their implementation has contributed to social fragmentation, stratification, and segregation. Instead of faster, more open, and more collective movement, the Bay Area tech industry has offered privatized and atomized transportation solutions that do little to nothing to decenter the use of private automobiles. These endeavors have promised sustainability and world-saving while the industry creating them has doubled the energy consumption from data centers in just ten years, as the redwood forests around their campuses burn.² I began with the question of the right to the city, and who these transport interventions suggest that the Bay Area is for—increasingly its rails, highways, and streets are for data, whether this is achieved through prioritized mobility for tech elites (the original vision of BART, the Google Bus) or through the mobile data aggregation of ride-hailing and autonomous vehicles. The space of transportation in the Bay has become a real-time lab for IT research and development, which is not neutral when the corollary effects are gentrification, displacement, increased congestion, and subjecting the population to the semi-licensed operation of rolling algorithms in the form of two-ton vehicles. As Leah Meisterlin has written: “(1) the city is not a lab, and (2) urbanism is not an experiment.” Similarly, social needs and issues are not engineering problems that can be “solved” through the application of the right technology. While it is very possible to ethically and responsibly pursue research on and in cities, it must at all times be recognized, as Meisterlin asserts, that a “city is not a

² Will Knight, “Data Centers Aren’t Devouring the Planet’s Electricity—Yet,” *Wired*, February 27, 2020, <https://www.wired.com/story/data-centers-not-devouring-planet-electricity-yet>.

model of a thing, but the thing itself.”³ Despite the attempts of engineers and technocrats to rationalize urban space and motion through it, cities and their regions are not static or predictable, but dynamic, ever-evolving, and above all, social—with all the messy complexity that entails. Making city regions “safe” for data-collection and the controlled navigation of autonomous vehicles put the interests of platform capitalists in direct opposition to the right of urban inhabitants to do whatever they like with their streets and their movement on, through, above, and below them.

Transportation and Quarantine

Nonetheless, ride-hailing companies and now, by extension, autonomous robotaxis have segued relatively seamlessly into the ongoing pandemic reality. I argue that this is because they materialized quarantine logic long before COVID-19. Automobility stratifies and isolates passengers; ride-hailing and autonomous ride-hailing increase this effect by moving automobiles into spaces that could be occupied by modes of transportation that more efficiently and collectively serve the residents of a city. Ride-hailing adopts a transit-like status and promises “sharing,” and it involves at least two people enclosed in space together. It delivers this, however, with the absolute minimum of interaction (no more fist bumps on offer), and completely contactless payment between passenger and driver. AVs double down on this promise, removing the driver from the equation entirely, in pursuit of a futurist utopia in which passengers

³ Leah Meisterlin, “The City is Not a Lab,” *ARPA Journal*, May 15, 2014, <https://arpajournal.net/the-city-is-not-a-lab/>; cited in Mattern, *A City is Not a Computer*. It should be noted that ARPA in this context stands for Applied Research Practices in Architecture, not the (Defense) Advanced Projects Research Administration responsible for funding so much of the development of information technology.

can circulate in complete isolation, while doing no labor themselves. In a paid-promotion between Cruise and a TikTok influencer, she enthuses, “Living in SF we’ve learned that it’s best to just hail a car to roam around the city...[with Cruise] we appreciate the fact that we don’t have to worry about having awkward conversations with the driver, because there isn’t one!” “All in all this is such a cool technology and the fact that I had full control of the car is amazing.”⁴ This separation of the individual from the mass has become even more alluring to those with the resources after years of hand washing, masking, discursive warfare over common-sense countermeasures, and entirely too much data about viral spread, surface transmission, and respiratory droplets and aerosols. In this, platform automobility is a manifestation of a besieged mentality, which requires division and “hygiene” and sees sociality as a form of possible contagion. It also trades the specter of disease vectors for the data-accumulating circulation of Wark’s vectorialism.

As of summer 2022, circulation of local and long-distance travelers has returned to near pre-pandemic levels, but public transportation ridership is recovering much more slowly. National numbers for rail and bus transit ridership have gradually increased to roughly half of what they were immediately pre-pandemic, and rail numbers are currently below the lowest measured point of the past 20 years, back in February of 2002.⁵ It is too soon to say what this will mean for the longer-term future,

⁴ Louie Angeles (@geezelouiseeeee), “Come to Date Night with us on a Self-Driving Car in San Francisco,” <https://www.tiktok.com/@geezelouiseeeee/video/7126263378640702762>.

⁵ US Department of Transportation, Bureau of Transportation Statistics, <https://data.bts.gov/Research-and-Statistics/Transit-Ridership-Urban-Rail/rw9i-mdin>, accessed August 22, 2022.

but comparing this data to metrics about other modes of mobility, as well as urban population shifts, makes it possible to speculate.

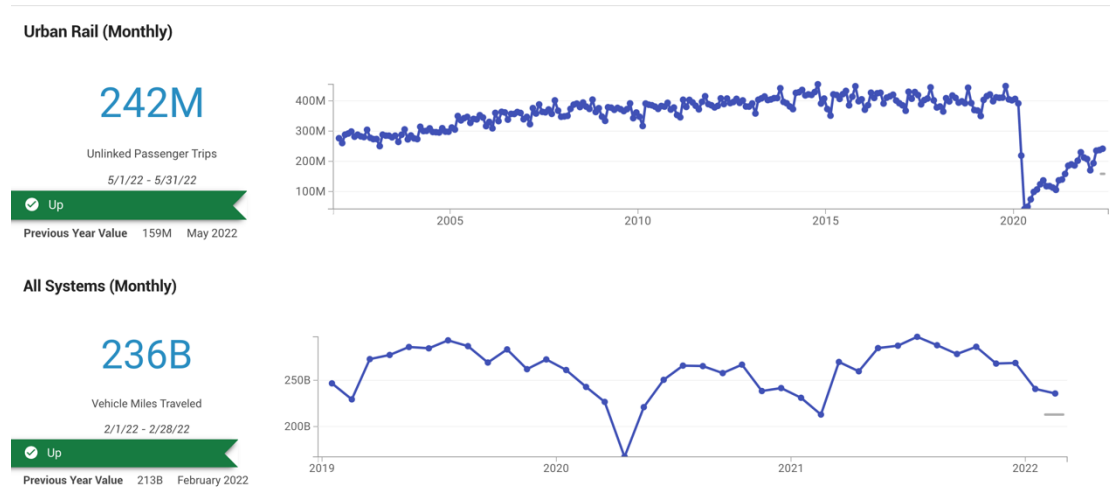


Figure 4.1–2: Monthly urban rail ridership statistics, 2000–2022 and highway vehicle miles traveled 2019–2022 (US Department of Transportation, Bureau of Transportation Statistics, 2022)

Some of the drop in transit ridership is due to the shifting nature of the work commute, as many workplaces have gone permanently partially or fully remote. The Bureau of Labor Statistics estimates there has been a 33 percent increase in businesses offering full or partial remote working situations since 2020.⁶ There was some early optimism about the demise of automobility during 2020, as shelter-in-place orders and travel restrictions kept personal car use to a minimum; in many places people celebrated the lack of noise, pollution, and the return of a more pedestrian relationship to place—“nature is healing” as the memes proclaimed. Research out of MIT that same year, however, revealed that the dollar value that drivers assigned to their personal cars—the cost that would be required to convince them to switch modes of transit—had more

⁶ US Bureau of Labor Statistics, “Telework during the COVID-19 Pandemic: Estimates Using the 2021 Business Response Survey,” March, 2022, <https://www.bls.gov/opub/mlr/2022/article/telework-during-the-covid-19-pandemic.htm>.

than tripled since the beginning of the pandemic, with survey respondents citing the feelings of security and control that they gained from car travel.⁷ Since the release of vaccines and the loosening of pandemic restrictions, car travel has rebounded, reaching and exceeding pre-COVID numbers within the first six months after vaccinations began; highway travel numbers are now averaging as high or higher than they did in 2019. Compared with the lack of similar growth for rail and bus travel, this may point to a shift in how passengers are traveling from place to place, regardless of destination or work situation.

Ride-hailing was also impacted in this period, but never fell to zero (except for pooled rides, which were discontinued and only brought back in mid-2022). As previously noted, metrics on ride-hailing are not straightforward to obtain, but data from New York shows ride-hailing recovered more quickly than transit ridership, and reached the low-end of typical pre-pandemic ridership by August, 2021. Subway travel in New York had only recovered to 55 percent of 2019 levels by the same period.⁸ Because ride-hailing is not yet operating to the same extent as before the pandemic, while driving statistics have soared, it seems greater numbers of travelers are driving in personal cars than in 2019 and earlier.

⁷ Meredith Somers, "Car access more than tripled in value during early COVID-19," *Ideas Made to Matter*, December 1, 2020, <https://mitsloan.mit.edu/ideas-made-to-matter/car-access-more-tripled-value-during-early-covid-19>.

⁸ Office of the New York State Comptroller, "Impact of the COVID-19 Pandemic on Subway Ridership in New York City," accessed August 12, 2022, <https://www.osc.state.ny.us/reports/osdc/impact-covid-19-pandemic-subway-ridership-new-york-city>.

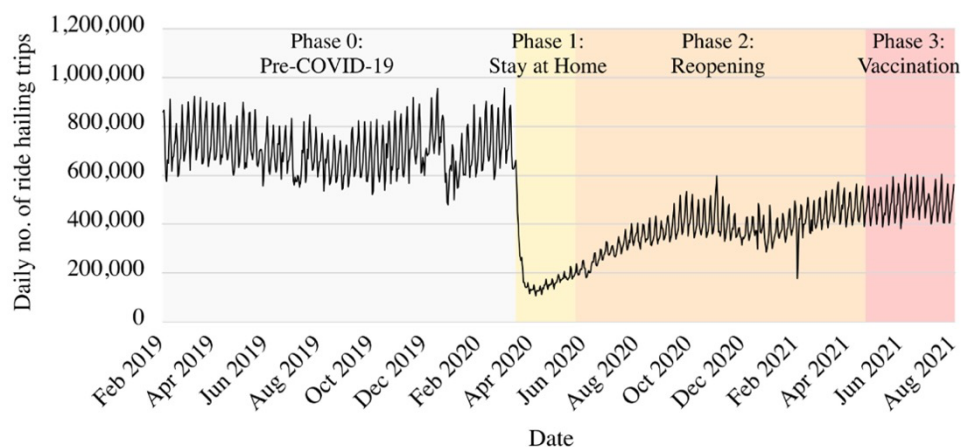


Figure 4.3: Daily hailed ride counts in New York City 2019–21 (Chang and Miranda-Moreno, 2022)⁹

The increase in car travel was also likely aided by a mass movement out of large, dense, cities and urban regions in 2020–21, and into suburban regions and smaller metro areas, which in the US are much more car dependent. New York, Chicago, Los Angeles, and San Francisco have all experienced significant population loss in the last two years (not attributable to COVID deaths) that may be permanent. As a case in point, Los Angeles County lost more residents than any other county in the US, while neighboring suburban Riverside County experienced the most population growth. My pandemic household accounts for one data point in that exodus, as my housemate left central LA due to loss of work during the pandemic, and moved home to live with family in Riverside. While some urban out-migration was due to this kind of economic necessity and the high cost of living, much of it, particularly the surge in suburban home buying, was driven by the same classist and discriminatory factors that steer

⁹ Annie Chang and Luis Miranda-Moreno, "Ride-hailing through the COVID-19 Pandemic in New York City," *Transport Findings*, March 9, 2022, <https://findingspress.org/article/33160-ride-hailing-through-the-covid-19-pandemic-in-new-york-city>.

automobility—fear of the contagion of the “unsanitary,” heterogeneous city. Early research from Johns Hopkins found no correlation between urban density and pandemic spread—in fact cities actually had lower death rates, perhaps due to better and more accessible infrastructure such as health-care services. What intensity there has been in urban cases and deaths is influenced by other factors, such as clusters of more impacted communities—the poor, communities of color—in cities, and is attributable to institutionalized racism, ableism, and intergenerational poverty, as much as viral spread.¹⁰ But these facts did nothing to lessen the panic induced by the sheer numbers of early deaths in cities like New York, where there were over 50,000 hospitalizations and almost 19,000 recorded COVID deaths between March and June 2020.¹¹

Public transit, already always suspect as a site of potentially dangerous mixing of demographics and pathogens, suffered by association. An April 2020 study from the MIT Department of Economics that heat-mapped cases in New York to the subway network, announced “The Subways Seeded the Massive Coronavirus Epidemic in New

¹⁰ Thomas J. Sugrue, “Preexisting Conditions: What 2020 Reveals About Our Urban Future,” *Public Books*, November 16, 2020, <https://www.publicbooks.org/preexisting-conditions-what-2020-reveals-about-our-urban-future>.

¹¹ Erin Prater and Nick Lichtenberg, “The pandemic migration’s full impact is becoming clear—and it’s a ‘big deal’ for the future of cities and white-collar work,” *Yahoo! Finance*, April 3, 2022, <https://finance.yahoo.com/news/pandemic-migration-full-impact-becoming-193425408.html>; US Census Bureau, “Over Two-Thirds of the Nation’s Counties Had Natural Decrease in 2021,” March 24, 2022, <https://www.census.gov/newsroom/press-releases/2022/population-estimates-counties-decrease.html>; Johns Hopkins Bloomberg School of Public Medicine, “Study: Urban Density Not Linked to Higher Coronavirus Infection Rates — and Is Linked to Lower COVID-19 Death Rates,” *Jhu.edu*, June 18, 2020, <https://publichealth.jhu.edu/2020/urban-density-not-linked-to-higher-coronavirus-infection-rates-and-is-linked-to-lower-covid-19-death-rates>; Centers for Disease Control and Prevention, “COVID-19 Outbreak—New York City, February 29–June 1, 2020,” *Morbidity and Mortality Weekly Report*, November 20, 2020, <https://www.cdc.gov/mmwr/volumes/69/wr/mm6946a2.htm>.

York City.”¹² Its methods were widely called into question by transportation experts and planners, however, and analysis of the same data that showed that the most-impacted areas had a higher share of automobile travelers than transit riders.¹³ Other early research on links between viral spread and public transit usage suggested that it was not a significant factor. Studies from France, Japan, Hong Kong, and Austria, where substantial case-tracking efforts were in place did not link any clusters to subway, rail, or bus travel during the first six months of 2020, even as the virus was spreading with no measures in place. Context was important in these studies, as all the cities considered are places where adherence to social guidelines while on transit (masking, no talking or eating, limiting destination and duration of travel) was high, along with thorough maintenance and cleaning of vehicles.¹⁴ At the same time many of the most affected communities in the US, like the Navajo Reservation, were entirely rural and car-dependent, and suffered the same effects of unequal access to healthcare and resources that impacted poor and marginalized communities in the large cities—higher rates of COVID, and higher likelihood of serious illness or death.¹⁵ Still, public transit became a scapegoat. In May of 2020, the CDC recommended in its re-opening

¹² Jeffrey E. Harris, “The Subways Seeded the Massive Coronavirus Epidemic in New York City,” *National Bureau of Economic Research Working Paper No. 27021*, April 19, 2020, https://web.mit.edu/jeffrey/harris/HarrisJE_WP2_COVID19_NYC_24-Apr-2020.pdf.

¹³ Salim Furth, “Automobiles Seeded the Massive Coronavirus Epidemic in New York City,” *Market Urbanism*, April 19, 2020, <https://marketurbanism.com/2020/04/19/automobiles-seeded-the-massive-coronavirus-epidemic-in-new-york-city>.

¹⁴ Feargus O’Sullivan, “In Japan and France, Riding Transit Looks Surprisingly Safe,” *Bloomberg City Lab*, June 9, 2020, <https://www.bloomberg.com/news/articles/2020-06-09/japan-and-france-find-public-transit-seems-safe>; Christina Goldbaum, “Is the Subway Risky? It May Be Safer Than You Think,” *New York Times*, August 2, 2020, <https://www.nytimes.com/2020/08/02/nyregion/nyc-subway-coronavirus-safety.html>.

¹⁵ Andis Robeznieks, “AMA urges HHS to address funding for Navajo COVID-19 hot spot,” *American Medical Association*, May 28, 2020, <https://www.ama-assn.org/delivering-care/population-care/ama-urges-hhs-address-funding-navajo-covid-19-hot-spot>.

guidelines for businesses that employers “offer employees incentives to use forms of transportation that minimize close contact with others (e.g., biking, walking, driving or riding by car either alone or with household members),” and discourage employees from using public transit. When the New York Stock Exchange floor re-opened that same month, traders and employees returning to work were banned from using public transportation altogether.¹⁶ A bias against transit-dependent commuters and those lacking cars is evident; without cars, or without employment that would incentivize them to travel by other means, transit commuters were out of luck.

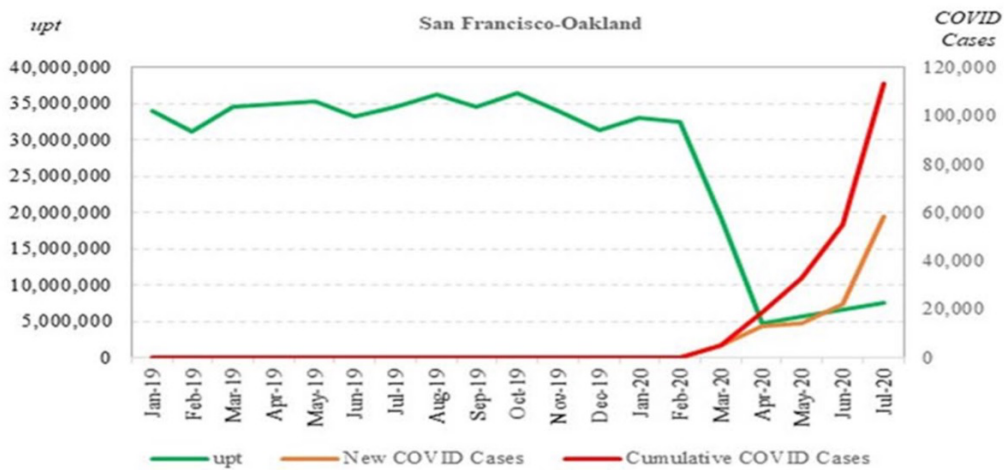


Figure 4.4: Public transit ridership data for all systems 2019–20 from San Francisco-Oakland (the highest-traffic segment of BART). Unlinked passenger trips (UPT) are defined as the number of passengers who board public transportation vehicles (Medlock, Temelzides, and Hung, 2021)¹⁷

¹⁶ Centers for Disease Control and Prevention, “COVID-19 Employer Information for Office Buildings,” CDC.gov, May, 2020, <https://www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html>; Bob Pisani, “How the reopening of the historic NYSE floor will work,” CNBC, May 15, 2020, <https://www.cnbc.com/2020/05/15/how-the-reopening-of-the-historic-nyse-floor-will-work.html>.

¹⁷ Kenneth B. Medlock III, Ted Temzelides, and Shih Yu (Elsie) Hung, “COVID-19 and the value of safe transport in the United States,” *Scientific Reports* 11, Article number: 21707 (2021), <https://doi.org/10.1038/s41598-021-01202-9>; data from the Federal Transportation Administration Monthly Module Adjusted Data Release, <https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release>.

The impacts of public transportation as a focal point for pandemic anxiety were severe. In San Francisco, transit ridership fell to a fraction of its already low 2019 numbers, and this decline has persisted, as noted in chapter 3. According to research from the Department of Transportation, overall ridership, and rail in particular, fell more sharply in San Francisco in 2020 than in any other US metro area (see Figure 4.3).¹⁸

The period since 2020 has had other impacts on the Bay Area that intersect with the argument laid out in the preceding chapters. Big tech companies were among the first to go fully remote, already having the infrastructure and wherewithal to do so, and many of those jobs will remain remote permanently. Building out their community without propinquity, techies have scattered across California, the West Coast, and the country, many swearing never to return to the Bay Area and the stratospheric cost of living that they produced. In a May 2020 anonymous survey of thousands of tech workers, two-thirds responded that they would leave the Bay Area if given the option to work remotely full-time.¹⁹ Rents fell more in San Francisco than in any other US city during 2020, though they also had the farthest to fall, and the Bay Area market has not recovered to the same degree as other metro areas, with rents remaining at 20 percent below pre-pandemic prices as of June 2022.^{20 21}

¹⁸ Steven Polzin and Tony Choi, "COVID-19's Effects on The Future of Transportation," United States Department of Transportation, Office of the Assistant Secretary for Research and Technology, January 14, 2021, <https://rosap.ntl.bts.gov/view/dot/54292>, 28.

¹⁹ Andrew Chamings, "Survey: 2 out of 3 tech workers would leave SF permanently if they could work remotely," *SFGate*, May 22, 2020, <https://www.sfgate.com/living-in-sf/article/2-out-of-3-tech-workers-would-leave-SF-15289316.php>.

²⁰ Apartment List, "Apartment List Vacancy Index," *Apartment List*, June 6, 2022, <https://www.apartmentlist.com/research/apartment-list-vacancy-index>.

²¹ Polzin and Choi, 18.

After multiple extensions of the timeline for return to work due to ongoing surges in COVID and new variants, Google and Apple called their employees back to work at least three days a week in spring 2022 and have faced pushback from those who have been living elsewhere for the past two years. More than 14,000 employees at Google alone have requested to remain fully remote. Apple's plans for renewed work from the office were made optional almost immediately as case numbers rose yet again into summer 2022. Despite this, the tech shuttles are circulating, and their numbers have dropped less than might be expected, with only 38 percent fewer shuttles in circulation than in February 2020, according to the SFMTA.²² This suggests, that, as with ride-hailing and private cars, there's a greater sense of hygienic safety in traveling by private company bus than there might be riding among the unfiltered masses.

What the transit landscape and the space of cities will look like in the years to come is not predictable, as the ability to forecast anything beyond the next few months remains challenging in such an unsteady world. It is clear from the near past, though, that urban out-migration, divestment from shared mobility, and the dominance of automobility have only grown since COVID entered the picture. The non-place future of tech—distance everything, decentralization, and automation, all dreamt of long

²² Katherine Bindley, "At Tech Companies, the Rebellion Against the Return to the Office Is Getting Serious," *Wall Street Journal*, May 14, 2022, <https://www.wsj.com/articles/remote-workers-dont-want-to-go-back-to-the-office-11652500810>; Benjamin Schneider, "Google buses are back as tech returns to the office," *San Francisco Examiner*, August 3, 2022, https://www.sfexaminer.com/news/google-buses-are-back-as-tech-returns-to-the-office/article_fae2ffa2-11ca-11ed-aa67-fb2bbebd522e.html.

before the novel coronavirus—has been fast-tracked by pandemic anxieties and realities. I close this chapter of my research by asking if this moment of rupture might present other possibilities, if other imaginings for what urban life could be going forward might generate from the experiences of the past few years. The sudden wrenching apart of our sociality by the deep isolations of 2020-21 was intended as collective effort to prevent viral spread and bring us back to each other faster, not as an enduring structure of daily life. It is profoundly disappointing that these mass experiences do not seem to have catalyzed broad recognition of our interdependence and need for meaningful being together beyond life on-screen. Have we all not lived through an involuntary multi-year experiment in just how damaging ongoing separation and isolation is, even as we may need to maintain some distancing and masking for the foreseeable future?

“Quarantine,” or “quar,” as many jokingly described the phase of sheltering in place, might have been necessary in the short term of immediate crisis in the form of slowdown and temporary retreat from collectivity, as mutual aid, and in conjunction with other measures like taking more care in the spaces where we interact—masking, hand-washing, testing, and the like. In the long term, mandated quarantine—a tool of spatial and bodily, but not necessarily epidemiological control—has tragic impacts on societies around the world, both geopolitical and highly personal. Criminalizing human movement across borders and between populations does not keep anyone safer; neither are the walls of “home” a safe place for everyone to shelter, nor are they even available to all. In the event of a highly transmissible respiratory virus, confinement and

stasis are quite dangerous, as evidenced by COVID's particular lethality in nursing homes and prisons. Even in the early months of 2020, the World Health Organization (WHO) did not recommend travel bans or closed borders as they would be ineffective against the spread of the virus, and would, in fact, make halting it more difficult by penalizing the real ways that human communities circulate and interact. Right-wing and ethno-nationalist racializing of "Kung Flu," and drawing a *cordon sanitaire* around China as the likely origin point where the virus met the human population, did nothing to lessen this interface.

As Angela Mitropoulos argues: "Quarantines often exacerbate viral dangers, because they foster the illusion that the isolation of a virus is synonymous with (or achievable through) the territorial confinement of groups of people, whose confinement is determined not by whether they are symptomatic or diagnosed with a disease but by a purportedly preemptive measure that uses nationality and geography as a proxy for exposure."²³ This is absolutely not to suggest, however, that the libertarian myth of "herd immunity" is some kind of antipode to state power. When separated from the context of mass vaccination programs—in which the induced immunity of large numbers of people makes it unlikely that chains of transmission can establish, protecting the vulnerable who cannot be vaccinated or generate a protective immune response—"herd immunity" is nothing more than eugenics and willful ignorance of the limits of available care systems and labor.²⁴ Testing to identify those

²³ Angela Mitropoulos, *Pandemonium: Proliferating Borders of Capital and the Pandemic Swerve* (London: Pluto Press, 2020), 34–8.

²⁴ *Ibid.*, 49–72.

who are actually infected or exposed, giving them care, and providing everyone else with the information and means to lessen the likelihood of contracting the virus and ease its severity if they do, are most likely to slow or stop viral spread. To address the injuries of the pandemic, as well as the deep structural inequalities it has highlighted on all fronts—medical and police racism, institutionalized ableism, the apparent disposability of entire communities within the population as “acceptable losses,” the prioritizing of the market and the workplace above human well-being—it is vital to see quarantine as a key part of the problem, not the solution. The sharing of space and community, meaningful recognition of the interconnectedness of all parts of a society (not just for the purposes of tracing chains of transmission), and above all, care for each other—these matter more than ever.

The apparent connections between cities, transit, and pandemic spread, which drove a regressive, self-quarantining flight to the suburbs similar to that of the post-WWII period, are largely functions of structural inequality, not intrinsic parts of the urban. “The 20th century offers object lessons in why fleeing cities for suburban and exurban settings can backfire—even if it seems like a good idea at first,” Annalee Newitz writes, summarizing the history of Ebenezer Howard’s garden suburbs, and the community of Usonia based on the utopian vision of Frank Lloyd Wright. “Wright argued that the Usonian city wouldn’t be a flight from modernity—instead, he would liberate ordinary people from high-density industrial “tumor” metropolises through technology. Brand-new inventions like telephones, radio and automobiles meant everyone’s work could be done remotely.” The similarity of this description to current

fantasies of dispersed work and low density is absolutely persistence of form. The flight of white elites to communities like Usonia had predictable results: Usonia was highly segregated; the houses—designed to be inexpensive and democratizing, are difficult and expensive to maintain; and it remains entirely car-dependent. “Ultimately, the garden city future is a false Utopia,” Newitz concludes. “The answer to our current problems isn’t to run away from the metropolis. Rather, we need to build better social support systems for people in cities so that urban life becomes healthier, safer and more sustainable.”²⁵ In the place of these reactionary utopias, it is vital to develop alternate visions. Beyond a call for reformed transportation that can be rendered safer and more sustainable, which might also involve the application of the properly suited technology designed by experts, it is necessary to rethink transportation entirely: who it is for, what it can do, and even what it means to call it “public.” After all, BART is “public transportation,” but, as discussed in chapter 1, it was never designed to serve everyone. In place of that terminology, a growing conversation suggests framing transportation within the logic of the commons, or better, the common.

Disaster Commoning and the Possible Impossible

As David Bell suggests in his work on rethinking utopia, “common” signifies the “creativity (re)produced through the labour [sic] power of intra-acting human and more-than-human bodies. Capitalism, of course, seeks to enclose and harness this labour power for its own reproduction, but (relatively) freed from such ‘bossing’ it has

²⁵ Annalee Newitz, “Want to Flee the City for the Suburbs? Think Again.” *New York Times*, August 17, 2020, <https://www.nytimes.com/2020/08/17/opinion/coronavirus-cities-suburbs.html>.

the potential to (re)produce the world in good way.” The common is beyond “the commons,” which is “a finite, commonly owned resource.” This unbounded common, freed from linkages to material property relations and open to the creative reforming of human interaction, adapts well to discussions of shared mobility, and is a definition that informs my understanding of the term. Writing about the formation of mutual aid communities in the wake of climate-related disasters, the collective *Out of the Woods* argues that such moments of rupture often reveal cracks in the ongoing slow disaster of capitalism, and therefore, possibilities for reformulation and resistance. While not an excuse to wait for apocalyptic conditions to create a *tabula rasa* on which to establish a revolutionary new order, they argue that mutual aid communities formed in the upheaval of disaster can “push us to recognize that scarcity is a social relation rather than a simple fact of number: the way goods and resources are distributed determines who can use them.” “These disaster communities,” they write, “are glimpses of hope: microcosms of a world formed otherwise...the ordinary, they insist, is not a given.”

Because capitalism is comfortable with the cozy, naturalized language of community—e.g. how sharing has been recoded as an economic activity by the platform economy—*Out of the Woods* insists that what they describe is Disaster Communism. This communism has the power to seize the means of social reproduction and redistribute resources to sustain the abundance that disaster communities create temporarily during crises—“paradises built in hell,” to quote Rebecca Solnit—and to use that abundance against capital. “In the collective responses to disaster,” they find “that many of the tools for constructing that new world already

exist.”²⁶ In other words, we need only look to new ways of distributing and supporting the resources, knowledge, and technologies that are already in our communities in order to build “new” worlds or futures. This is an ambitious vision, and aimed at a transformation that is beyond the scope of my argument here, but with apologies to the collective, I would like to bend the idea of disaster communism to what might be called “disaster commoning.”

The language of the common, or commoning, has circulated in the critical mobilities literature in the last decade as a means of distinguishing the “movement, meaning, and practice” of mobility for the many, from the asymmetrical power relationships, histories of eminent domain, austerity governance, and capitalist shaping of transportation that has characterized projects such as BART.²⁷ According to Enright, the “public” in public transportation does not translate to “universal, accessible, sustainable, and democratic, urban mobility.” “There is a radical chasm between public transit and what we might consider common transit,” she writes. “Whereas the public refers to state-owned property managed in the collective interest of a predetermined citizenry, the common is a non-property relation of use and engagement through which diverse subjects are constituted.” Common transit is shared mobility, whereas public transit is often characterized by exclusion and dispossession.²⁸ Commoning transit shifts the domain of discussion to the “what” of transit—people moving through the spaces they

²⁶ Out of the Woods, “The Uses of Disaster,” in *Hope Against Hope: Writings on Ecological Crisis*, 229–240 (Brooklyn, NY: Common Notions, 2020).

²⁷ Anna Nikolaeva, Peter Adey, Tim Cresswell, Jane Yeonjae Lee, Andre Nóvoa, and Cristina Temenos, “Commoning mobility: Towards a new politics of mobility transitions,” *Transactions* (Institute of British Geography) December 28, 2018: 3–4, <https://doi.org/10.1111/tran.12287>.

²⁸ Enright, “Commotion.”

inhabit, together and alone—and away from the “how”—an over-determined focus on particular modes of transit and their infrastructures, from the informal to the formal. From this perspective it is perhaps easier to perceive and to articulate exclusion and immobility that is by design.

Nikolaeva, Adey, Cresswell, Lee et al. emphasize the way that the common can be rendered a verb—commoning—because it “highlights active and collective processes of making.”²⁹ This emphasis on the processual and the relational creates needed space to discuss the transformation of transportation from something that works for too few, to something that works for everyone. This “everyone” is crucially un-romanticized and specific; Nikolaeva et al. caution that spatial togetherness does not necessarily lead to social cohesion. They contend, however, that it does encourage a “range of verbal and non-verbal communication, as the affective and embodied experience of being co-present on the move. In other words, being appreciative of somebody moving slightly to accommodate you in a packed train, briefly smiling to a fellow cyclist or getting irritated with somebody’s loud conversation all shape our perceptions of places and communities we are part of.” Certainly this is better for collective sense of belonging and communal awareness than the sociopathic individualism (see: Elon Musk) engendered by automobility.

In defining the space between common and public, theories of commoning make it possible to debate how to make shared mobilities even more comprehensive, instead of continuing to cede ground to the technocratic and automotive. The common

²⁹ Nikolaeva et al., “Commoning mobility,” 7.

is “something we share and can collectively govern rather than something we value only as it is converted into financial equivalent, square kilometres [sic], and minutes of commute—mobility as fetish.” Because this discourse is collective and processual, it also becomes dialectic, and capable of producing meaningful change. Nikolaeva et al. point to Harvey’s injunction, though, that the common is still always contested, always ideological.³⁰ As Enright contends “The defense of existing public transit (like public services more generally) may be an exigent arena to reject neoliberal mores, but this cannot be the end of social justice struggles. Instead, we must radically reimagine what transit can be and what it can do.” To this end, she recommends that mobility activists agitate, appropriate, amplify, and generally cause a commotion (common motion), to apply pressure to systems that do not serve their needs, as well as to create systems that do not yet exist. The stakes are high, as Sheller argues, “mobilities of transport and mobilization for political protest are closely related: without bodily freedom of mobility there may be no way to disrupt the ruling mobility regime and its kinetic elites.”³¹

Appeals to technocracy at the level of big capital campaigns are unlikely to move fast enough to be responsive to need, but citizen pushback to transform existing systems through agitation—as in the citizen action around AC transit documented by Attoh, and more recently the collective efforts of The Untokening and those they inspire—may yield results. Moreover, since capital (or the platforms economy, or vectoralism...) has claimed the streets for its own, there is no reason why urban

³⁰ David Harvey, “The future of the commons,” *Radical History Review*, 109 (2011): 101–107, <https://doi.org/10.1215/01636545-2010-017>.

³¹ Sheller, *Mobility Justice*, 87.

inhabitants, with their eyes on truly shared mobility, should not do the same. The disasters of the past few years present an opportunity to put the language and action of commoning in practice, because the common is what has been so profoundly ruptured, which is also just the most recent break in a long and painful history of such crises. I find that thinking in this way lends clarity to the stakes of mobility justice, and takes the conversation away from the theoretical and into the realm of practice, asserting the “right to transportation” as a facet of the right to the city, as per Attoh.³² As Enright maintains,

Commoning public transit, then, need not entail the creation of completely new and autonomous systems of mobility, but at minimum, would entail revealing its inadequacies, opening access, emphasizing use rights, and democratizing decision. More expansively, commoning public transit could leverage broader social and spatial relations that reflect active participation, redistribution, recognition, and care.³³

Against the neoliberal utopia of automation and segregation, a competing utopia must be asserted and agitated for. The right to transportation is part of the right to the city, making it a fundamentally utopian undertaking—utopian in the terms of Raffaella Baccolini and Tom Moylan, in that it is “emancipatory, militant, open, indeed critical.”³⁴ The mobility justice movement, centered in the principles laid out by The Untokening in 2016 and then put into practice by its co-founders are an example of using collective power in tandem with existing agencies and governments to meaningfully shift priorities and resources. As Naomi Doerner, one of the co-founders

³² Attoh, *Rights in Transit* (2019).

³³ Enright, “Commotion.”

³⁴ Raffaella Baccolini and Tom Moylan, “Dystopia and Histories,” in *Dark Horizons: Science Fiction and the Dystopian Imagination*, ed. Raffaella Baccolini and Tom Moylan (New York: Routledge, 2003), 8.

and the first ever Director of Transportation Equity for the City of Seattle has argued, simply creating targeted initiatives to “listen to communities” around plans that are already in motion, while leaving the bureaucracy around transportation planning and management unchanged is “not really sharing power.”³⁵ In her work in Seattle and later, Doerner has aimed for co-creation: communities having broad-scale power to determine what transportation could look like for them, how it would best suit patterns of life and knowledges of the city already established, and how it would interact with the community and the greater urban space they co-inhabit. This moves far beyond the simple question of an individual modality—train, bus, or bike. “The ability to move freely, the ability to self-determine how you want to move, where you want to go, what you want to do, and to thrive. And to be able to do all of that without persecution, without harassment. That is, concisely, what mobility justice is,” Doerner says.³⁶

In the breakdowns and uprisings of 2020, transportation often played a central role, through direct actions such as fare strikes, bus and traffic stoppages, and the use of car blockades to claim street space for unpermitted marches during the racial justice protests following the murders of George Floyd, Ahmaud Arbery, Breonna Taylor, and many others. As The Untokening collective argued in their report documenting what could be done to move forward from 2020: “sustainability,” especially as it typically

³⁵ Naomi Doerner, interview by Josh Cohen, “Listening Is Not Really Sharing Power,” *The Movement 77*, July 29, 2020, <https://transloc.com/the-movement-podcast/episode-77-listening-is-not-really-sharing-power-with-naomi-doerner>.

³⁶ Naomi Doerner, interview by Courtney Kashima, “Navigating Mobility Justice with Naomi Doerner,” *APA Podcast*, July 18, 2022, <https://planning.org/podcast/navigating-mobility-justice-with-naomi-doerner/>.

takes the form of carbon reduction and transfer of modal share, is not synonymous with anti-racism. It takes active abolition and remaking to achieve that. Adding new modes of transportation, bike lanes, etc, does not change critical issues of mobility for poor and marginalized communities if those new modes are heavily policed, filtered, and steered only towards the needs of some within the community or city. The Untokening does not stop at discussing the ways in which transit is unsafe or discriminatory for BIPOC riders, they call for the removal of police from transit systems and budgets. Indeed, they call for the abolition of planning as a profession, in that the legacy of such planning is in white-supremacist and settler-colonist forms of violence: eminent domain, the silencing of local and indigenous knowledges, and the remapping and dislocation of existing communities at the behest of capital interests. Planners, they find, as those working in the field: “are not asking what communities are doing already, what they care about, or what their priorities are. The unstated expectation is that community members should jump when planners say jump, or else they will get paved over.”³⁷ The mobility justice work of The Untokening serves as a redirection of the capitalist realism that “there is no alternative” to the visions of the transportation future that we are collectively being sold. Of course there are alternatives, they already exist, but we must change the grounds of both discussion and action, and that includes the imagining of alternate futures³⁸

³⁷ The Untokening, “COVID-19, Uprisings, & Mobility Justice,” *Untokening.org*, 2020, <https://static1.squarespace.com/static/579398799f7456b10f43afb0/t/5f7102823a2a3d3970528072/1601241733858/COVID+19+Transformative+Talks+report.pdf>.

³⁸ Mark Fisher, *Capitalist Realism: Is There No Alternative?* (London: Zero Books, 2009).

In a piece called “There Are No Cars in Wakanda,” Arieff describes glossy proposals for high-luxury private AVs:

With this sort of amenity-rich cocoon, there is a relentless focus on the object, absent of any context or community. The future of mobility is assumed to be car-dependent, while a vision based more on public transportation is thought to be old-fashioned. But isn't planning for the car the thing that is most out of date?

What is perhaps most notable about these renderings, sketches, videos and the like is what they leave out. We don't see pollution or smog, traffic jams or gas stations, sprawling surface parking areas or collisions. No people of color. Or old people or homeless people. Indeed, these visions deliberately exclude anything that might be perceived as an obstacle or that seem outside a very narrow norm, from regulatory impediments to the inconvenience of other people.³⁹

As she and Brentin Mock have noted, the afrofuturist, uncolonized city of Wakanda in the *Black Panther* universe contains many technological marvels aiding the mobility of its citizens: “maglev trains, dragonfly-shaped spaceships, hoverbikes,” but no cars. Mock notes that in conjuring this vision, designers for the film explicitly considered “how to preserve the traditions and culture of a place while embracing innovation and technology; how transit can co-mingle with walkability; and the role of design in facilitating spaces that protect vulnerable populations from oppressive forces.” Representation is, of course, not everything, but in order to argue for substantive changes to the status quo, there is an imagined future in operation; which future and whose are salient questions. In discussing mobility justice work during a community visioning process in the historically Black neighborhood of Leimert Park in Los Angeles,

³⁹ Allison Arieff, “There are No Cars in Wakanda,” *SPUR*, February 20, 2020, <https://www.spur.org/news/2020-02-20/there-are-no-cars-wakanda>.

Doerner specifically notes that afrofuturist and mobility futurist imaginings have been central to the conversation.⁴⁰

Futurist imaginaries such as the tech dreams of Silicon Valley, as Miriam Greenberg has written in her work on critical sustainabilities, “have long been presented as universal and all-inclusive across lines of class, race, and geography, while also drawing boundaries that exclude...as urgent as our current situation is, and as pressing as our desire is to push for a sustainable future now, if we are to overcome these dilemmas we first need to step back and ask some very basic questions about the nature of our goal.” “The sustainable future we seek to build,” she states, “depends entirely upon whose sustainability we are talking about.”⁴¹ While, as Enright notes, many even on the far left have trouble imagining transit not operated as it currently is, due to the scale and interconnected technical knowledges required to construct, maintain, and oversee such systems, and to materially facilitate the movement of millions of people, alternatives to technocratic and elite control of our collective and specific mobilities can and do exist. As Lefebvre wrote of his right to the city and the centering of social needs, which are necessarily urban, “in order to extend the possible, it is necessary to proclaim and desire the impossible. Action and strategy consists in making possible tomorrow what is impossible today.”⁴²

⁴⁰ Brentin Mock, “The Wakanda Reader,” *Bloomberg City Lab*, February 22, 2018, <https://www.bloomberg.com/news/articles/2018-02-22/what-you-can-learn-about-the-future-of-cities-from-wakanda>.

⁴¹ Miriam Greenberg, “What on Earth is Sustainable: Towards Critical Sustainability Studies,” *Boom: A Journal of California*, Winter 2013: 56–57.

⁴² Henri Lefebvre, *Survival of Capitalism: Reproduction of the Relations of Production*, translated by Frank Bryant (New York: St. Martin’s Press, 1976), 36–7.

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