

**The Fragility of Modernity: Infrastructure and Everyday Life in Paris, 1870-1914**

by

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For Jen, who saw me through the whole project.

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## **Introduction: Modernity, Infrastructure and Everyday Life**

We tend to associate “modernity” with power, control, order, progress, durability and mastery. We also associate it with Western cities in the grips of the twin historical transformations unleashed by the nineteenth century: industrialization and urbanization. We often hear that Western cities became safer, cleaner, healthier, more comfortable, efficient and rational places to live in the nineteenth century because Europeans judiciously applied reason, science and technology to organizing and managing everyday urban life. While Europe underwent fundamental social, spatial and technological changes (urbanization, industrialization and globalization), so the familiar story goes, European ways of life became more civilized, rationalized, standard, advanced, efficient, democratic, humane, or even universal.

But what would happen to this view of modernity if I told the story of a city in the grips of industrialization and urbanization, whose leaders were anxious to improve life by applying science and technology, which, however did not only become more rational, more efficient and more humane in many ways, but also more complicated, more risky and more fragile? What if that city was Paris, so-called “capital of the nineteenth century,” “capital of modernity” and “capital of the world”?<sup>1</sup>

In this study, I argue that Paris between 1870 and 1914, the scene of massive

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1 (1) Walter Benjamin, “Paris, Capital of the Nineteenth Century,” from *The Arcades Project*, trans. Howard Elland and Kevin McLaughlin (Harvard, 2002), pp. 3-26; (2) David Harvey, *Paris, Capital of Modernity* (Routledge, 2003); Patrice Higonnet, *Paris: Capital of the World* (Harvard, 2005).

work in infrastructural modernization, can help us uncover a different perspective on modernity that highlights its contingencies, contradictions, complexity and fragility.<sup>2</sup> This study is about what I call “the fragility of modernity,” meaning the special difficulties that confront cities dependent on increasingly complex networked infrastructures which bind humans, technology and the natural environment in new ways. Although we often hear that everyday life was transformed by science and technology in these years (often called the “Second Industrial Revolution”), Paris’s modernization from 1870 to 1914 is better characterized as uneven development. In 1900, Paris became the world’s fourth city to open an electric-powered subway, but as late as 1928, 18% of its houses did not enjoy direct to sewer drainage.<sup>3</sup>

Parisian responses to modernization were equally uneven, expressing both optimism and anxiety about technological change, and a number of never-completed fantasies of perfecting, optimizing, and controlling humans, the city, technology, nature, and their relations.<sup>4</sup> While France’s civilizing mission kept Paris planners, engineers and politicians on a technological-determinist track that identified infrastructural development with progress, results on the terrain of everyday life were quite mixed. Technical accidents, bureaucratic inefficiency, and shortages of crucial resources like water and affordable housing called this progress into question. In this study we will hear many voices in Paris questioning the familiar narrative of infrastructural modernization as progress, as well as many defending it.

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2 This idea is inspired by a long line of critical theorists who stress the “duality of modernity.” Ideas drawn from classic German theorists like Marx, Weber, Adorno, Horkheimer and Benjamin have been retooled by more recent scholars like Raymond Aron, Marshall Berman, Jürgen Habermas, Detlev Peukert and David Harvey.

3 Norma Evenson, *Paris: A Century of Change, 1878-1978* (Yale, 1978), p. 208.

4 Anson Rabinbach, *The Human Motor: Energy, Fatigue and the Origins of Modernity* (University of California, 1992).



Infrastructural development did not influence everyday life in predictable ways. As the Paris authorities used networked infrastructures to solve urban problems (distributing water and power, public transportation, etc.), they increased the heterogeneity, complexity and fragility of the city, helped reproduce social inequalities, and increased the city's ecological impact. In this study, I show that what Parisians recognized as urban modernity between 1870 and 1914, which after Haussmann revolved around the application of networked infrastructures for solving urban problems, was an increasingly heterogeneous and fragile assembly, vulnerable to disruptions of social routine, technological function, and the forces of nature.

*Provincializing Paris: Remembering Passepartout and Rothal*

In 1872 Paris had a new republican regime. It was a time for national self-reflection. Parisians had spent the last year and a half sieged by the Prussians and then at civil war with one another. Now as they rebuilt the capital, they looked to London for inspiration. The Prefecture of the Seine was studying London's urban railways to imitate them in Paris, while French ex-patriots in London wrote home with excited accounts of the ride.<sup>5</sup> Meanwhile, Jules Verne was publishing *Around the World in 80 Days* as serial fiction in Paris newspaper *Le Temps*.<sup>6</sup> The story opens in London that same year. In 1872, London was a jealously-regarded mirror of Paris's future, a city further along the evolutionary curve of industrialization, a model modern metropolis. The capital of

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5 Historian Hippolyte Taine, French ex-patriot in London, wrote a starry-eyed review of London's urban railways for *Le Temps*, as we'll see in Chapter 2. Poet Arthur Rimbaud, also traveling in London that year, wrote the throbbing prose poem *Métropolitain*, which one critic has speculated was written about his experience riding the city's railways. See: Michael Spencer, "A Fresh Look at Rimbaud's "Métropolitain"," *The Modern Language Review*, Vol. 63, No. 4. (Oct., 1968), pp. 849-853.

6 See Chapters I-IV of the free, public Wikisource version: ([http://fr.wikisource.org/wiki/Le Tour du monde en quatre-vingts jours](http://fr.wikisource.org/wiki/Le_Tour_du_monde_en_quatre-vingts_jours)).

Victoria's empire was the world's largest city and the hub of the world economy, a global cosmopolis. So Verne's story follows the networks of the British Empire.<sup>7</sup> Verne's linchpin—the wager that Phileas Fogg can go around the world in 80 days, thanks to the speed of locomotives and steamships—was a question about how industrialized, steam-powered means of transportation had changed time, space, and ultimately human life. Verne's book was a textual tool for coming to terms with London's perceived developmental leg up on Paris, for exploring the differences between England and France (personified in the odd couple of Fogg and Passepartout), and for exploring the human impact of industrialized means of transportation.

Verne portrays English “gentlemen” Phileas Fogg as cold, intensely cerebral, “mysterious” and “silent.” He is young, wealthy, single, educated, eccentric but intelligent, a thinker, punctual, meticulous, even obsessive-compulsive. Verne repeatedly calls him “mathematical” and “mechanical.” His life is as regimented as timetable of trains, his fortress house outfitted with all of the latest conveniences. Simple Frenchman Passepartout, *un vrai Parisien de Paris* who comes to work as his butler, is unused to such rationalization and shocked to find his room wired for electricity.<sup>8</sup> When Fogg tells Passepartout about the wager, and asks him to pack their bags for a trip around the world, slow-moving Passepartout, little experienced with industrialized means of transit, thinks the wager is a bit *fou* (crazy).

Fogg is a timely representation of European urban elites in 1872. For bourgeois actors, both the actual architects of industrialization (engineers, entrepreneurs,

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7 London-Suez-Mumbai-Calcutta-Hong Kong-Yokohama-San Francisco-New York-London

8 The *vrai Parisien de Paris* was a popular image of the simple, working-class Parisian, fundamentally local, tied to his or her neighborhood, often blinkered about what was going on in the rest of the world, and decidedly non-modern.

politicians) and those upper middle class people who then had access to the benefits and power of technoscience (Jules Verne, Hippolyte Taine, Phileas Fogg), the period from 1870 to 1914 could feel like an adventure, and industrialization an exciting current of history to ride. They were right to be amazed by the new capabilities that technoscience offered humanity. It is no surprise contemporaries spoke of a “Second Industrial Revolution.” Thus Verne posited a hypothesis to be tested about how technology had changed humanity’s ability to master time and space. Readers perform the test while following Fogg on his fantastic world tour.

But what of Passepartout, the working-class Parisian? His hair is rather blown back by the tour, saying “We travel so fast that I seem to be journeying in a dream.” He can't even understand why his watch is no longer in sync with the sun when they arrive at Suez and refuses to wind it, claiming that the sun, not his faithful watch, is wrong. In sharp contrast to the Londoner's obsessive futurism, Passepartout makes the Parisian of 1872 seem dim-witted, doe-eyed, backward. For Verne, Passepartout was an editorial, a mirror held up to Parisians to vent his own futuristic fantasies and fears. But Passepartout also teaches the reader that technology's ability to help humans master things like time and space depends deeply on understanding how technologies work, giving these technologies the right human inputs, and understanding how the human experience of time and the workings of technology (the watch) relate to the natural world (the sun).

Another moment in the story suggests a gap in Verne's hypothesis. When Fogg and Passepartout reach Rothal in India, their journey is suddenly interrupted when the train reaches the end of the line. There is no station, and the passengers are abruptly disembarked. Fogg is bewildered that the newspapers falsely reported that the railway

was finished.<sup>9</sup> In this unexpected turn, the railway—clear symbol of humanity's mastery of nature, time and space, and a track along which the plot rolls—is cut short. This derailment teaches both Fogg and readers that technoscience's power to change human life only reaches as far as the infrastructural networks on which it travels. Verne shows us uneven development, and the cognitive dissonance it causes for Fogg, because from this Londoner's Eurocentric point of view, living at the center of a global network, one expected technological development to have cast a wider historical-geographical net. Even in this triumphant tale of Fogg winning the wager thanks to modern technology Verne had to admit the reality of uneven development.

Existing historical literature does not do enough to “provincialize Europe,” by showing how technological development in Europe's colonies sometimes outstripped development of provincial spaces in Europe<sup>10</sup>, or by exploring the multiple axes of developmental inequality within Europe, between nations, between classes, between regions, between town and country<sup>11</sup>, between men and women, or between different parts of a single city, as I do in this study. Verne, like many of his contemporaries, was keenly aware of uneven development, and invented Fogg and Passepartout to illustrate the developmental differences between Englishmen and Frenchmen, bourgeoisie and proletariat. Verne's era of increasingly competitive imperialism, capitalism and globalization was also an age of increasing techno-nationalism. A race for development was on, and for the bourgeois elites who had taken the reigns of European history in the

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9 In a moment of wicked wit, Verne explains that “The papers were like some watches, which have a way of getting too fast.”

10 Damen Salesa suggested this in his talk at the University of Michigan's Eisenberg Institute for Historical Studies, “The Future Ruins of London: Victorians, the British Empire, and the Wars of Race,” Jan. 24, 2008.

11 The classic example here is Eugen Weber's *Peasants into Frenchmen* (Stanford, 1976).

19<sup>th</sup> century, jealous comparisons to neighboring countries and nationalist anxieties accompanied any discussion of technological development.

Unfortunately, we have been telling ourselves stories like Fogg's since Jules Verne's days without stopping much to remember Passepartout or Rothal. We have forgotten the subtler parts of Verne's tale in light of Fogg's win. We are used to telling ourselves stories of modernity based around “industrial revolutions,” in which technoscience transforms human life, becomes a motor of history, and thereby becomes associated with the future and with progress. Open any history book that covers the period between 1870 and 1914, and you'll likely find mention of science and technology transforming human life.<sup>12</sup> As if reading from Verne, historians describe a Second Industrial Revolution during which transportation and communication technologies like the railroad, telegraph, steam ship, automobile, electricity, telephone, radio, phonograph, airplane, etc., contributed to globalization, fundamentally altering the scale (space) and pace (time) of everyday life, the way we communicate, the way we produce and consume goods to meet our needs. Artificial light lengthened the day, the bicycle transformed individual mobility, mass transport allowed people to live farther from work, steam ships allowed more people to travel the planet, to experience cultural “others,” to “master” space, time and nature.

Everyday life, it is often claimed, became penetrated by or saturated with

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12 See: (1) Hobsbawm's *Age of Empire 1875-1914*, pp. 52-3. On p. 21, he writes “it is roughly correct to make industry a criterion of modernity.” (2) Eugen Weber, *France Fin-de-Siècle*, pp. 51-82. This conception is repeated in classical social and economic histories, like David Landes's *The Unbound Prometheus* (1969) and kept afloat by thematically-oriented textbooks like Colin Chant et al., eds. *Science, Technology and Everyday Life 1870-1950* (Routledge/Open University, 1988) or David Goodman, ed. *The European Cities and Technology Reader* (Routledge/Open University, 1999) and even sometimes in certain corners of the history of technology: Mikael Hård and Andrew Jamison, eds. *The Intellectual Appropriation of Technology: Discourses on Modernity, 1900-1939* (MIT, 1998) or Thomas Misa, Philip Brey and Andrew Feenberg, eds. *Modernity and Technology* (MIT, 2003).

technology in new ways. Life became “more technological,” *mediated* by technology. Everyday activities like cooking, bathing, or going to work suddenly began to require more elaborate equipment, and to be “impossible” without it. Everyday life became dependent on technology, *socio-technical*. This simple conception, of everyday life being periodically “revolutionized” by technological change, has become one of the intellectual fixtures of nineteenth century history. The French first heard this narrative from Georges d'Avenel, whose multi-volume study of “mechanized life,” *The Mechanism of Modern Life* (1896-1906) sought to analyze the history of “industrial progress.”<sup>13</sup> The narrative entered the global academic canon in 1948 with architectural theorist Siegfried Giedeon's mammoth study *Mechanization Takes Command*. I am not the first to pose the question, but it is time to ask again: to what extent *did* mechanization take command?<sup>14</sup>

Recent cultural and intellectual histories of technology have critiqued these narratives, teaching that the idea of technology as a maker of history (under the rubrics of “the technological sublime” or “technological determinism”) is a Eurocentric and teleological cultural construction which often serves capitalist and imperialist interests. They have unpacked the cultural meanings and political consequences of technology in the modern era with both political and analytical force. They break the circuit between “mechanization” and “command,” showing that we’ve been telling ourselves stories of

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13 Georges Avenel, *Le mécanisme de la vie moderne*, vol. 1 (Paris: A. Colin, 1896), preface.

14 (1) Siegfried Giedeon, *Mechanization Takes Command: A Contribution to Anonymous History* (Oxford, 1948). Giedeon tried to show, in painstaking detail, the way that “mechanization” (involving industrialization, rationalization and mediation) infiltrated and materially transformed everyday life. He writes of “tracing our mode of life as affected by mechanization—its impact on our dwellings, our food, our furniture” (p. vi), or: “We shall inquire in the first line into the tools that have molded our present-day living. We would know how this mode of life came about, and something of the process of its growth” (p. 2); “In their aggregate, the humble objects of which we shall speak have shaken our mode of living to its very roots. Modest things of daily life, they accumulate into forces acting upon whoever moved within the orbit of our civilization.” He wanted to analyze “the slow shaping of daily life” (p. 3), and show mechanization's “almost inescapable influence over our way of life, our attitudes, our instincts” (P. 4); (2) For the more recent reference to Giedeon, see Neil Postman, *Technopolity: the Surrender of Culture to Technology* (Knopf, 1992), p. 40.

technology helping humans to “conquer” things like time, space, disease, each other, even nature itself since the 1870s.<sup>15</sup> These studies have taught us to question the place of technology in society, culture and politics, helping to unpack narratives like those of Verne, Avenel and Giedeon. This is a crucial lesson, but it implies a one-sided analysis of technology’s relationship to society, culture and politics. These scholars tend to leave technology itself analytically untouched, “blackboxed” as historians of technology say. They treat technology as an undifferentiated block that influences society and culture “from the outside,” has cultural meanings projected onto it “from without,” becomes taken up as an instrument in social and political struggles, or is socially (or culturally) constructed.

Historians of technology help fill in the gaps by providing richly detailed accounts of technological design and use that show how social, cultural and political factors influence the design process.<sup>16</sup> But this tends to privilege design over use and technology over practice in subtle ways, often telling us more about scientists and engineers than about the people who use their innovations.<sup>17</sup> Rather than seeing “technology-in-use” as

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15 Jeffrey Herf, *Reactionary Modernism* (Cambridge, 1986); Wolfgang Schivelbusch, *The Railway Journey* (University of California, 1987); Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Cornell, 1989); Anson Rabinbach, *The Human Motor: Energy, Fatigue and the Origins of Modernity* (University of California, 1992); Peter Fritzsche, “Machine Dreams: Air-mindedness and the Reinvention of Germany,” *The American Historical Review*, 98 (June 1993); David Nye, *American Technological Sublime* (MIT, 1994); Lisa Cartwright, *Screening the Body* (University of Minnesota, 1995); Kristin Ross, *Fast Cars, Clean Bodies* (MIT, 1996); Rieger, Bernhard, *Technology and the Culture of Modernity in Britain and Germany, 1890-1945* (Cambridge, 2005).

16 Although some historians of technology fall into the trap of blackboxing society and culture as relatively undifferentiated blocks, separate “domains” into which technologies have to be “worked.” See: Mikael Hård and Andreas Knie, “The Grammar of Technology: German and French Diesel Engineering, 1920-1940,” *Technology and Culture* 40/1 (1999), pp. 26-46; Mikael Hård and Andrew Jamison, eds. *The Intellectual Appropriation of Technology: Discourses on Modernity, 1900-1939* (MIT, 1998); Misa, Thomas, Philip Brey and Andrew Feenberg, eds. *Modernity and Technology* (MIT, 2003); Hård, Mikael and Thomas J. Misa, eds. *Urban Machinery: Inside Modern European Cities* (MIT, 2008). In the debate on national technological styles, this tends to caricature national cultures; in the debate on technology and modernity it tends to historicize technology while blackboxing modernity.

17 Donald Reid, for example, provides excellent analysis of workers who operate technology, but does not

David Edgerton recently called for, these studies show us technology “in context,” and we hear more about the context’s impact on the technology than about the technology’s impact on the context. Too often, stories about users are only brought into the history of technology in order to destabilize the designer’s point of view. So recent cultural historians of technology thoroughly historicize practice but blackbox technology, while socio-technical historians of technology often highlight the relationship between technology and practice without giving the two terms equal explanatory power.

Inspired by the strengths and weaknesses of both approaches, and by French Actor Network Theory’s commitment to placing social and cultural practice on equal analytic footing with technology and nature, I try in this study to develop a new method for studying the relationship between technology and human practice empirically and historically. By historicizing both technology and practice, and empirically investigating how they shape one another in concrete, local settings, I hope to contribute to a project started by cultural historians and historians of technology—namely, to unravel what Thomas Misa called “the compelling tangle of technology and modernity.”<sup>18</sup>

### *Theorizing and Historicizing Modernity*

Modernity is an unavoidable concept for historians, because it bears on one of our favorite questions: that of historical continuity and discontinuity. When Durkheim set out

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analyze technology’s users much, in *Paris Sewers and Sewermen*. David Barnes shows powerful connections between the history of science, cultural history and the history of public health, but this tells us more about the people who published on technoscience than about those who experienced it on a day to day basis. See David Barnes, *The Making of a Social Disease: Tuberculosis in Nineteenth Century France* (University of California, 1995) and *The Great Stink of Paris and the Nineteenth-Century Struggle against Filth and Germs* (Johns Hopkins, 2006).

18 Thomas Misa, “The Compelling Tangle of Modernity and Technology,” in *Modernity and Technology*, ed. Misa, Brey and Feenberg (MIT, 2003), pp. 1-30.



to distinguish the basic social forms of his 'modern' epoch from those preceding it (which he called 'primitive'), he was making a claim to discontinuity, a claim to be living after a world-historic rupture or break. Similarly, Baudelaire attempted to capture the essential character of his own historical moment on a smaller scale by writing about street life in Second Empire Paris. Durkheim's historical rupture separated epochs, while Baudelaire's separated decades; Durkheim's modernity was global, while Baudelaire's was local. But in both cases the claim to historical discontinuity was a reaction to life in nineteenth century Paris, which seemed cut off from the past.

Detlev Peukert argued that marking particular moments as historical ruptures (whether to begin or end a period) is a sensitive interpretive matter. One of the historian's most basic tasks—dating—is thus fraught with hermeneutic risk.<sup>19</sup> For example, Eric Hobsbawm suggested the Industrial Revolution and the French Revolution as possible founding ruptures for modernity. Choosing the Industrial Revolution makes modernity seem fundamentally industrial, and England sets the pace: a high growth, high risk economy, the din of machines, investment crazes, rapid proletarianization and urbanization, the degradation of work, worker unrest, environmental pollution—this is the world of Marx, Dickens, and Zola. Choosing the French Revolution yields modernity as the age of the liberal bourgeoisie, as it goes from Europe's insurgent class to its ruling class. Here France sets the pace, and the themes are overwhelmingly social-political: state building, revolution, civil war, nationalism, enlightened reform, class formation, party

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19 This means that dating requires an interpretive 'leap of faith.' By the same token, it is fraught with political risk, too. Peukert wrote, "the demarcation of a period of history necessarily rests on a particular conception of the period, explicitly underpinned to a greater or lesser extent by theoretical analysis," such that "analytical conceptions of [a] period are implicit in these different datings." Detlev Peukert. *The Weimar Republic: The Crisis of Classical Modernity*. Trans. Richard Deveson (Hill and Wang, 1987), p. 3.

formation, civil society and the public sphere, etc.<sup>20</sup>

Peukert chose the ‘belle epoch’ of the 1890s through World War I as Germany's “classical modernity.” Thus modernity was characterized by big business, cartels and interest group politics, the birth of modernist cultural production, the spread of mass societal forms (mass culture, mass production, mass consumption, mass transit, mass communication), fin de siècle decadence, the rise of organized labor, the crisis of liberalism, electrification, etc. Enrique Dussel chose 1492, giving modernity a colonial, imperial or global cast.<sup>21</sup> Other likely landmarks include the Renaissance, the Reformation, the 19<sup>th</sup> century, the Enlightenment, the 30 Years War, or either of the two world wars—any number of dates, events, or periods that can be claimed as moments of historical rupture.<sup>22</sup>

Herein lies a problem. With so many ruptures to choose from, and remembering Peukert’s warning that the choice is sensitive, it becomes clear how *arbitrary* the choice is. In light of all the different places and times claimed as ‘modernity,’ the concept seems to be deconstructing itself, falling apart as scholars realize that “there is no such thing as modernity in general,” only plural modernities.<sup>23</sup> These confusions about *where* and *when* modernity can occur are joined by a more basic confusion about *what* modernity is.

In the social science tradition, ‘modernity’ names an *objective* state of affairs, the social,

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20 In Hobsbawm’s classic account of European modernity, the two revolutions of the late eighteenth century (industrial and French) mark the epochal break. See *The Age of Revolution 1789-1848* (Vintage, 1996).

21 As he explains in his essay “Debate on the Geoculture of the World System” (online at: <http://168.96.200.17/ar/libros/dussel/artics/debate.pdf>), “in 1492 four phenomena arise at the same time: 1) World-System; 2) Capitalism (still mercantile); 3) Colonialism, 4) Modernity (as a cultural phenomena of the management of Europe's 'Centrality' within the world-system),” p. 240. See also: Enrique Dussel, *The Invention of the Americas: Eclipse of “the Other” and the Myth of Modernity*, trans. Michel D. Barber (Continuum, 1995), also online: <http://168.96.200.17/ar/libros/dussel/1492in/1492in.html>.

22 David Frisby, *Cityscapes of Modernity: Critical Explorations* (Polity, 2002), p. 3.

23 Jeffrey Herf. *Reactionary Modernism: Technology, Culture, and Politics in Weimar and the Third Reich* (Cambridge, 1984), p. 1.

political, economic and cultural condition(s) of the industrialized, urbanized ‘Western’ world in the 19<sup>th</sup> and 20<sup>th</sup> centuries. Many historians continue to use the term in this sense, as a social-structural backdrop for historical narratives.<sup>24</sup> For philosophers and cultural theorists, however, ‘modernity’ often denotes a *subjective* state of affairs. Habermas links it with a “consciousness of time,” Foucault calls it an “ethos,” or “the attitude of modernity,” Marshall Berman calls it “a mode of vital experience,” and Bruno Latour calls it a project or “mission.”<sup>25</sup> Kate Lacey is right that “the term *modernity* is a notoriously slippery one.” Rita Felski calls the modern a “myth,” “the most pervasive yet most elusive of periodizing terms.”<sup>26</sup>

This lack of analytic clarity contributes to awkward norms of scholarly practice with contradictory effects. On the one hand, we use the term ‘modernity’ as if its meaning were self-evident or taken for granted, assuming that colleagues, students, and readers already know what it means, *when this is precisely what we ought to explain*. Here, too little has been said about modernity. On the other hand, the concept's analytic instability has led scholars in a variety of disciplines (including philosophy, sociology, anthropology, “science, technology and society,” comparative literature, cultural studies,

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24 (1) Marshall Berman, *All That is Solid Melts Into Air: The Experience of Modernity* (1982) is the most well-known example, especially because Berman self-consciously thematizes the relationship of modernism to modernity. More recent examples include: (2) David Frisby, *Cityscapes of Modernity: Critical Explorations* (Polity, 2002), (3) Vanessa Schwartz, *Spectacular Realities: Early Mass Culture in Fin-de-siècle Paris* (University of California, 1998); (4) Mikael Hård and Andrew Jamison, eds. *The Intellectual Appropriation of Technology: Discourses on Modernity, 1900-1939* (MIT, 1998); (5) Bernhard Rieger's *Technology and the Culture of Modernity in Britain and Germany, 1890-1945* (Cambridge, 2005).

25 Habermas, *The Philosophical Discourse...*(cited above); Foucault, “What is Enlightenment?” (cited above); Berman, *All That is Solid...*(cited above); Latour, *We Have Never Been Modern* (cited above).

26 Kate Lacey. *Feminine Frequencies: Gender, German Radio, and the Public Sphere, 1923-1945* (University of Michigan, 1996), p. 5. Rita Felski. *The Gender of Modernity* (Harvard/Belknap, 1995). David Harvey and Patrice Higonnet have also discussed myths of modernity, see: Harvey, *Paris: Capital of Modernity* (Routledge, 2003); Higonnet, *Paris: Capital of the World* (Harvard, 2002). Peukert adds, “‘Modernization’ is a vague term, embracing a variety of shades of meaning; its usefulness as an explanatory tool in history has been much debated.” *The Weimar Republic*, p. 81.

and history) into attempts, both theoretical and empirical, to define the concept more clearly. Here, too much has been said. The interdisciplinary dialog is dizzying. There are now a bewildering array of characterizations of modernity to choose from, which are sometimes overlapping and sometimes incommensurable, sometimes more situated and sometimes more synthetic.<sup>27</sup>

The concept is constantly troubled by anachronism, for it is possible to assess ‘when modernity began’ only in hindsight, by measuring the past against the present. If we say that modernity began in 1789, for example, this is because we see something of our contemporary world in the French Revolution—something the revolutionaries could never have seen. So claims to modernity also evoke what Benedict Anderson called “the specter of comparisons,” because they can only be evaluated *by comparison*. The concept is *relational*, only meaningful when two different things are compared; there is no absolute modernity, no “most modern”—there is only more or less modern. This causes both methodological and political difficulties because comparisons of different ‘modernities’ cannot be value free: modernity is too often valued as an end in itself.<sup>28</sup>

Two other political issues haunt the concept. First is the aging intellectual crisis which pits modernists against anti-modernists, and which has led to post-modern and a-

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27 Because the general literature on modernity is so vast, I will only list some works that strike me as most influential and most interesting. Arjun Appadurai, *Modernity at Large: Cultural Dimensions of Globalization* (University of Minnesota, 1996); Zygmunt Bauman, *Modernity and the Holocaust* (Cornell University, 1989); Marshall Berman, *All That is Solid Melts into Air: The Experience of Modernity* (Penguin, 1982); Michel Foucault, “What is Enlightenment?” *The Foucault Reader*, Paul Rabinow, ed. (Pantheon, 1984), pp. 32-50; Jürgen Habermas, *The Philosophical Discourse of Modernity*, trans. Thomas McCarthy (MIT, 1987); Jürgen Habermas, “Modernity versus Postmodernity.” *New German Critique* vol. 1, no. 22, Winter 1981, pp. 3-14 (Giddens’ reply to Habermas follows immediately after in the same volume); Bruno Latour, *We Have Never Been Modern*, trans. Catherine Porter (Harvard, 1993); Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton, 1998); Derek Sayer, *Capitalism and Modernity: An Excursus on Marx and Weber* (Routledge, 1991); James C. Scott, *Seeing like a State: Why Certain Schemes to Improve the Human Condition have Failed* (Yale, 1998).

28 Benedict Anderson, *The Spectre of Comparisons: Nationalism, Southeast Asia and the World* (Verso, 1998).

modern disavowals of modernity, or attempts to transcend it.<sup>29</sup> Second is the critique of modernization theory as a chauvinistic attempt to rank societies on a hierarchy of development, legitimizing imperialism and shoring up European claims to superior civilization. Scholars in colonial and postcolonial studies have revealed the paternal, Eurocentric, and teleological historical assumptions embedded in talk of modernity.<sup>30</sup> Because claims to modernity necessarily invoke a historical rupture, they are implicated in the politics of history, i.e. the messy decisions behind including or excluding people and events from archives and narratives.<sup>31</sup>

Like recent cultural histories I seek to historicize modernity, tempering the analytic and political problems of modernity as an analyst's category with sustained attention to modernity as an actor category. This means empirically investigating how historical agents made their own claims to modernity in concrete, local settings rather than passing judgment ourselves on how modern they were. Claims about modernity should be the *object* of study more than the *goal* of study.<sup>32</sup>

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29 Latour recommended the amodern option, see *We Have Never Been Modern* (cited above). For more on anti-modernity and post-modernity, see Habermas, "Modernity versus Postmodernity" (cited above) and Frederic Jameson, *Postmodernism, or The Cultural Logic of Late Capitalism* (Duke University, 1991).

30 For example, see Appadurai, *Modernity at Large* (cited above) and Dipesh Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference* (Princeton, 2000).

31 Gabrielle Hecht has dissected "rupture talk" as a device for cutting oneself off from an unfortunate past. She has in mind something like what Michel-Rolph Trouillot calls "silencing the past": a politics of denial, ideology, or cover-up. In this way, Germany's claims to newness and democracy after WWII cut ties to fascism and genocide, while France's Gaullist appropriation of the resistance for the entire nation as a "nation of resisters" cut ties to Vichy (read: fascism and genocide). As Hecht and Shepard have argued, France used an elaborate language of decolonization to hide their continuing colonial power behind a post-colonial image. Across the Western world, rupture talk has declared the end of the Cold War. See: (1) Michel-Rolph Trouillot, *Silencing the Past: Power and the Production of History* (Beacon, 1995); (2) Gabrielle Hecht, "Rupture-Talk in the Nuclear Age: Conjugating Colonial Power in Africa." *Social Studies of Science* 32/5-6 (Special double Issue on 'Postcolonial Technoscience') Oct.-Dec. 2002, 691-727; (3) Gabrielle Hecht, "Globalization meets Frankenstein? Reflections on Terrorism, Nuclearity, and Global Technopolitical Discourse." *History and Technology* 19/1 (2003), 1-8; (4) Todd Shepard, *The Invention of Decolonization: The Algerian War and the Remaking of France* (Cornell University, 2006).

32 For useful (and concise) methodological discussions of analyst and actor categories, see: (1) Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (MIT, 1995), p.

19<sup>th</sup> century European cities were the historical ground on which the concept of modernity first bloomed. The textual and archival record is unequivocal: references to ‘modernity’ increased over the course of the 19<sup>th</sup> century, spreading on both academic and popular levels.<sup>33</sup> The term became cultural currency for the first time during Hobsbawm's ‘age of capital’ (1848-1875) and ‘age of empire’ (1875-1914). As such, it bears the unmistakable mark of these two interrelated conditions—capitalism and empire. The term expresses awareness of a metropolitan, European world transformed by capitalism, industrial technology, urbanization and globalization. For Europeans experiencing what they perceived to be massive transformation of their lives, the concept of modernity did two kinds of work: it distinguished 19<sup>th</sup> century Europe from its own past, and distinguished it from its colonies, justifying its superiority and legitimizing its exploitation as “civilization.” As these kinds of chauvinistic distinctions were made between the modern and the non-modern, technological development was constantly invoked as a measure of modernity.<sup>34</sup> Jules Verne and Georges d'Avenel fit right in, bringing us back to the relationship between technology and practice in narratives of modernity.

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48; and (2) Scott Spector. *Prague Territories: National Conflict and Cultural Innovation in Franz Kafka's Fin de Siècle* (University of California, 2000), p. 34. Examples of cultural studies that succeed at historicizing modernity and treating it as an actor category include Mary Nolan's *Visions of Modernity* (Oxford, 1994) and Arnold Lewis's *An Early Encounter with Tomorrow* (University of Illinois, 1997), in which Europeans look to the United States as a preview of their own imagined modern, technological futures. See also: Bernhard Rieger's *Technology and the Culture of Modernity in Britain and Germany, 1890-1945* (Cambridge, 2005).

33 Vanessa Schwartz, *Spectacular Realities*; David Frisby, *Cityscapes of Modernity*; Bernhard Rieger, *Technology and the Culture of Modernity in Britain and Germany*; Hård and Jamison, eds. *The Intellectual Appropriation of Technology*; Detlev Peukert, *The Weimar Republic*

34 Michael Adas. *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Cornell, 1989). It is also important to note that modernity was also an idea exported by Europe and the United States to the rest of the world, already very much “at large,” as Appadurai put it, in the nineteenth century; see *Modernity at Large*. See also Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity* (University of California, 2002).

*Infrastructure and Everyday Life*

In this study, I use the term “infrastructure” for the built environment and networks of roads, rails, buildings, pipes and wires, systems for distributing power, heat, light, and water. The terms “utilities” and “public works” are not far off.<sup>35</sup> These networks and the built space they wind through are at the heart of my analysis. As I tell the story of Paris's being equipped with new roads, railways, housing, water supply and waste disposal systems between the 1870s and the 1910s, I will unpack familiar technologically-determinist narratives of the Second Industrial Revolution by examining the relation of these infrastructures to everyday life, the relation of technology and practice.

My approach to networked urban infrastructures is shaped, first and foremost, by a growing literature on urban technologies.<sup>36</sup> These studies show that various spaces and practices which we recognize as essentially “modern” or “urban” are unthinkable without certain technological supports—there is no high density living without the apartment building, no commute or traffic jam without roads, rails and vehicles, no power outage without an electrical grid, no late train without a schedule. From this perspective,

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35 There is another use of “infrastructure,” in which the word is recursively defined as whatever is needed to make something else work: a support, necessity or prerequisite. Occasionally I use the term with this much broader meaning, but it should be clear from context in which sense I am using the term. For more discussion of the term, see Paul Edwards, “Infrastructure and Modernity: Force, Time, and Social Organization in the History of Sociotechnical Systems,” in *Modernity and Technology*, ed. Philip Brey, Andrew Feenberg, and Thomas Misa (MIT, 2003), pp. 185-225

36 Accordingly, this footnotes contains some of the work that has been most important in this study: (1) Thomas Hughes, *Networks of Power: Electrification in Western Society 1880-1930* (Johns Hopkins, 1983); (2) Joel A. Tarr and Gabriel Dupuy, eds. *Technology and the Rise of the Networked City in Europe and America* (Temple University, 1988); (3) David C. Goodman, ed. *The European Cities and Technology Reader: Industrial to Post-Industrial City* (Routledge, 1999); (4) Manuel Castells, *The Rise of the Network Society: Economy, Society and Culture* (Blackwell, 2000); (5) Steven Graham and Simon Marvin, *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition* (Routledge, 2001); (6) Mikael Hård and Thomas J. Misa, eds. *Urban Machinery: Inside Modern European Cities* (MIT, 2008). This last volume also contains a good, brief literature review of this body of research on cities and technology, see pp. 14-15.

“modern urbanism emerges as an extraordinarily complex and dynamic sociotechnical process.”<sup>37</sup> A smaller literature on underground infrastructures adds the important point that networked infrastructures are often physically or socially *hidden* in the city. They are physically hidden because planners deliberately embed them in other structures, behind walls or underground, but they are socially hidden because they are made to run smoothly and fade into the background, to become routine or taken for granted.<sup>38</sup> As many historians of technology have pointed out, technological systems have a funny way of disappearing from view. We stop noticing them when they function correctly, and take notice only when they fail.<sup>39</sup> In other words, large technical systems can become hegemonic, habitual, routine, worked into the patterns of everyday life. Studies of the urban underground remind us that we have to uncover and reveal infrastructures, bring them back into focus, to explicate how their correct functioning works in everyday settings.

Following recent interdisciplinary studies of technology, I interpret technology and social-cultural practice, human beings and the material things we live with, as mutually shaped and shaping, “co-constructed.”<sup>40</sup> Infrastructure is indeed a *support* of

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37 Graham and Marvin, *Splintering Urbanism*, p. 8.

38 (1) Rosalind Williams, *Notes on the Underground: An Essay on Technology, Society and the Imagination* (MIT, 1992), see Ch. 3, “Creating the Substructure of Modern Life,” pp. 51-81; (2) Donald Reid, *Paris Sewers and Sewermen: Realities and Representations* (Harvard, 1991); (3) David Pike, *Subterranean Cities: The Worlds Beneath Paris and London, 1800-1945* (Cornell, 2005).

39 (1) Wiebe Bijker and John Law, eds. *Shaping Technology and Building Society: Studies in Sociotechnical Change* (MIT, 1992), pp. 1-4; (2) Paul Edwards, “Infrastructure and Modernity: Force, Time, and Social Organization in the History of Sociotechnical Systems,” in *Modernity and Technology*, ed. Philip Brey, Andrew Feenberg, and Thomas Misa (MIT, 2003), pp. 185-225; (3) Mikael Hård and Thomas J. Misa, eds. *Urban Machinery: Inside Modern European Cities* (MIT, 2008), Introduction, p. 8; (4) Graham and Marvin, *Splintering Urbanism*, p. 22.

40 The most influential ideas for me come from the following: Thomas Hughes, “The Evolution of Large Technical Systems,” Michel Callon, “Society in the Making: The Study of Technology as a Tool for Sociological Analysis,” and John Law, “Technology and Heterogeneous Engineering,” from *The Social Construction of Technological Systems*, ed. Bijker, Hughes and Pinch (MIT, 1983), pp. 51-134; see also Madeleine Akriche, “The De-Description of Technical Objects” and Bruno Latour, “Where Are the



practice, a determinant influence that both constrains and enables action, but it is equally an *outcome* of practice, a form of material culture. For example, in the late 1890s, faced with the coming 1900 World's Fair, the Paris authorities worried that the city's transportation, water supply and sewage systems were already strained, lagged behind international standards of development, and would not be able to accommodate the crowds coming to the exposition. They tried to correct these problems with a flurry of infrastructural development before 1900, but foreign visitors still found transportation inadequate and summer drought brought water shortages, sewer malfunction and a typhoid scare. Insecurities about national culture drove attempts to rebuilt national prowess with technological development.<sup>41</sup> Thus, as material culture the new tramways and additions to the water system were a product of techno-nationalist practice. But these same infrastructures also shaped practice; when they delivered failure instead of success, this ironically questioned the nationalist and civilizationalist narrative they were designed to shore up. They were both shaped and shaping, a product of techno-nationalist practice which then served to undermine that same practice.

To make sociotechnical study better at revealing *everyday* practice, we need to pursue a finer-grained and more bottom-up approach, which balances analysis of both design (innovation) and use (renovation) as sociotechnical processes. This is where studies of everyday life can help, guided by scholars like Alf Lüdtkke, Henri Lefebvre and Michel de Certeau. These scholars stress detailed, "ethnographic" analysis of day-to-day

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Missing Masses? The Sociology of a Few Mundane Artifacts," plus the dialogue on methodological vocabulary between the two authors following these essays, in Bijker and Law, eds. *Shaping Technology/Building Society* (MIT, 1987), pp. 201-265; see also: Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (MIT, 1997, 1999).

41 This is already a well-known pattern in post-WWII French history; see Gabrielle Hecht, *The Radiances of France* and Kristin Ross, *Fast Cars, Clean Bodies*.

practice, taking a “bottom up” view of “big structures” and “large processes” like urbanization and industrialization from the point of view people who experience them in concrete, local settings.<sup>42</sup> This focus on practice highlights social conflict and contested meanings, watching agents navigate and negotiate systems. In Paris after the exposition, from 1900-1903, Parisians had to use the fragile systems installed for the exposition on a daily basis. Continuing water shortages and traffic accidents inspired increasing labor unrest and user-driven critique of the failing transportation and water systems as threats to urban efficiency, social equality, public health and public safety. By combining socio-technical methods with the study of everyday life, I hope to reveal the infrastructural entanglement of everyday practice, and the practices behind apparently autonomous technical change (viewing technologies as they are made, used, and remade on a day-to-day basis). I do this empirically by watching Parisians negotiate the place of networked infrastructures in their urban modernity.

This means recognizing that large technical systems like the Paris water supply system or Métro are also social and institutional systems.<sup>43</sup> Because they are operated and used by large groups of people, they create new communities which include workers, passengers and subscribers. Those who are excluded and remain 'off the grid' do not enjoy equal access; hence infrastructural networks also help reproduce social

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42 As David Crew puts it, “*Alltagsgeschichte* questions accepted understandings of 'big structures' and 'large processes' – 'industrialization,' 'bureaucratization,' and 'modernization' – by deconstructing these arid abstractions into the flesh-and-blood human beings whose conflicting ideas and actions produced history...” Crew then quotes Alf Lüdtke, who sums up nicely, “social practice moves to the center of the stage.” David Crew, “*Alltagsgeschichte: A New Social History from Below?*” *Central European History* 22 (Sept.-Dec. 1989), 394-407, p. 396; Geoff Eley explains that this focus on “...highly concrete microhistorical settings...was not supposed to supplant but to specify and enrich the understanding of structural processes of social change.” See: Geoff Eley, “Labor History, Social History, *Alltagsgeschichte: Experience, Culture, and the Politics of the Everyday—a New Direction for German Social History?*” *Journal of Modern History* 61 (June 1989), 297-344, p. 317.

43 Donald Reid's work on Paris sewer workers and Gabrielle Hecht's on nuclear power plant workers stand out as examples of this kind of study. See *Paris Sewers and Sewermen* and *The Radiance of France*.

inequalities.<sup>44</sup> In conflict over what infrastructures were for, and who they should serve, Parisians not only struggled to control these technologies, but also the mobility, water and other resources that they provided. These systems also had to be funded, regulated and operated by a competent public or private authority, and the question of which was more competent often gave rise to heated political conflict. Public works projects, as we'll see throughout this study, are not only commonly recruited into political conflict as instruments of struggle, but also often *themselves* become important political entities. For example we'll see how the Métro helped build a local welfare apparatus in Paris, and how tramways, the bus company and park space became contentious election issues.

I argue that the theoretical “glue” for holding together sociotechnical studies with studies of everyday life can be found in Actor Network Theory (ANT). ANT is based on the idea that much more is required to make technologies work than correct mechanical function. John Law sums this up by saying that engineering is “heterogeneous.”<sup>45</sup> In order to make a tramway work, for example, one must not only make sure the car, tracks, and power source interact in precise ways, but also ensure that driver and passengers (the human component) as well as other vehicles on the road (broader traffic networks) behave properly. One must also secure funding, a staff of workers to build and maintain infrastructure, a policy climate in which tramways may operate efficiently, and fares that riders can afford. These heterogeneous components—tram, workers, money, wires, tracks, regulation, other vehicles, drivers, riders—form a “network” whose components

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44 Graham and Marvin, using Bijker's vocabulary, called for a perspective on urban infrastructures as “congealed social interests.” See *Splintering Urbanism*, p. 11.

45 John Law, “Technology and Heterogeneous Engineering: the Case of Portuguese Expansion” in Bijker, Hughes and Pinch (see footnote immediately above), pp.111-134. Madeleine Akrich, “The Description of Technical Objects” in *Shaping Technology/Building Society* (cited above), pp. 205-224. Akriche writes, “...technical objects participate in building heterogeneous networks that bring together actants of all types and sizes, whether human or nonhuman,” p. 206.

must be coordinated to make it work. The complexity of such networks underscores their fragility—changes at one point on the network affect other points. So ‘correct function’ varies with context. Function is relational. The purpose and capabilities of a technical device (or system) depend on the humans, other devices, and wider context with which it interacts. This theory provides a much more flexible and contingent vision of technologies than we are used to. It forces us to recognize that historical actors other than engineers make technological history. Especially important in this regard is the agency of the users/consumers of technology.<sup>46</sup>

Perhaps most radically, ANT includes *natural* components in heterogeneous networks. This evokes environmental history and the importance of natural resources like fuel, water and human or animal work. Let's return to the example of tramways. For much of the 19<sup>th</sup> century, they were pulled by horses, agents in a technological system that were neither human nor human-made. Paris's failing electric tramways in 1900-1903 were vulnerable to humidity; their conductors were sunk in the pavement and flooded with rain. Paris's water shortages and sewer failures in the same era were caused by the opposite problem—too little water, caused by heat and drought. Paris's tramways and water system depended on the amount of rainfall for proper function in different ways. These examples show that horses and rainfall can have as much impact on heterogeneous networks as putatively technological and human components can.

Just as ANT's reinterpretation of technology stresses fragility, complexity and heterogeneity, highlighting user agency, so studies of everyday life stress the way that

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46 Although theorists in ANT make this point often, the argument has also been made by other practitioners of socio-technical study: (1) Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (MIT, 1997, 1999); (2) David Edgerton, *The Shock of the Old: Technology and Global History since 1900* (Oxford, 2006). Edgerton calls for a history of “technology in use.”

everyday people experience, influence, adjust to or subvert the social and cultural patterns that structure their lives. Lüdtké's vocabulary of *Eigen-sinn* (self-assertion) and Certeau's language of "getting by," "making do," "appropriation," "*bricolage*," and "consumer production" make the theoretical similarities clear. Certeau calls his work an "investigation of the ways in which users...operate."<sup>47</sup> By using ANT to join sociotechnical studies with studies of everyday life, I want to reveal how Parisians of all kinds intervened in struggles over infrastructure. Technology was much too important to be left to the engineers. In this study, we'll see journalists and politicians arguing the technical details of tramway and water supply networks, contesting the engineer's monopoly on technology, striking construction workers seeking better working conditions and higher standards for construction, the urban underclass scrounging for open water off the supply grid, and the Paris omnibus company trying to block railway development.

ANT, like the history of everyday life, foregrounds the structure-agency problematic without solving it, holding the terms in suspension and constant investigation. It holds open the question of structure and agency as a dialectic.<sup>48</sup> We need to look beyond one-sided analyses of the way that artifacts reflect the beliefs, desires, and interests of the people who *produce* them, to recognize that artifacts also show the

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47 Michel de Certeau, *The Practice of Everyday Life* (University of California, 1998), see p. xi; Alf Lüdtké, *The History of Everyday Life* (Princeton, 1995). Kristin Ross explains *bricolage* as "the wrenching of everyday objects from their habitual context to be used in a radically different way," or "using the elements or terrain of the dominant social order to one's own ends, for a transformed purpose." Kristin Ross, "Rimbaud and the Transformation of Social Space" *Yale French Studies*, No. 73, *Everyday Life* (1987), 104-120, quotes pp. 110 and 116.

48 In so doing, it approaches the theoretical projects of those social thinkers who try to reconcile structure and agency in a more general theory. I'm thinking of structuration, from Anthony Giddens, *The Constitution of Society: Outline of the Theory of Structuration*. (University of California, 1984), and William Sewell's "A Theory of Structure: Duality, Agency, and Transformation". *The American Journal of Sociology*, Volume 98, Number 1 (Jul., 1992), 1-29. Pierre Bourdieu tried to do something similar with the concept of *habitus* in his *Outline of a Theory of Practice*, trans. Richard Nice (Cambridge, 1977).

imprint of those who *consume* them (the ‘user’), as the handle of a tool wears with age. Scholars in ANT argue the actor is “indeterminate,” that the capabilities of people and things depend on the people and things they interact with (I hit differently with a fist than I do with a hammer). In Paris, hygienists and reformers knew this, designing improved housing stock in hopes of making the working classes more comfortable, more productive, more docile and healthier, less socially and biologically threatening. Cleaner apartments would make cleaner workers. Thus artifacts like working-class apartments act on a local, everyday level like what social scientists call “structures”—they both enable and constrain action, pushing it into patterns; they act back on their users and designers (so the hand holding the hammer is calloused as the handle is worn). Artifacts show the imprint of design and use, while agents show the influence of the artifacts around them. Just like social and cultural practice, technology is shaped and shaping.

For my study of urban infrastructures, this means that Graham and Marvin's “complex and dynamic sociotechnical process” creates both empowering and structuring effects on city dwellers. In order to function, technical systems need the right inputs of human work and the cooperation of nature. This leads city dwellers to seek new ways to control people, technologies and nature. Urban governance becomes entangled with the management of these heterogeneous networks or complex systems, and urban citizenship entails using them. For everyone in Paris, using these systems on a day to day basis required knowledge about what they would do given certain human and natural inputs (which omnibus stations gave out transfers, which way was the exit in case of fire, which taps distributed which kind of water, and how were humans and horses vulnerable to electric shock in different ways?).

Madeleine Akrich coined the term “scripts” to refer to this user knowledge. She wrote: “like a film script, technical objects define a framework of action together with the actors and the space in which they are supposed to act.”<sup>49</sup> To continue the theatrical metaphor, scripts provide users with information about the *action*, *characters* and *set* of a sociotechnical scenario. She argued that in order to make heterogeneous networks function, designers not only create devices, but also write scripts for who should use them and how, when and where they should be used. Technical scripts thus describe a normal or routine use and user for technologies, providing cues about what to expect. Whereas Akrich suggests that only technology’s designers write scripts, I follow Michel de Certeau in thinking that users write scripts, too.<sup>50</sup> The totality of user and designer scripts forms a thin tissue of information, a user manual for the networked city, which is constantly being re-scripted by both designers and users who want to control and use technologies in myriad ways. When designs and uses become durably scripted, sociotechnical routines can emerge, patterns of practice which become everyday. There is no clearer example than the Paris expression *Métro-Boulot-Dodo* (Métro, Work, Sleep), which puts the Métro at the center of the daily grind. Scripts, then, have divergent potentials: on the one hand, where users have diverse ideas about how technologies should work, scripts become increasingly contested; on the other hand, where scripting becomes routine, sociotechnical practice can become deeply interwoven with everyday life. Along with Akrich and de Certeau’s language of “scripts,” I use Wiebe Bijker's

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49 Akrich, “The De-Description of Technical Objects,” p. 208.

50 Michael de Certeau, *The Practice of Everyday Life*, Ch. 7 “Walking in the City” and Ch. 9, “Spatial Stories,” pp. 91-111 and 115-131. These sections of de Certeau’s book make clear that he thinks scripts are written about many things other than technologies. Key for his analysis and for mine, he follows Lefebvre in arguing that space is a “social product,” and his analysis of spatial scripts foregrounds the way that users write these spatial scripts. This opens another important vein of influence on my work, the “critical geography” of scholars influenced by Lefebvre’s post-Marxist and para-situationist approach to space such as David Harvey and Edward Soja, Roger Gould and Kristin Ross.

notion of “interpretive flexibility” to bring out contest over scripts, and Henri Lefebvre's notion of everyday life coalescing around rhythms and routines to analyze stabilizing scripts.<sup>51</sup>

Paris's networked infrastructures were rapidly transformed between 1870 and 1914, producing new users, operating in a context where scripts were still unwritten. Bernhard Rieger has theorized a “problem of knowledge” or “knowledge gap” between lay and expert understandings of technology in the Second Industrial Revolution, but this implies that designers were relatively sure and confident of technical scripting, and that users contested these scripts with their uncertainty. My research, however, reveals that Parisians of all kinds—*users and engineers alike*—struggled to write scripts for the city's new infrastructures in this era. Both designs and uses were not fully scripted. Hence to study how these scripts were written, as Akrich put it, “we have to go back and forth continually between the designer and the user.”<sup>52</sup> As I do this, we will see that interpretive flexibility and contest over scripts were much more prevalent in this period of technological innovation than were durable scripts coalescing around stabilized routines. The city's new networked infrastructures destabilized old scripts and routines, and often made forming new ones difficult. Both Akrich and Rieger analyze the scripting process in terms of designers and users, but Akrich privileges designers and technology

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51 Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (MIT, 1997, 1999); Henri Lefebvre, *Rhythmanalysis: Space, Time and Everyday Life*, trans. Stuart Elden and Gerald Moore (Continuum, 2004). Some historians of technology make this sort of durable scripting the hallmark of technological “function,” see Mikael Hård and Thomas J. Misa, eds. *Urban Machinery: Inside Modern European Cities* (MIT, 2008), Introduction, p. 12: “To function, technologies have to be domesticated into routines of daily life, incorporated into existing institutional arrangements, and assimilated into prevailing cognitive and linguistic structures....In short, actors must *appropriate* them.” More on this appropriation process can be found in Mikael Hård and Andrew Jamison, eds. *The Intellectual Appropriation of Technology: Discourses on Modernity, 1900-1939* (MIT, 1998).

52 Akrich, “The De-Description of Technical Objects,” p. 208-9. Akrich and I pursue this same task differently, and for slightly different reasons. For her, technologies are scripted by designers, and we must shuttle back and forth between designers and users to “de-script” them. For me, scripts are constantly written and re-written by both designers and users.



over users and practice, while Rieger privileges the opposite. Building on these two approaches, I try to historicize technology and practice as co-constructed by balancing designer and user perspectives.

### *The Way Ahead*

My first chapter confronts a rupture that often marks the onset of Paris's modernity: Haussmann's ambitious urban renovations of 1853 to 1870. He first attempted equipping Paris with comprehensive networked infrastructures, but this project remained incomplete during his term in office and his lifetime. Strange, then, that both academic and popular memory remember him for much more.<sup>53</sup> Inspired by recent Paris urban studies that challenge Haussmann's hegemony, originality and modernity in various ways<sup>54</sup>, I argue that much of what we call "Haussmannization" actually happened after he left office, in the Third Republic. In order to understand the ongoing urban renovations of 1870 to 1914, we need to better understand Haussmann's legacy for the Third Republic. In addition to his staff and a host of unfinished projects, Haussmann also left behind three main legacies in 1870. First were new forms of government, through which the state took responsibility for public works. This politicized networked infrastructure and associated it with urban modernity. Second were new spatial forms—

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53 They remember him for having completely made over the city, having brought modernity to Paris, or even inventing modern city planning itself.

54 (1) David Jordan, *Transforming Paris: The Life and Labors of Baron Haussmann* (University of Chicago, 1996); (2) *La Modernité avant Haussmann: Formes de l'espace urbaine à Paris 1801-1853*, ed. Karen Bowie (Editions Recherches, 2001); (3) David Harvey, *Paris, Capital of Modernity* (Routledge, 2003); (4) Nicholas Papayanis, *Planning Paris Before Haussmann* (Johns Hopkins, 2004); (5) Sharon Marcus, *Apartment Stories: City and Home in Nineteenth-Century Paris and London* (California, 1999); (6) Sharon Marcus. "Haussmannization as Anti-Modernity: The Apartment House in Parisian Urban Discourse, 1850-1880." *Journal of Urban History* 27/6 (Sept., 2001), 723-745. These studies dispute Haussmann's claim to rupture by showing his debt to and continuity with the urban crisis of 1815-1848. Without this crisis, all of his urban renovation would have been unnecessary. These studies rethink Haussmann's modernity by redefining what he *started* in Paris. My goal is to examine Haussmann's relationship with the period *after* 1870, to redefine what he finished.

the iconic boulevards and a city wired for globalization, operating on an unprecedented scale. Finally, Haussmann helped normalize a cultural framework of Paris as a sick city, by referring to his city planning as “surgery.”<sup>55</sup> By using urban renovation to treat the ailing social body, he connected public works and public health. This perspective flagged traffic and hygiene as key urban problems, and remained quite popular in Third Republic Paris, as I show in a brief intellectual history of “the city as social body.” In dealing with these three legacies, public works in the Third Republic both built on Haussmannization and strove to transcend it.

Chapters 2 and 3 form Part 1 of the dissertation, concerning traffic. In Chapter 2 I use Bijker’s concept of “interpretive flexibility” to examine the debate on Paris’s metropolitan railway from 1872 to 1895. My aim here is a fuller picture of how designers write technical scripts. Examining Métro plans and public debate from architects, engineers, politicians, journalists and intellectuals, I call this period the “dream life of the Métropolitain,” in which the imaginary Métro-to-be was called to do all sorts of different things.<sup>56</sup> Revising the standard view of the Métro’s prehistory—which holds that the Métro was debated for so long because of an administrative stand-off between the municipal and national governments for control of the new network—I argue that there were more parties to the debate than these two levels of governments, and more issues at stake than simply which level of government would win control.<sup>57</sup> Parisians disagreed

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55 Haussmann took up the nineteenth century’s popular idea of the city as a living organism, whose life consisted of circulation – the flow of things like traffic, resources, capital and information. For a classic analysis of this biological construction of Paris as a sick city, see Louis Chevalier, *Laboring Classes and Dangerous Classes* (Princeton, 1973), pp. 11-23.

56 The Métro idea sparked prismatic technological fantasizing, which asked the railway to articulate the cultural meanings of the underground, to define safe and unsafe, to guide different visions of city planning, to solve the housing problem, and to show Parisians the meaning of politically and culturally charged words like “public works,” “general interest” and Haussmannization.

57 One important force in this debate was the *Compagnie Générale des Omnibus* (CGO), whose

about where rails should go, what system of traction should be used, who the Métro should serve, how the Métro should be funded, regulated and operated, and what the Métro's many meanings might be. The Métro became a vehicle for debating oppositions like national vs. local, public vs. private, politics vs. engineering, and liberalism vs. socialism. Ultimately, I argue, dreaming the Métro concerned much more than simply a railway, giving Parisians a way to debate Haussmannization, networked infrastructure, urban governance and modernity.<sup>58</sup>

Chapter 3 examines user experiences of transportation networks during the dynamic and difficult years from 1895 to 1914. Sparked by electrification, locomotion now became available to Paris's mass public for the first time. This created new communities of construction workers, operators and passengers who often saw these networks in less certain and less positive terms than designers did. Faced with Métro construction, tramway electrification, the birth of mass transit, highly visible transportation accidents and growing labor militancy, Parisians began to write scripts for these new transportation technologies. So the user experiences of 1895-1914 contrast significantly with the design dreams of 1872-1895.

Electrical technology gave rise to divergent scripts. While it was powerful and bright, displayed as futuristic and progressive at the era's Universal Expositions, it was also dangerous. New means of transportation increased both mobility and risk for

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Haussmann-era contract gave it a "monopoly" on public transportation in Paris that didn't expire until 1910. The CGO often used its monopoly to try and block development of new railways, a narrative which becomes an important thread running from Chapter 2 to Chapter 3. For versions of the "standard view," see Evenson, *Paris: A Century of Change* and Pike, *Subterranean Cities*.

58 Throughout this whole debate, I stress the under-appreciated tramway networks, a testing ground for learning about light rail. While the Métro helped Parisians intellectualize and fantasize about the new phenomenon of urban railways, the tramways were a field of practical experiment in which to test new ideas of urban rail. Hence the tramways were in a constant crisis, involving technical experiment, financial failure and ongoing organizational overhaul.

passengers. Hence designer scripts that identified new technologies with progress and civilization vied with user scripts that suggested their barbarity. A series of tramway and Métro accidents from 1900 to 1903 taught users the darker side of infrastructural modernization, the price of progress. It also taught designers that electrical engineering and passenger safety had become tasks of governance. To oversee functional public transport networks, the local government had to be technically competent, publicly oriented, and concerned for public safety. Designers could not re-script these technologies without considering the user's point of view.

The question of whether private companies could be trusted to provide public services defined the infrastructural politics of the era. Between 1905 and 1910 a wave of construction worker strikes and public debate about how construction sites had compromised the city flagged the issue of delinquent contractors. The public blamed government contractors for wasting public money, doing shoddy work, and endangering the public (both workers and riders), and blamed the government for not better choosing contractors and enforcing its contracts. Here again a language of civilization and barbarism emerged. As with Haussmann's public works, issues of financial responsibility and managing the relationship between the public and private sectors flared up, as Parisians debated whether the new tramways and Métro were achieving the social and technological progress that networked infrastructures were supposed to deliver. This contention shows that a language of urban and infrastructural crisis emerged in Paris long before the catastrophic flood of 1910 and the First World War. The city battered in 1910 and 1914 was already wounded. Scripts about the fragility of modernity were already being written.

Chapters 4 and 5 form Part 2 of the dissertation, concerning hygiene. Continuing the theme of infrastructural crisis, Chapter 4 deals with what I call “opening the city,” the diverse strategies and fantasies for dealing with Paris's problems with housing, hygiene and urban density. Paris’s built environment was an especially strained infrastructure throughout the 19<sup>th</sup> century, but the authorities never took responsibility for providing it (it never became “public works”). The chapter’s first section deals with housing shortages, housing reform and housing activism, showing that built space was a hotly contested resource and political issue. I illustrate this further through reading of local sources from Montmartre. While the avant-gardists around the *Chat Noir* cabaret parodied the social-spatial relations and scripts of the Paris lodging house and fantasized about liberating tenants, their anarchist-activist colleagues Pouget, Pennelier and Cochon pursued clandestine move-outs, rent strikes and community organizing, building a movement for tenants' rights and collective action.

The chapter then moves on to discuss Parisian desires for more light, air, open space and green space. Building on the work of well-known journalist and critic Jules Claretie, I show the gap between the ideal city and the lived city, and the multiform practices of “escaping the city” which emerged to vent the pressures of urban life.<sup>59</sup> Parisians contrasted city life with the cleaner, greener spaces of the suburbs, provinces and colonies, dreaming of more room to move and breathe. In 1896, utopian August Fabre argued that skyscrapers could become cooperatively-owned worker housing blocks, solving both the housing problem and the city’s shortage of light and air.<sup>60</sup>

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59 Parisians physically fled the city through cycling, tourism and summer and weekend trips; they imaginatively left the city through popular novels and avant-garde painting.

60 He argued that recent technological advances in garbage collection, heating, fire prevention and elevators could clean up and moralize working class life, increase health and hygiene, access to quality

Inspired by the booming tuberculosis prevention movement, the Paris authorities increasingly turned to slum clearance after 1894. While hygienists dreamed of disencumbering and cleaning up public streets and sidewalks, hotel rooms and even pieces of furniture, the local government aggressively medicalized urban space. By the early 1900s, the authorities identified six neighborhoods in which tuberculosis was particularly prevalent, marking them as *îlots insalubres* (unclean blocks), and slating them for demolition.<sup>61</sup> Considered along with other large-scale urban plans of the era<sup>62</sup>, this slum clearance campaign shows that Parisian awareness of urban crisis was scaling up. Urbanism, or modern city planning, emerged in Paris from the growing need to address the city's complex urban problems in a comprehensive, interdisciplinary way.<sup>63</sup> In short, urbanism was born of the multiform practices of "opening the city," a fitting end to four decades of struggle over the city's increasingly fragile built environment.

Chapter 5 revolves around the theme of nature's role in heterogeneous networks, examining water in Paris from three angles. First, I consider water as a natural resource and human need, examining Paris's overburdened water supply. Paris suffered numerous water shortages between 1880 and 1911, almost always during summer heat. To distribute enough water, the Water Service contended not only with drought and gravity, but also with a press and public clamoring for more water, arguing that it was a need or a

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housing, and access to fresh light and air. For Fabre, the solution to Paris's problems with housing, hygiene and density was to harness the power of "modern industry," bending its technological innovation and expanding scale to new purposes.

61 This was the most proactive slum clearance plan since Haussmann, but authorities could not recruit the money for expropriations, and the project stalled, not to be picked up again until the 1920s.

62 Here I have in mind campaigns for low-cost housing, public housing, tuberculosis prevention, redevelopment of the fortifications, redevelopment of the *îlots insalubres*, expansion of park space and extension of the city limits. All of these new, large-scale projects for repairing Paris's nagging social and spatial problems were hatched between the 1890s and the 1910s, interrupted by the First World War, and not realized until the 1920s. Meanwhile, long-standing dreams of opening the city were disappointed.

63 Urbanism sought to integrate diverse concerns: traffic flow, public health, architectural aesthetics, social peace, public works funding, etc.

right and that it was the government's responsibility to provide it. Haussmann first *enclosed* Paris's water supply, transforming it from a natural resource into what Jean-Pierre Goubert called an "industrial product." So Parisians became increasingly dependent on the government—and on an industrial distribution network—for this basic resource. The 1906 example of shantytown dwellers on the city's periphery shows that finding open water off the grid was increasingly difficult in these years.

Second, I consider water as a waste-disposal technology, connecting the story of Paris's sewer development with the debate on Paris's ecological impact on the Seine. In this era, Parisians developed an increasing awareness of humanity's power to manipulate nature, for both good and bad: humans could both pollute and purify water. During summer water shortages, there was often not enough water to flush the sewers, contributing to the "Great Stinks" of 1880, 1895 and 1911.<sup>64</sup> As Paris's ecological footprint expanded, the city came into conflict with its suburbs, other cities, other provinces, the Atlantic, and ultimately Switzerland. Paris's growing appetite for water and growing production of wastewater pushed the city's ecological impact out into a widening field in this era.

Finally, I consider water as a force of nature, which always remains environmental, just outside of human control, examining the Seine floods of 1876, 1883 and 1910. In 1910, floodwaters brought such dramatic physical damage and infrastructural collapse that Parisians saw the fragility of their city and its networked infrastructures. Floodwaters shut down or compromised all of the networks I discuss throughout this study: buildings, tramways, sewers, the Métro and the water supply. Because electricity,

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<sup>64</sup> David Barnes, *The Great Stink of Paris and the Nineteenth-Century Struggle against Filth and Germs* (Johns Hopkins, 2006), p. 237.

gas, fresh water and compressed air lines were bundled in Paris's sewers, they were knocked out as the sewer system flooded. The city not only flooded laterally via the Seine, but also from underneath, as rising groundwater infiltrated catacombs and quarries, sewers and train tunnels.

The public took note of this, one handbill arguing “The city of Paris brought you the flood with its sewers.” The fragility of these networked infrastructures, and the inability of the city's engineers to master the forces of nature, called into question narratives of progress through networking that Parisians had heard since Haussmann. The press exploded, talking about “the powerlessness of the engineers” and “the 1870 of engineers,” seeing the flood as yet another indictment of the authorities' mismanagement of the city. As Parisians had learned since the 1890s from tramway and Métro accidents, delinquent contractors, and the housing and water shortages, networked infrastructures could not only improve life in the city (reduce disease, improve standards of living, etc.) but also bring new dangers, dependencies and fragilities. The flood showed Parisians the heterogeneity of their networked city, teaching that humans, technologies and natural forces had to be properly aligned to make the city function. Disruptions of social routine, technological function or ecological conditions could shut down the city's daily life. The flood showed Parisians the fragility of their urban modernity.



## Chapter 1: Paris, Modernity and Haussmann

### *Public Works in Paris after Haussmann*

Late one summer afternoon in 2005 I left the Paris Municipal Archives at the Porte des Lilas where I was doing dissertation research and boarded the number 61 bus bound for a friend's apartment on the boulevard de Ménilmontant. Sitting behind me were a pair of middle-aged English women, tourists. My ears perked up at the sound of English, and as we were passing the place Gambetta, whose most noticeable feature is the stark, geometric 1992 fountain at its center, one of them sighed and said, “oh, don't you just love Haussmann!” I chuckled to myself at the ridiculous anachronism of her statement: wasn't this high-modernist fountain obvious evidence that the square had been renovated more recently than Haussmann's term, 1853-1870? Giving in to a mainstay of Paris localism, I thought to myself *stupid tourists*.

But I was wrong about them, and there was something historically important behind my fit of historical snobbery. It served as a reminder that Baron Haussmann still dominates historical memory of infrastructure in Paris, on both an academic and on a popular level.<sup>1</sup> His ambitious program of public works is all too often credited with having more-or-less completely made over Paris in the space of 17 years. The gross shape of the city's street plan, the most recognizable “classic” architectural forms of the

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<sup>1</sup> This is especially true in mid-level stores of knowledge like guidebooks, websites, historical surveys and encyclopedias. For example, see Martin Filler, “Architecture View; Baron Haussmann, Urban Designer Par Excellence” *New York Times*, March 24, 1991.

Paris apartment house, the city's first comprehensive sewer system, first water supply system, largest parks, and long-standing reputation as a “capital of modernity” or “capital of the world,” even the origins of modern city planning (or urbanism) itself—although it is a historical exaggeration, all of these are commonly credited to Haussmann. At the very least, his is the most famous name in Paris public works; at most, he is credited with making Paris what it is today, as if no one else intervened much in the *fin de siècle* or the 20<sup>th</sup> century.

The most complete source for reconstructing Haussmann's career is his memoirs, which are consistently self-aggrandizing. His memory is larger than life because he described himself that way, and historians have been careless enough to believe him, mistaking his arrogance for fact.<sup>2</sup> Of course, it doesn't hurt to have a *grand homme* of urbanism like LeCorbusier polishing your reputation, either.<sup>3</sup> But when narratives of Paris history cast Haussmann as protagonist or hero, Haussmannization is cast as a radical departure from the past, a dramatic rupture which rocketed Paris into modernity. As one scholar put it, “In a mere fifteen years the physiognomy of that city underwent a complete transformation, a 'regularisation' (Haussmann) that is unique in European history.”<sup>4</sup>

Such “rupture talk” is always suspicious, not only because it is easy for historians to see that claims of rupture hide profound continuities, but also because rupture talk is *itself* a subtle way of leveraging social power, of justifying human projects as forward

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2 David Jordan, *Transforming Paris* (Chicago, 1995): Prologue, pp. 1-12. David Harvey said it well: “Haussmann's *Mémoires*, upon which most accounts have hitherto relied, are full of dissimulation.” *Paris, Capital of Modernity*, p. 9.

3 Le Corbusier. *The City of Tomorrow and its Planning* (1929), trans. Frederick Etchells (Dover, 1987), p. 257 for example.

4 Schivelbusch, *The Railway Journey*, p. 118.

thinking in various ways (e.g. as innovative, progressive, liberating or revolutionary), and of influencing the way that events are understood and remembered.<sup>5</sup> Rupture talk applies the politics of knowledge to the very stuff of history—continuity, change and memory. Rupture talk is also central to any discourse of modernity, modernity necessarily being defined by a rupture with the past or tradition. This in turn implies that any claim to modernity is implicated in the politics of history and knowledge. Claims to modernity shift the chronological frame in ways that have deep political and epistemological consequences.

In Paris, Haussmannization is often identified as the rupture that brought about the city's modernity. The larger than life myth of Haussmann is thus crucial to upholding myths of modernity in Paris. On this terrain the historian must tread carefully. As David Harvey has recently argued, Haussmann badly needed his own myth of rupture, in order to justify his creative destruction of old Paris as the best way to solve the urban crisis of the 1830s and 1840s, to provide the Second Empire with a founding myth (the tag line would have been something like “rising from the ashes of 1848”), and to co-opt or dismiss various alternatives for thinking about the city that emerged in these same years.<sup>6</sup> Harvey's argument shows us how much our image of Haussmann, as maker of the great rupture that brought modernity to Paris, is a product of Haussmann's own memory-maintenance, propaganda, and self-inflation. Being a modernist, a self-conscious modernizer, Haussmann tended to whiggishly represent his own approach as progressive.

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5 The term “rupture talk” is Gabriel Hecht's. See: (1) "Globalization meets Frankenstein? Reflections on Terrorism and Technopolitics in the Nuclear Age." *History and Technology*, vol. 19, no. 1, 2003. (2) "Rupture-talk in the Nuclear Age: Conjugating Colonial Power in Africa," *Social Studies of Science* Vol. 32, Nos. 5-6 (October -December 2002), special issue on "Postcolonial Technoscience," pp. 691-728.

6 *Paris, Capital of Modernity*, pp. 8-13.

Recent research in urban history like Harvey's has begun to chip away at Haussmann's hegemony, arguing more generally that life in the city was modern before his intervention (Karen Bowie and David Harvey), that piecemeal attempts at urban renewal were made under his predecessor Rambuteau (1833-1848), and that his brand of city planning was not as groundbreaking as it is commonly remembered to have been, drawing heavily on Parisian ideas of urban renovation reaching back as far as Voltaire (David Jordan and Nicholas Papayanis).<sup>7</sup> These approaches argue for Haussmann's continuity with and debt to the period of the July Monarchy, showing that Haussmann did not bring modernity to Paris, but instead responded to a modernity that had already arrived between 1815 and 1848, mostly in the form of urbanization—a crushing flood of immigrants, filling the city to bursting, unleashing overcrowding, infrastructural collapse, epidemic disease, ecological damage, social unrest, even revolution. Paris was caught in the well-known feedback loop between industrialization and urbanization which overtook Europe in the 19<sup>th</sup> century.<sup>8</sup> It became a social whirlpool, exerting a centripetal force on the rest of France, attracting more and more capital, goods, labor, migrants, and information.

The urban crisis of the early-mid nineteenth century is already a familiar topic for historians, unforgettably portrayed in Louis Chevalier's classic *Classes Laboureuses*, *Classes Dangereuses* (1958), and captured in the English word *Dickensian*. Its most basic

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7 (1) David Jordan, *Transforming Paris: The Life and Labors of Baron Haussmann* (University of Chicago, 1996); (2) *La Modernité avant Haussmann: Formes de l'espace urbaine à Paris 1801-1853*, ed. Karen Bowie (Editions Recherches, 2001); (3) David Harvey, *Paris, Capital of Modernity* (Routledge, 2003); (4) Nicholas Papayanis, *Planning Paris Before Haussmann* (Johns Hopkins, 2004).

8 On this historical-geographical phenomenon, see (1) David Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* (Cambridge, 1969), p. 51; (2) Eric Hobsbawm, *The Age of Revolution 1789-1848* and *The Age of Capital 1848-1875* (Vintage, 1996).

geographical or ecological condition was massive population growth in limited areas, plunging European cities into an experiment in population density with dire consequences.<sup>9</sup> From 1800 to 1850, Paris was the largest city on the European continent. Only London was larger, but Paris was twice as dense.<sup>10</sup> In these years, the population inhabiting the city's 3,402 hectares (13.12 sq. miles) doubled, going from 547,000 to around 1.1 million. Average population density doubled, too, from about 42,000 inhabitants per square mile to about 84,000.<sup>11</sup> Far from representing a healthy, vibrant growth, this population explosion was experienced in Paris as acute urban crisis, the shock of modernity. Urban historian Bernard Marchand called his chapter on the boom of 1800-1850 *Paris grandit trop vite*: “Paris grows [or 'grows up'] too fast.”<sup>12</sup> While the suburban areas around Paris expanded to make more room for new inhabitants, Paris folded painfully in on itself, packing more and more people into the city limits, resulting in what David Jordan has vividly described as “a congested, chaotic, incoherent jumble.” In the center of Paris around Les Halles, contemporaries counted around 1,000 inhabitants per hectare (259,000 per square mile), leaving only 8 square meters of living space per inhabitant.<sup>13</sup>

The effect on the built environment was devastating. As Jordan put it, “The old

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9 The mega-capitals of Berlin, London and Paris all quadrupled in size between 1800 and 1900. The same pattern holds for other major cities—Amsterdam, Barcelona, Brussels, Budapest, Cologne, Copenhagen, Dresden, Edinburgh, Genoa, Glasgow, Helsinki, Kiev, Krakow, Leningrad, Milan, Moscow, Munich, Oslo, Vienna, and Warsaw—all of which were at least 4 times as populous in 1800 as they had been in 1900. Zurich's population expanded almost ten times. See B.R. Mitchell's *European Historical Statistics 1750-1970*. New York: Columbia, 1978, pp. 12-15.

10 Steven Johnson, *The Ghost Map: The Story of London's Most Terrifying Epidemic—and How it Changed Science, Cities and the Modern World* (Riverhead, 2006), p. 9.

11 Bernard Marchand, *Paris, Histoire d'une ville* (Paris: Editions du Seuil, 1993), p. 41, in general, see pp. 9-68. It is important to note that the same did not happen in the suburban areas outside Paris's walls. Here the population exploded as well, many figures suggest multiplying by as much as four times, but was able to spread out over a larger land area.

12 Marchand, p. 9.

13 Jordan, *Life and Labors*, 93.

center of Paris absorbed a good deal of this new population by dividing and subdividing the existing housing until the smallest humanly inhabitable space, the *garnis*, or furnished room, was created....”<sup>14</sup> In addition to subdividing existing housing stock, buildings were expanded in the only directions they could be: either upward, awkwardly stacking extra stories, attics and dormers, or by filling courtyards and any other remaining open space between and around buildings with extra rooms. The peculiar crowded, twisted geography of built space that resulted can still be seen today in certain central districts of Paris, especially in the third, fourth and tenth districts. Here buildings appear to wind around each other, stack on top of one another, and interlock in messy ways, leaving little courtyard space for each building, but plenty of dead-end alleys and pedestrian-only streets, often covered or crossed by parts of buildings (what the French call *cités*, *impasses* or *passages*).

Finding a place to live in this crowded space was not the only problem Parisians faced. The quality of housing was also a major issue. Many structures were old, rotting, sagging.<sup>15</sup> Access to sunlight and fresh air was minimal on the lower floors of buildings. Then there was traffic, which often moved slowly through the city's narrow, winding streets. Direct routes were few and far between, and bottlenecks could form easily. But the streets carried more than traffic. For centuries, Parisians had been dumping household, commercial and industrial waste in the street, to be picked over by rag pickers (*chiffonniers*) and recycled, to be collected and sold to farmers around Paris as fertilizer, or

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14 Ibid., 96.

15 Housing inspections, by the government organs like the Commission on Insalubrious Housing or the Cholera Commissions of the 1830s, often cited the humidity of buildings as a problem for structural integrity and health and safety. See Andrew Aisenberg, *Contagion: Disease, Government, and the “Social Question” in Nineteenth-Century France* (Stanford, 1999), pp. 21, 54.

to be pushed around with water and brooms.<sup>16</sup> Whatever was left was, in theory, washed by the rain into the soil or into the river. By today's standards this waste disposal system was inefficient, and ceased to work as soon as the population of Paris reached a certain density. There was simply too much waste to process, and so smaller streets grew thick with stinking sludge (*boue*). Basic infrastructures were decidedly overtaxed. As Jordan described the effects of this rapid increase in population density,

All the basic urban services collapsed under this burden. Water, sewers, hospitals, police, transportation, education, commerce—nothing functioned adequately. Pedestrians and carts could no longer use the same space. Complaints as well as demands and schemes for improvement issues from every quarter. Then came the ghastly cholera epidemics of 1832 and 1849...

...not to mention the revolutions of 1830 and 1848!<sup>17</sup>

This scenery of urban crisis was the backdrop for the emergence of the social question, a moment of intellectual efflorescence, public debate, and social critique, a mood of reformism and utopian thinking in the 1840s.<sup>18</sup> The topic of this wide-ranging

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16 This also included a small amount of whatever human waste didn't make it into the cesspit (not every house in Paris had a cesspit), and a larger amount of horse manure, a product of the thriving taxi and bus industry.

17 Jordan, *Life and Labors*, p. 96. Michael Wagenaar has spoken of an “urban crisis” in Paris. Due mainly to overpopulation, “the built environment and infrastructure were increasingly unable to meet modern demands,” and the authorities were confronted with “the alarming state of public health, physical decay, congestion, and increased pollution.” See “Conquest of the Center or Flight to the Suburbs? Divergent Metropolitan Strategies in Europe, 1850-1914.” *Journal of Urban History*, vol. 19, no. 1, November 1992, pp. 61-2.

18 Harvey, *Paris, Capital of Modernity*, p. 71-73; Papayanis, *Planning Paris Before Haussmann*, pp. 62-128. Cultural and intellectual histories have highlighted a boom in works of social commentary ranging from the novels of Balzac and Hugo to communist and anarchist critiques (the most famous voices here being Blanqui and Proudhon), and a wide variety of socialisms—Fourier and Saint-Simon, Louis Blanc's *The Organization of Work* (1840), as well as well-known works by Flora Tristan and Etienne Cabet. There were also liberal works like Villermé's study of working conditions in the textile industry, or Frégier's conservative *On the Dangerous Classes of the Population in Large Cities and the Means to Make Them Better* (1840). For more on Frégier, see Andrew Aisenberg, *Contagion: Disease, Government, and the “Social Question” in Nineteenth-Century France* (Stanford, 1999), pp. 41-45. This explosion of individual works was made possible by a broad foundation of public debate and intellectual social networks like the architects and engineers grouped around Cesar Daly's *Revue générale de l'architecture et des travaux publics*. For more on Daly and his *Revue*, see (1) Sharon Marcus, *Apartment Stories: City and Home in Nineteenth-Century Paris and London* (California, 1999), pp. 159-165, and (2) Harvey, *Capital of Modernity*, pp. 80-85. Another such community of experts were

debate, typically called the “social question,” was actually many questions—questions about poverty and inequality, the family, hygiene, alcoholism, working conditions, housing, spatial organization, industry, waste-disposal practices, public works, disease control, prostitution, crime, liberalism and statism, reform and revolution, etc. It cannot be stressed enough how central the city was in shaping this debate. Urbanization was a recent and difficult phenomenon. Looking down from their offices, governors saw a city growing in complexity, risk and danger by the day, a city that was hard to monitor, hard to control, hard to keep clean, healthy, safe, orderly and productive. The top of the social pyramid was awash in fear of the working classes as agents of moral decay, epidemic contagion, physical degeneration, social unrest and revolution. Meanwhile at the bottom were dangerous work and cramped quarters, filth, sickness, and competition with thousands of neighbors while the cost of living rose. Above all, existing historical research is unequivocal on this point: it was clear to everyone—press, elite and public alike—that the city just wasn't working properly. In this age of rapid urbanization, cholera epidemics, recurring revolutions, and the social question, then, it was ultimately *the city itself* that came into focus as a topic of debate.

By tying Haussmann's urbanism closely to this context of urban crisis and debate in the 1840s, recent historical research like that of Bowie, Harvey, Jordan, Marchand and Papayanis has begun to bring Haussmann's posterity down to size. They demonstrate that Haussmann reacted to Paris's modernity rather than creating it. Sharon Marcus has recently argued that Haussmannization can be interpreted as a program of “anti-modernity,” a series of attempts to attenuate or block the city's modernization,

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the hygienists grouped around Parent-Duchâtelet and the *Annales d'hygiène publique et de médecine légale*. For More on Parent-Duchâtelet and his *Annales*, see Ann La Berge, *Mission and Method: the early nineteenth-century French public health movement* (Cambridge, 1992).



specifically those aspects of modernity that Second Empire authorities found most threatening: the intensification of uncontrolled, 'promiscuous' social intercourse, epidemic contagion and political ferment in public spaces like the street, the common parts of apartment buildings, meeting halls, cabarets, brothels, etc.<sup>19</sup> But we continue to make classic historical errors—mixing up causes and effects, confusing the conditions that created Haussmann for the conditions Haussmann created, or confusing Haussmann's ideals with his results.

With the exception of Marcus's, these recent studies have one major bias: their perspective on history looks back, drawing continuities between Haussmann's era and the July Monarchy preceding it. This casts urbanism as a response to urbanization (like Marshall Berman's account of modernism and modernity). In attaching the human projects of urbanism to the more 'objective' process of urbanization, it guards against enlightenment fantasies of humanity's total control of self and environment.<sup>20</sup> This sort of enlightenment perspective makes human beings seem the masters of modernity, and makes modernity seem fully “legible” (James Scott), makes it seem totalized, rationalized, complete, planned, even intentional—that is, makes it seem to be a human project. With urban geographers like David Harvey and Matthew Gandy, I see forms of modernism like Haussmann's city planning as urgent, risky, improvised, and incomplete attempts to deal with modernization, attempted solutions to the problem of rapid

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19 Sharon Marcus. “Haussmannization as Anti-Modernity: The Apartment House in Parisian Urban Discourse, 1850-1880.” *Journal of Urban History* 27/6 (Sept., 2001), 723-745.

20 See: (1) Marshall Berman, *All That is Solid Melts into Air: The Experience of Modernity* (Penguin, 1988); (2) Theodor W. Adorno and Max Horkheimer, *Dialectic of Enlightenment* trans. John Cumming (Continuum: 1997), especially Chapter 1, “The Concept of Enlightenment,” pp. 3-42; (3) James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (Yale, 1998).

population growth.<sup>21</sup> Harvey contests the idea that modernity could have come to Paris all at once, insisting, as he has very forcefully throughout his career, that modernization has always meant *uneven development*.

These recent urban histories revise our understanding of what Haussmann *started*, challenging the claim that Haussmann's arrival in office, or the inception of his public works, constituted a major historical break. But was there a break in history when Haussmann left office in 1870? We must also look into the continuities between Haussmannization and the Third Republic, as scholars like Marcus, Jones and Gandy do, to discover what he *finished*. That is my purpose here. Haussmann's inflated historical memory makes his urban projects seem holistic, complete, or totalized. This in turn has encouraged scholars to ignore the massive amount of public works that happened under the Third Republic, because the city appears to have been fully made over between 1853 and 1870.

Haussmann's plans did not even cover the whole city on paper. True, he mapped the entire city, but his well-known vision of the city as a unified whole (a living organism) had an awful lot of blind spots. Overall, more work was done in the city's center than in the periphery, more was done on the Right Bank than on the Left, and more work was done in the fashionable and growing bourgeois neighborhoods on the west side of the city than in the working-class east.<sup>22</sup> Haussmann's work also notably ignored major hilltops around the city like Montmartre, Belleville and the Butte aux Cailles, also working class areas. The class analysis of Haussmann's works is already very well established. The number of people since Karl Marx who have used the term "bourgeois"

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21 Gandy, p. 29.

22 See Jones, Jordan, and Harvey, as well as Bernard Marchand, *Paris, Histoire d'une ville* (Editions du Seuil, 1993), p. 88.

to describe Haussmannization is so huge that the point barely needs mentioning.

The development of plumbing, both fresh water and waste water, is a clear example. Piping proceeded much more quickly on the north-west side of the city, where, conveniently, wealthy landlords could also pay to upgrade the smaller capillaries of the pipe network, those that were considered parts of privately-owned buildings. As late as 1888, there were only 697 buildings in the city equipped with direct-to-sewer drainage for toilets, while in 1895, there were 7,291.<sup>23</sup> This was still less than 10% of residential buildings in Paris (which already numbered almost 72,000 in 1876).<sup>24</sup> In these same years the number of subscriptions to city fresh water service grew from 56,920 to 69,249.<sup>25</sup> In 1891, when the municipal government discovered that residents in the wealthiest districts of the city (the 1<sup>st</sup>, 2<sup>nd</sup>, 8<sup>th</sup> and 9<sup>th</sup>) consumed an average of 55-60 liters of water provided by the city per day, while people on the east side were consuming 14-19 liters, they made subscription to the city water service a legal requirement of property ownership.<sup>26</sup> Connecting toilets to the city waste water system was made obligatory three years later, in 1894. Piping started to become more comprehensive only because the authorities of the Third Republic found the resolve to put pressure on property owners in this way, while Haussmann did not.<sup>27</sup>

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23 Ville de Paris, Direction des Eaux. *Étude & Programme pour le complément de l'alimentation de Paris en eaux de source et de rivière, rapport de l'inspecteur général* (Humblot). 1896, p. 15.

24 Commission des Logements Insalubres, *Rapport General sur les travaux de la Commission pendant les années 1870-1876* (Charles de Mourgues Freres, 1878), pp. 18, 36 (AP VO3 63).

25 Humblot (1896).

26 *Memoire* from Prefect of the Seine Poubelle to the Municipal Council, Apr. 2, 1890, plus several engineering reports on the project of making subscriptions to the Water Service obligatory. For water use figures, see annexes. AP VO3 220.

27 David Jordan, *Transforming Paris*, p. 275. As geographer Matthew Gandy put it, "the flow of water in Paris did not become modern, in the sense that we would now recognize, until after the fall of the Second Empire, with new legislative developments in the 1890s..." Matthew Gandy, "The Paris sewers and the rationalization of urban space," *Transactions of the Institute of British Geographers* 24 (1999), pp. 23-44, quote from pp. 23-4. See also: (1) Gerard Jacquemet, "Urbanisme Parisien: la bataille du tout-a-l'égout a la fin du. XIXe siècle," *Revue d'histoire moderne et contemporaine* 26 (Oct. 1979), pp.

As this glance at Paris's water system shows—and recent research on the 1830s and 40s misses this—much of Haussmann's public works remained unfinished in 1870, not to mention in the 1890s. In terms of money spent, neighborhoods effected, and the scale of constructions designed, the half-century *after* Haussmann witnessed more public works, more physical transformation of Paris's basic infrastructures, than he did. Colin Jones reports that “more than three times as many buildings were erected between 1878 and 1888 as between 1860 and 1869,”<sup>28</sup> while Bernard Marchand notes, “haussmannism witnessed its finest days after 1870.”<sup>29</sup> As contemporary American observer Albert Shaw put it,

...the public works that have been executed in the twenty years from 1875 to 1895 have in all likelihood cost a larger sum in the aggregate than those carried out in the twenty years following the *coup d'etat* of July, 1851. The Haussmann transformations were begun when Paris had only a million people and an area of only thirteen square miles.... But in 1875 the authorities had to provide for nearly two million people, a number that in 1895 was fast approaching three millions. These last two decades have witnessed transformations less pretentious and not so widely advertised, but touching more closely and deeply the lives of the people, and ministering more perfectly to the best demands of modern civilization. Services of education, of cleanliness and of health, on a vast and varied scale, have occupied the administrative machinery that was once so engrossed with boulevards and architecture.<sup>30</sup>

Simply put, much of what we think of as “Haussmannization”—even including road development—actually happened under the Third Republic, between 1872 and the 1930s. Historical memory of Haussmann is distorted because we confuse what he started with what he finished. He started the long, uneven process of modern infrastructural development in Paris, but he by no means finished it.

Returning to where we started the chapter, it was this set of common

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505-48 and (2) Roger-Henri Guerrand, “La bataille du tout-a-l'égout” *L'Histoire*, Feb. 1983, pp. 66-74.

28 Colin Jones, *Paris: the Biography of a City* (Viking, 2004), p. 334.

29 Marchand, *Paris*, p. 140. Marchand is here invoking Francois Loyer.

30 Albert Shaw. *Municipal Government in Continental Europe* (1895), pp. 12-13.

misconceptions that came to light that summer afternoon in 2005 on the number 61 bus. The British tourist behind me had committed a different and *more instructive* historical error than I originally thought. Rather than mistaking the 1992 fountain for a Haussmann-era original, she and her travel buddy had mis-dated Salleron's 1875 administrative office (*mairie*) for the 20<sup>th</sup> district, which turns its grand, faux-Renaissance facade toward the square, in good Haussmanian fashion. This new *mairie* finished Haussmann's plan for the square originally opened in 1862.<sup>31</sup> 1875 is also the year that Garnier's Opera was finished, the crowning jewel in Haussmann's plan for north-west Paris, as well as the year that Belgrand's 1861 plan for supplying the city with spring water (via the *Aqueduc de la Vanne*) was finally put into permanent service. It was an easy mistake to make, one that I have since caught myself making in Paris. Looking at the architectural surface of Paris, it is very difficult to distinguish 1853-1870 from 1872-1895. New styles of building only emerged over the course of the 1890s.<sup>32</sup>

Our common bias in favor of Haussmann distorts historical understanding in palpable ways. It blocks our view of Louis Napoleon's very real interest in urbanism.<sup>33</sup> It also makes Haussmann seem a more innovative planner than he was, drawing as he did on popular ideas of the 1830s and 40s (see Jordan and Papayanis). It neglects that his supposed greatest areas of innovation were in no small part the work of others: streets (Napoleon III), parks (Alphand), sewers (Belgrand). As Alphand himself put it,

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31 At the time the place was called Place Puebla, for the city in Mexico where the French lost a battle earlier that year.

32 David Jordan made this case very forcefully in "Haussmann and Haussmannization: the Legacy for Paris" *French Historical Studies* 27/1 (winter 2004), special issue: new perspectives on modern Paris, pp. 87-113. Thus goes for both Art Nouveau and a harder-edged modernism of the era, prefiguring the "new objectivity" of the 1920s.

33 David H. Pinkney "Napoleon III's Transformation of Paris: The Origins and Development of the Idea" *The Journal of Modern History*, Vol. 27, No. 2 (June, 1955), pp. 125-134.

Hausmann often took on ideas he learned from others “as his own.”<sup>34</sup> Most importantly, it ironically blocks our view of his lasting influence on public works in the Third Republic, and thus hides conservative forces at work in the new regime. The difficulty of dating architectural forms in the city is an outward sign of the inner principles of Paris governance. There was deep administrative continuity between the Second Empire and the Third Republic, in spite of intervening regime changes. Hausmann's devoted assistants Alphand and Belgrand took over the office of Paris Works (*Travaux de Paris*) after he was removed from office, and helped see many of his plans through.

I agree with recent scholarship on the early nineteenth century that there was substantial continuity between Hausmann and his predecessors, but I also agree with Sharon Marcus, Bernard Marchand, Matthew Gandy, and Colin Jones that there was substantial continuity between Hausmann and his followers. Hausmann managed to set the agenda for urbanism in Paris, and indeed in France, for more than 100 years after he left office.<sup>35</sup> This may have been for several reasons—because of administrative continuity in the municipal and departmental governments before and after 1870-1, because Hausmann's vision of the city remained compelling, and was the only comprehensive vision to date, because Hausmann aggravated the urban crisis which had been raging in Paris since the 1830s (because he correctly identified Paris's urban problems, but designed poor solutions), thus making more renovation necessary, or because the spatial forms he designed were so enormous, blocky and immobile that they

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34 Quoted in Patrice Higonnet, *Paris: Capital of the World* (Harvard, 2002), p. 10.

35 Several articles in the winter 2004 special issue of *French Historical Studies* called “New Perspectives on Modern Paris” made this point rather clear. See Charles Rearick, “Introduction: Paris Revisited” (1-8), David Jordan “Hausmann and Hassmannization: the Legacy for Paris” (87-113), and Rosemary Wakeman, “Nostalgic Modernism and the Invention of Paris in the Twentieth Century” (115-144).

tended to fix further spatial transformations<sup>36</sup>, etc.

The imperial government took up public works as a response to the urban crises of 1830-51, and these works were greatly interrupted by the crises of 1870-1, but this only made the empire's unfinished response to 1830-51 seem more urgent.<sup>37</sup> The problems faced by the authorities in Paris after 1870 were largely the same ones Haussmann had confronted in the 1850s. Rather than solve the urban crisis that emerged in the first half of the 19<sup>th</sup> century, Haussmann's public works aggravated it.

On a basic, demographic level, it is easy to see that Haussmann made little difference in the process of Paris's population growth. The rate of growth established between 1800 and 1850, which doubled the city's population, leading to crisis, was repeated between 1860 and 1911. In 1860, Haussmann expanded the city limits to 30 square miles; the population of the annexed area doubled by 1911, reaching 2,847,229 with the greatest average density to date, 365 people per hectare (95,000 per square mile!).<sup>38</sup> What Haussmann's works did do was move population around, draining the center districts and increasing movement out toward the periphery. Rather than solve the housing shortage, his gentrification of the center city resulted in more expulsions and demolitions, as well as rising rents. Those who weren't kicked out were priced out. Rather than slowing the flood of migrants coming to Paris looking for jobs, he created a huge number of jobs in construction, encouraging more immigration, even though it was increasingly difficult to find affordable housing. Rather than bringing social peace to the city, Haussmann aggravated the main geographic lines of conflict: east vs. west, center

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36 Eve Blau, "The City as Protagonist" from *Shaping the Great City: modern architecture in Central Europe, 1890-1937*. (Prestel, 1999), p. 16.

37 The argument that 1848 is a more important turning point for understanding the curve of the 19<sup>th</sup> century is the core of David Harvey's *Paris: Capital of Modernity*.

38 *Commission d'Extension de Paris* 1913 vol. 1 historique – see annexes.

vs. periphery, Right Bank vs. Left Bank, etc. The city was more segregated and more divided because of his public works, and many have interpreted the civil war of 1871 as the “revenge of the expelled.”<sup>39</sup> Rather than solving the crisis of traffic in the city, he simply created broader streets, more space in which vehicles could circulate. By all accounts, more and more vehicles appeared to fill the vacuum. Then the city was battered by German canons and sabotage of infrastructures, as well as by bitter street fighting. When Napoleon III and Haussmann were finished, the need for infrastructural development was greater than ever.

Haussmann ensured that the debate around the urban question and the social question, which made his public works important in the first place, would remain central to Paris life until the eve of the First World War and after. As Roger Gould has recently argued, the Paris Commune is a gauge of how important *urban* issues were in 1871.<sup>40</sup> The issues which became sources of conflict that year included municipal self-governance and the city's high rents, the former inflamed by Haussmann's ruthless sidelining of the municipal government, the latter by his gentrification of the center city.<sup>41</sup> Gould's argument helps us see that Haussmann sharpened the lines of urban conflict in Paris, and encouraged the working class to look to the state for someone to blame for the city's problems. Haussmann had critics in his own time as in ours, and having someone to blame for the transformations the city was experiencing was a powerful explanatory tool. The monolithic myth of Haussmann the modernizer has been

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39 (1) The phrase comes from John Merriman, *The Margins of City Life* (1991), p. 80; (2) Marchand, p. 114. (3) Roger Gould, *Insurgent Identities: Class, Community, and Protest in Paris from 1848 to the Commune* (Chicago, 1995), pp. 1-13; (4) David Harvey, *Paris Capital of Modernity*.

40 Roger Gould, *Insurgent Identities: Class, Community, and Protest in Paris from 1848 to the Commune* (Chicago, 1995), pp. 1-13.

41 Ibid. See esp. p. 19.



used as much to build him up as to bring him down.

In addition to his former staff, and a host of unfinished projects, what else did Haussmann leave to the Third Republic? There are three principle answers: (1) new forms of government, through which the state took responsibility for public works, thereby politicizing public works, (2) the specific spatial forms that Haussmann's crews built into Paris, and (3) a model of city planning based in biological and medical imagery (which I call "the city as social body"). The next three sections treat each one in turn.

### *Consequences of Haussmannization I: New Forms of Government*

According to much recent scholarship, Haussmann's main innovation in public works was making them happen at all. Parisians had been dreaming of renovating the city a century before Haussmann's term in office, but only Haussmann finally accepted the challenge of realizing the dream. Works on such an enormous scale were not cheap (the usual figure is 2.5 billion francs), and so Haussmann financed them with debt-spending. This brought the state into closer relations with major capitalists, riskily tying state coffers to the ups and downs of the market. Haussmann also used the state to encourage and steer development, giving out contracts for construction or operation of infrastructural networks to private companies. This was accompanied by private monopolization of many city services. Both the omnibus company and the gas company were consolidated city-wide under Haussmann, and both were property of the Perriere brothers.

This tendency toward centralization in business was equally evident at the level of the state. There was a great effort at centralization of various types. Through railroad

development, Paris was made the financial, commercial, and industrial center of the nation. Capital and population continued to collect in Paris as well. Napoleon III and Haussmann also worked to consolidate state power, by limiting free speech, expanding police power, and surveillance in the form of inspections, espionage, etc. They also worked to accrue more and more power to Haussmann's office, to sideline the municipal government, and to detach executive authority from the legislature.

This state formation was not merely, as Marx put it, a fattening of the state apparatus, or a fetish for state power—though both aspects are important to understanding this regime.<sup>42</sup> The Second Empire also expanded the state's reach by staking out new domains of governance: public health, public welfare, urban infrastructure, etc. In other words, the state took on *the social* as a domain of governance.<sup>43</sup> Far from the French liberal tradition, the Second Empire was primarily statist in orientation.<sup>44</sup> More than Marx, we require Foucault in order to make sense of these changes. Adopting these new domains of governance also encouraged the continuing development of professional and technical expertise. The centrality of public works meant that engineers trained at the *École des Ponts et Chaussées* were in high demand; both Alphand and Belgrand held this degree. Overall, the basic intellectual orientation of Haussmann and the Emperor was provided by Saint-Simonism, which stressed combining the powers of technoscience, money and the state in the service of modernizing development. By accepting public works as a public responsibility, the

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42 See the “18<sup>th</sup> Brumaire of Louis Napoleon” from Robert Tucker, ed. *The Marx-Engels Reader* (Norton, 1999).

43 George Steinmetz, *Regulating the Social: The Welfare State and Local Politics in Imperial Germany* (Princeton, 1993).

44 Ann F. La Berge, *Mission and Method; The Early Nineteenth-century French Public Health Movement* (Cambridge University, 1992); Alain Corbin, *Women for Hire: Prostitution and Sexuality in France after 1850*, trans. Alan Sheridan (Harvard, 1990); Andrew Aisenberg, *Contagion: Disease, Government and the 'Social Question' in Nineteenth-Century France* (Stanford, 1999).

Second Empire both politicized public works and connected urban modernity with networked infrastructures.

*Consequences of Haussmannization II: New Spatial Forms*

Surely the most famous of Haussmann's works are the boulevards, one of his most lasting contributions to Paris's history. While it remained unfinished in his career and his lifetime, his street network created a template that the *Travaux de Paris* would continue to follow into the 20<sup>th</sup> century. The gross spatial forms of the network are fairly complex, but can be explained on three levels. The foundation of the plan was Haussmann's first project, the *grand croissée*, a central intersection of two principle roads, the rue de Rivoli (east-west) and the boulevards Sébastopol and St. Michel (north-south), which cut the city into quadrants and provided direct access to Les Halles, the central market. This established a new center for the city.<sup>45</sup> Fanning out from this central point, Haussmann planned a second network of roads from a bird's eye view, connecting important plazas, monuments, and buildings, especially train stations, with straight lines. This overlaid the already messy map of old Paris with a complex web of larger roads, diagonals on the urban grid meeting in star-shaped hubs. Third, Haussmann laid concentric circles of roads and rails through the city, the interior boulevards, the exterior boulevards, and the *chemin de fer de ceinture* (belt railway).

Construction of these roads and rails cut through existing neighborhoods in radical and sometimes cruel ways. It is well-known that Haussmann referred to himself as a “demolition artist.” Although he bragged about the service to public health he was doing by removing slums like those on the *Île de la Cité*, it was no coincidence that these

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<sup>45</sup> A new center which was, in one very important sense, off center: it was on the right bank.

slums stood in the way of his boulevards. He tended not to renovate, but to ignore or neglect working-class neighborhoods. From an engineering standpoint, these broad, straight roads were designed to do two things: to open up the city to the flow of traffic (and thereby commerce and cavalry movement), and to act as vents, letting natural light and fresh air into crowded working-class neighborhoods, feared for their filth, disease, and revolutionary unrest. Pierre Pinon used the word *dégagement* (opening up) to describe this process, calling our attention to Haussmann's hopes of decreasing density (i.e. *congestion*) in the center city—density of traffic, construction and population.<sup>46</sup>

Haussmann also sought to “regularize” the city, straightening its crooked streets, aligning monuments with lines of sight, and standardizing fixtures of all kinds (lightposts, park benches, kiosks, etc.). The boulevards were monumental in their own right, sublime swathes of open space cut (Haussmann said “pierced”) through the dense urban fabric. Contemporaries never failed to note how *wide* and *straight* they were, a sharp contrast to the tangle of narrow, winding streets that characterized medieval and early modern Paris.

In terms of architectural style, Haussmann embraced typical nineteenth-century historicism, appropriating various styles of the past. His personal preference, at least as far as street planning went, was for Napoleonic neo-Roman classicism, the deliberate geometry and wide-open feel of Roman plazas. But he also appreciated reference to other historical styles. The accepted style for district administrative offices (*mairies*), train stations, and other buildings designed during Haussmann's term evoked the early modern forms of Renaissance and Baroque architecture. This historical style provides another vantage point on Haussmann's relationship to modernity. He is often credited with bringing modern forms of construction to Paris, namely the iron-and-glass style

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<sup>46</sup> Quoted in Jordan, “Haussmann and Haussmannization,” p. 89.

associated with industrial buildings, train stations, and pavilions for world expositions. Brick construction also increasing in this period. But these new building materials and methods were often hidden behind facades of cut stone in the historical style.<sup>47</sup> This process of hiding new forms of construction under historicist architectural forms suggests an ambivalence toward modernity, an attempt to deliberately domesticate new architectural forms by dressing them up in inoffensive, 'tasteful' historical kitsch, to temper modernity with a coating of tradition.<sup>48</sup>

Sharon Marcus has highlighted the way that sidewalks along the new streets were furnished, “relatively interiorized spaces out of doors,” carefully staged for bourgeois social relations, what we might call a theater of civilization.<sup>49</sup> Haussmann decorated or landscaped (or *embellished*, to use the French term) his new streets with all manner of benches, fountains, street lamps and gardens, in addition to various *édicules* (small constructions)—kiosks, advertising columns, bus stops, gardener's sheds, public toilets, newsstands, etc. These sidewalk furnishings functioned as a sort of stage set, suggesting that the same sort of mannered conduct expected indoors was expected outside as well. It also drew social activities out into the open. Consumption, leisure and entertainment became more and more outdoor activities, out of the dark corners of neighborhood bars, small shops, the meeting places of civil associations, etc. Marcus's analysis is brilliant precisely for bringing our attention to the subtle play of opening and enclosure in Haussmann's sense of urban space, the intention to push the boundaries between public

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47 See (1) Sigfried Giedion, *Building in France, Building in Iron, Building in Ferroconcrete*. Translated by J. Duncan Berry (Getty Research Institute, 1996); (2) Schivelbusch, *The Railway Journey*, pp. 171-187; (3) Jordan, *Transforming Paris*, p. 193; (4) Harvey, *Paris, Capital of Modernity*, p. 135.

48 Rosemary Wakeman, “Nostalgic Modernism and the Invention of Paris in the 20<sup>th</sup> Century” *French Historical Studies* 2004 27(1), pp. 115-144.

49 Marcus, *Apartment Stories*, 140.

and private space, and the resulting tensions between indoor and outdoor spaces. Marcus shows how Haussmann's architectural style can be read as an embodiment of both his bourgeois, civilizationist values and his ambivalence about modernity.

Most famously, this decorative impulse played out in the regularization of facades along the boulevards. Buildings were grouped in blocks (*îlots*), the law stipulating that they could be no more than 80 meters high (usually six stories), with all horizontal elements (floors, windows, balconies) of neighboring buildings aligned. Each block of apartments thus presented a more-or-less uniform facade on all sides, giving an impression which is sometimes called *rue-mur* (street-wall) in French. If the furnishings along the boulevards were parlor furniture for the drama of bourgeois life, the aligned facade was the gross structure of the stage set itself. This coordination of street planning and building design also served the civilizational ideal. The carefully planned and styled surface of the boulevards presented Paris's public face to the world, while the street-wall established borders demarcating the frontiers of Haussmannization, hiding the unrenovated sections of the city. On the scale of the entire city, this is clear along the exterior boulevards, which separated the renovated city center from the much less renovated periphery.<sup>50</sup> Very few new roads had penetrated the city's periphery in 1870. As David Jordan noted, because all of Haussmann's north-south streets that cross the river (except the Boulevard St. Michel), dead end at the Boulevard St. Germain, “everything to the south of the boulevard St. Germain turns its back on the rest of Paris”—which is to say the majority of the Left Bank.<sup>51</sup>

While the new streets marked off the unrenovated sectors of the city, uniform

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50 See map in Colin Jones, p. 306-7. See also Map in *Spintering Urbanism* (2001), p. 54.

51 Jordan, *Transforming Paris*, p. 365.

facades also served to hide the unchanged interior of each block of buildings. As

Théophile Gautier put it in 1851, Haussmann's demolitions revealed “all the ugliness” of the city beyond the renovations:

One had no idea how hideous Paris was, for so much was carefully hidden away behind its boulevards, its river, and its fine streets. It is only after the cesspools laid bare by the new construction that one becomes convinced of the need for all this work, which is turning the city upside down to good purpose and making a home for civilization.<sup>52</sup>

So Gautier was as interested in civilizing the city as Haussmann was. He saw the unrenovated parts of the city as an inspiration to further Haussmannization. But republican critics of Haussmann like Flaubert and Zola saw the unrenovated city beyond Haussmann's street-walls as evidence of Haussmann's failure to make real infrastructural change for those who needed it most. To them Haussmannization seemed like giving a sick city cosmetic surgery, hiding its problems behind a thin facade of splendid renovation. Jordan uses words like “hypocrisy,” “timidity,” “illusion” and “false” to convey their view of him.<sup>53</sup> In the early 20<sup>th</sup> century, one British observer saw right through the facade of Haussmann's external boulevards, calling them “shabby-gentile.”<sup>54</sup> Françoise Choay noted the “surface logic” of Haussmannization, and Patrice Higonnet added that “his modernizing discourse was coherent in appearance only.”<sup>55</sup>

In addition to the boulevards, Haussmann decisively “changed the spatial scale of both thought and action” in Paris according to Harvey. A brief look at some figures easily proves his point. When the architect Hittorf met with Haussmann in 1853 and suggested a new, triumphal avenue to connect the Arc de Triomphe with the Bois de Boulogne, he

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52 Quoted in Higonnet, *Paris, Capital of the World*, p. 86.

53 *Transforming Paris*, p. 364.

54 Frank L. Emanuel, *The Illustrators of Montmartre* (London: A. Siegle, 1904), pp. 4-5.

55 Higonnet, p. 170.

suggested it be 40 meters wide, while Haussmann wanted it 120 meters wide.<sup>56</sup> This monumental scale of construction characterized buildings in the Second Empire as much as roads. The gallery of machines at the 1855 Exposition was over a kilometer long; the main pavilion for the 1867 Exposition was 380 by 490 meters in area.<sup>57</sup> In 1860 when Haussmann annexed large parts of the suburban areas around Paris, he more than doubled the city's land area, from 13 to 30 square miles. Under the Second Empire, the national rail network increased more than 10 times, from 1,931 kilometers of track in 1850 to 23,000 in 1870. Telegraph lines went from zero to 23,000 kilometers in the ten years between 1856 and 1866. The number of omnibus passengers in Paris tripled, from 36 million in 1856 to 110 million in 1860.<sup>58</sup> The length of sewer pipe in the city nearly quintupled, going from around 70 miles to around 350 miles.<sup>59</sup> Haussmann increased the total length of roads in the city from 450 to 525 miles, according to his own count.<sup>60</sup> The number of bricks entering the city increased ten times, from under 50 million in 1850 to 500 million in the late 1860s; similar numbers are available for the amount of cut stone and quarry stone.<sup>61</sup> The old Paris was characterized by buildings 2-4 stories high; Haussmann upped the norm to 5-6 stories.

It should be noted right away that this dramatic transformation in scale was *not* merely quantitative. Haussmanization illustrates the old Hegelian-Marxist point that

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56 Harvey, *Paris: Capital of Modernity*, p. 12.

57 Giedeon makes much of the size of Exposition buildings in his *Building in France, Building in Iron, Building in Ferro-Concrete*, pp. 120-142. Harvey mentions the same, again on p. 12.

58 Harvey, *Paris: Capital of Modernity*, p. 109, 113.

59 Mathew Gandy, "The Paris Sewers and the Rationalization of Urban Space," p. 30; Donald Reid, *Paris Sewers and Sewermen: Realities and Representations* (Harvard, 1991), p. 30.

60 Haussmann, *Mémoires* vol. 2 p. 512-513. Roger Gould provides slightly different figures, 450 to 535 miles, *Insurgent Identities*, p. 73. Figures regularly range from 80-90 miles of new roads built under Haussmann.

61 Harvey, p. 135.



transformations of quantity give way at some point to qualitative transformations.<sup>62</sup>

Harvey speaks often of Haussmannization's compression of space and time, an intensification of circulation in the city—circulation of goods, information, capital, and people. Haussmann started the process of wiring Paris for globalization, dramatically increasing the size of markets in which Parisians could buy and sell. Railroads connected the capital to a broader, national economy, making Paris more and more dependent on provincial production, especially for food. This broadening of Paris's economic horizons also opened Paris to imports and exports from other countries and continents, and to international competition. One major sign of this was the department stores, which relied more and more on an economy of scale—huge inventories, turned over consistently, at low rates of return. Each sale didn't produce much profit, but the net effect was enormous.<sup>63</sup> Other signs of Paris's widening relations with the world include expanding tourism in the city and the international expositions. Haussmannization set off the mass age in Paris—mass migration, mass consumption, mass production, etc.<sup>64</sup>

Other transformative changes in scale included people living farther from their places of work, and Paris's expanding ecological footprint. One correlate of rising population, production and consumption was a dramatic increase in the amount of waste Paris created. This had a positive effect of farmers who used Parisian waste as fertilizer, especially along the sewage pipeline stretching from Paris to Gennevilliers for “irrigation” in the late 1860s. But it also had an increasingly negative effect on water

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62 Robert Carniero, “The transition from quantity to quality: a neglected causal mechanism in accounting for social evolution” *Proceedings of the National Academy of Science* 97/23 (Nov. 7, 2000), pp. 12926-12931.

63 Michael Miller, *The Bon Marché: Bourgeois Culture and the Department Store, 1869-1920* (Princeton, 1981).

64 For a clear statement of this argument, see “Haussmannization” from Vanessa Schwartz, *Spectacular Realities*, pp. 16-26.

quality for the suburbs downstream of Paris.<sup>65</sup> Haussmann and company began to widen the circle of Paris's ecological impact.

Another major spatial tendency of Haussmannization was infrastructural bundling, creating infrastructural paths (roads, rails, etc.) which would then attract other infrastructures (pipes, wires, etc.). Eve Blau recently wrote, “The nineteenth-century model for modernizing the old city (employed by Baron Haussmann in Paris, for example) created a form that was fixed and static, not a model for change that could accommodate growth.”<sup>66</sup> Haussmann modified the city so that people and commodities could move through it more quickly and easily. The existing city could thus accommodate more traffic and commerce. But he did not plan a modular, expandable city which would be sustainable under growth. He did not imagine that this expanded traffic and commerce would further change the city's spatial needs and forms. His spatial forms were historically heavy, as well, tending to restrict Paris's spatial system for the next several decades, erecting physical and imagined barriers that one could not or did not cross.

One can see these heavy, immovable forms getting in the way if one looks at the struggles over how to equip Paris with a metropolitan railway (whether underground or overground) in the 1870s-1890s. As David Jordan put it in his recent essay on the consequences of Haussmannization:

Haussmann's ideas on getting about in the city were, even for the mid-nineteenth century, primitive, limited as they were to walking and the private carriage. He

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65 We'll see more about this in Chapter 5. See Donald Reid, “The Irrigation Fields,” from *Paris Sewers and Sewermen: Realities and Representations* (Harvard, 1991), pp. 53-70. See also: Gerard Jacquemert, “Urbanisme Parisien: la bataille du tout-a-l'égout a la fin du. XIXe siècle,” *Revue d'histoire moderne et contemporaine* 26 (Oct. 1979), pp. 505-48.

66 Eve Blau, “The City as Protagonist” from *Shaping the Great City: modern architecture in Central Europe, 1890-1937*. (Prestel, 1999), p. 16.

had little or no sense of the importance of public transportation within the city, although he could be imaginative about trains to, from, and around Paris.<sup>67</sup>

This is a perceptive observation. The openings that Haussmann created by cutting boulevards through the city were intended for pedestrians and relatively small, horse-drawn vehicles. So under the Third Republic, as city government, engineers, and developers argued about how to equip Paris with an intra-urban rail network, they were in a bind. To route tramways over the boulevards would no doubt disrupt existing flows of foot traffic and horse-drawn vehicles, but they were the only spaces in the city large enough to even consider putting tramway lines. In this sense, Haussmann's street network was already out of date before it was finished. Three years before the Avenue de l'Opéra was finished (1875) and six before the boulevard St. Germain (1878), the Council of the Seine and the Municipal Council had already opened the question of urban rail development.<sup>68</sup> Haussmann's boulevards were never intended to route trains, but they were the only spaces in Paris large enough to do so. The developers of city rail were stuck; Haussmann's forms boxed them in. Even in 2004, David Jordan recognized, "Haussmann's city endures and is clearly identifiable" because "its itineraries" are "reinforced by the Métro..."<sup>69</sup>

So the paths of the city rail network developed between 1872 and 1914 tended to follow, mimic, or mirror the paths cut through Paris by Haussmann's boulevards—the tramways on their surface, Métro tunnels beneath. Major sewers also followed the path of the streets above. Each sewer tunnel is marked with a street sign, showing the name of

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67 David Jordan. "Haussmann and Haussmannization: The Legacy for Paris." *French Historical Studies* 27/1 (Winter 2004), p. 96.

68 *Rapport de la Commission Spéciale sur L'étude des Chemins de Fer et Tramways d'Intérêt Local a établir dans le département de la Seine*. Paris: Charles Mourgues Frères, Imprimeurs de la Préfecture de la Seine, 1872 (AN F 14 9153).

69 Jordan, p. 112.

the Paris street above it, forming a two-story map of the city. These large sewers served as channels for other things besides waste water: fresh water pipes, gas lines, telegraph lines and pneumatic pipes for mail, later carrying telephone and electrical cables. The spatial arrangement of these sub-conduits depended on the conduits they were routed through, an early example of what is called “infrastructural bundling” today.<sup>70</sup>

Hausmann’s forms put up both material and symbolic obstacles to transforming Paris. Materially, he cut wide channels of infrastructure into the city, which continued to attract or bundle other infrastructures to them throughout the Third Republic. Symbolically, because many Parisians remained loyal to the norms and principles of Hausmannization well into the 20<sup>th</sup> century.

*Consequences of Hausmannization III: The City as Social Body – Public Works and Public Health*

One of the most enduring images of Hausmann is as a surgeon. Zola may have used the image first, but Le Corbusier's use is more famous, glorifying Hausmann because his “whole work” had the character of a “bold piece of surgery.”<sup>71</sup> Hausmann inspired Le Corbusier's own plan to make “a frontal attack on the most diseased quarters of the city.”<sup>72</sup> The image has been passed down and reproduced countless times since.<sup>73</sup>

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70 The best source on infrastructural bundling I've found is Graham and Marvin's *Splintering Urbanism*. They discuss bundling on pp. 10, 35, 55, 68, 71, 175, 237, 257, 259, 264, 271, 274, 277 and 282.

71 Le Corbusier, *The City of Tomorrow*, p. 257. On Zola, see Jordan, “Hausmann and Hausmannization,” p. 90.

72 Quoted in Papayanis, p. 253.

73 The following is a sample of such references: David Barnes, *The Great Stick of Paris and the Nineteenth-Century Struggle against Filth and Germs* (p. 50); John Rennie Short, *the Urban Order: an introduction to cities, culture, and power* (p. 401); Malcolm Miles, *Urban Avant-Gardes: Art, Architecture and Change* (p. 65); Arturo Almandoz Marte et al., *Planning Latin America's Capital Cities, 1850-1950* (p. 24); Pamela Gilbert, *Imagined Londons* (p. 104); Joseph Rykwert, *The Seduction of Place: the History and Future of the City* (p. 90); Michael Parfect, et al. *Planning for Urban Quality:*

For my purposes, it is not the surgeon that is important, but the patient.

Hausmann's third contribution to public works in the Third Republic was to normalize a certain way of imagining the city as a living organism. The implication of this idea, as textual analysis of Hausmann's *Memoires* reveals, was an overarching metaphor of city planning as medical science. Let's look closely at his vocabulary. Hausmann called the demolitions on Ile de la Cité Paris's "gutting" (*éventrement*). He referred to Alphand's *Bois de Boulogne* and *Bois de Vincennes* as "lungs," whose green space would allow the city to breathe. Roads were "arteries," and were "pierced" through the city, like medical instruments into flesh. Most striking is Hausmann's depiction of Belgrand's sewers: "The underground galleries, organs of the large city, would function like those of the human body. Pure and fresh water, light, and heat would circulate beneath the urban skin like the diverse fluids whose movement and maintenance support life."<sup>74</sup> There is clearly a vision here of the city as a living organism, an urban body. And for this organism's proper function, fluids had to circulate in healthy ways, matching inputs and outputs, spreading life-giving nutrients and removing waste. For Hausmann, Paris was a city of flows: flows of traffic, of light and air, of water and heat, of commodities, labor and capital, of information. These flows had to be carefully managed and balanced.

According to Schivelbusch, "the concept of circulation" was "central to the scientific social notions of the epoch." This expressed itself in "the biologization of

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*Urban Designs in Towns and Cities* (p. 157); Donald James Olson. *The City as a Work of Art: London, Paris, Vienna* (p. 142); Leonard Pitt. *Walks Through Lost Paris: a Journey into the Heart of Historic Paris* (2006), p. 5; Spiro Kostof, "His Majesty the Pick: the Aesthetics of Demolition" in *Streets: Critical Perspectives on Public Space*, Ingersoll et al., eds. University of California, 1994, pp. 9-22. See p. 11.

<sup>74</sup> Quoted in Jordan, *Transforming Paris*, p. 274, Goubert, *The Conquest of Water*, p. 67 and Reid, *Paris Sewers and Sewermen*, p. 29.

social processes and institutions that is so typical of nineteenth-century thinking.”<sup>75</sup>

Viewing this scientism through a wider lens, Anson Rabinbach described a widespread “strategy of social modernity” in the nineteenth century, which sought answers to social problems in the rational application of science and technology.<sup>76</sup> Many scholars (Schivelbusch, Jordan, James Scott) have stressed Haussmann's holism and rationalism, his persistent fantasy of seeing the city as a whole (witness his comprehensive mapping of the city), a complex system whose problems could be solved rationally. Schivelbusch and Evenson have stressed that his was an “engineering” approach to city planning rather than an architect's.<sup>77</sup> Haussmann and his cohort drew this scientism from Saint-Simon, one of the guiding intellectual lights of the Second Empire (and the Third Republic, for that matter). They sought to understand and master the city as a complex system, and the most readily available heuristic in the mid-nineteenth century was the analogy of a living organism.

Haussmann helped to popularize this vocabulary, and to cement its influence in thinking about cities. His ideas were not influential for their originality, but for their timeliness. As David Pinkney put it, Second Empire plans “concerned with public health, slum clearance, and traffic [fit] readily into the pattern of the urban reform and public health movements of the 1830s, 1840s and 1850s in Britain, Germany, and France.”<sup>78</sup>

According to Papayanis, “the ideology of circulation” was already the dominant way of imagining cities in 1840s France.<sup>79</sup> David Harvey argued that circulation and fluidity

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75 *The Railway Journey*, p. 194.

76 *The Human Motor*, p.??

77 Evenson, *Paris: A Century of Change*, p. 22; Schivelbusch, *The Railway Journey*, pp. 181-3.

78 David Pinkney, “Napoleon III's Transformation of Paris: The Origins and Development of the Idea” *The Journal of Modern History*, Vol. 27, No. 2 (Jun., 1955), pp. 125-134, quote p. 134.

79 *Planning Paris before Haussmann*, pp. 103, 118-9

were such popular concepts for understanding life in mid-nineteenth-century Paris because 'modernity' had arrived. He notes that Balzac referred to Paris as a “rushing stream” where daily life moved at a “frenetic pace” and time and space had become “compressed.”<sup>80</sup> Dramatic population growth between 1800 and 1850 brought spectacular increases in commerce, in traffic, in crowding, and in rents. The plausibility of this notion was increased by an accident of the French language: the word *circulation* is used for both the movement of fluids like blood through veins and the movement of traffic on city streets.<sup>81</sup>

In fact, the conception was much broader than simply city as body. Any large human agglomeration could be referred to in this way, like the 'social body' or the 'body politic'. What is crucial here is the homology between ways of understanding the city and ways of understanding society. As early as 1829, Jean-Baptiste Say pointed out that this idea had a long (Roman) history: “*civitas*, city, society are synonyms.”<sup>82</sup> In his liberal political economy, the concept of organism was crucial:

Political economy is nothing other than the economy of society. Political societies, what we call nations, are living bodies (*sont des corps vivants*), just like the human body. They subsist, they live only by the play of the parts of which they are composed, as the body of the individual subsists only by the action of its organs.<sup>83</sup>

For Say, the action of these organs consisted in circulation: “One imagines that the social body will be the livelier and healthier the more general and rapid the circulation of values is.”<sup>84</sup> This was the broader, social application of a key principle of liberal political

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80 *Paris, Capital of Modernity*, p. 32.

81 Schivelbusch, *the Railway Journey*, p. 195.

82 Jean Baptiste Say, *Cours complet d'économie politique pratique*, (Guillaumin and Cie, 1852), p. 1, in the footnote.

83 *Ibid.*

84 Schivelbusch, *the Railway Journey*, p. 195.

economy, namely that economies are healthy when capital remains liquid, freely flowing.

Written between 1869 and 1875, Maxime du Camp's *Paris, its Organs, its Functions, its Life* is probably the most famous example of this fluid, vitalist biologism. In this study of his beloved capital city, he wrote, "Paris being a giant body, I tried to do its anatomy."<sup>85</sup> The study proceeds over several volumes to do just this. Du Camp analyzes the city as an integrated set of functionally distinct "organs" like the post office, the railroads, the telegraph and the Seine. This elaborate analysis was demanded, du Camp argued, by Paris's exceptional speed, efficiency, scale and complexity. More than anything, Paris was characterized by constant, rapid movement:

In my life as a traveler, I've seen many capitals, some being born, some growing [up], those which are at the summit of their destiny, those that are dying, those that are dead, but I have never seen a city produce an impression as enormous as Paris or more clearly present the idea of an indefatigable people, nervous, living with an equal activity under the light of the sun, under the glow of gas [lights], panting for its pleasures, for its business<sup>86</sup> and gifted with perpetual movement.<sup>87</sup>

Years later, the groundbreaking sociologist Émile Durkheim would describe industrialized societies in fundamentally similar terms, as complex assemblages of functionally integrated parts organized under the division of labor according to the principle of "organic solidarity." Durkheim often used the idiom of the "social body" and social health, once remarking, "For a society to feel itself in good health...the development of all its functions must be regular, harmonious, proportioned."<sup>88</sup>

The importance of this trend of understanding the human world physiologically

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85 Maxime du Camp. *Paris, ses organes, ses fonctions, sa vie dans la seconde moitié du XIXe siècle* vol. 1 (Paris: Hachette, 1875), p. 8.

86 The French word is *affaires*, which suggests either commerce in general or the personal possessions of each Parisian. Either way, it suggests an appetite for commodities.

87 Maxime du Camp. *Paris: ses organes, ses fonctions et sa vie dans la seconde moitié du XIXe Siècle*, vol. 1, p. 5.

88 Émile Durkheim. "Suicide et Natalité: étude de statistique morale," *Revue Philosophique* 26 (July-Dec., 1888), p. 447.



cut across discipline and across politics. It was one of the most popular notions in Paris's long nineteenth century, one of the most important ideas in the human sciences of the era. J.B. Say was a classical liberal political economist, Durkheim was a solidarist republican sociologist, du Camp was a conservative man of letters. It inspired Jewish philosopher Henri Bergson, whose vitalist metaphysics preferred becoming to being, change to stasis, as much as it inspired radical rightist and committed anti-semitic Georges Vacher de Lapouge. For Lapouge, the homology between biology and society was crucial; it justified his Social Darwinism. In his 1894 article "Laws of the Life and Death of Nations," he argued that nations "are born, live and die like animals and plants. A people, a society are like organisms the seat of an incessant vital whirlwind." Lapouge saw the body as a collection of cells in a constant process of reproducing and dying. In each of these cells, chemical materials were constantly renewed. "*In social organisms, phenomena are still more complex, but of the same order.*"<sup>89</sup> In this constant circulation, this process of decay and repair, bad cells had to be removed and good encouraged to flourish. Socio-biology led Lapouge down the path of racist eugenics.

At the opposite end of the political spectrum, Emile Zola turned this conception to his own purposes. In his theory of the *roman expérimental* (the experimental or experiential—i.e. empirical—novel), he portrayed the naturalist or social realist writer as a "doctor of moral sciences" (*docteur en sciences morales*). In this view, society is an organism, whose "different organs are integrated (*solidale*)." Like Durkheim, Zola was concerned that the functional interdependence of these organs made such complex systems fragile. He wrote: "the social circulus is identical to the vital circulus: in society

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89 "Lois de la Vie et la Mort des Nations." *Revue internationale de sociologie* (yr. 2, no. 1, Jan. 1894), p. 421 – 436. See pp. 421-2.

as in the human body, there is a solidarity which links the different organs to one another, in such a way that, if one organ goes bad, many others are strained, and a very complex malady arises.”<sup>90</sup> For Zola, the job of the naturalist writer was to diagnose these social pathologies.

This biologized view of city and society was crucial to Parisians because it gave them a language in which to express the *malady* of contemporary urban life. As Durkheim and Zola reveal, the obvious implication of seeing human agglomerations (whether cities and societies) as living things was the notion that they could be in better or worse health. Paris, as we have seen, was very sick. This imagery, of the city or the social body as sick, was periodically recharged throughout the nineteenth century. According to David Barnes and Catherine Kudlick, the cholera of 1832 was a major turning point.<sup>91</sup> For Robert Nye, Eugen Weber, and Bruno Latour, it was military defeat to Prussia in 1870 that brought on consciousness of sickness in the social body.<sup>92</sup> Both views are correct. The imagery first emerged in the 1830s and 40s at the onset of Paris's urban crisis, and received a significant re-energizing from the defeat of 1870 (yet another example of how Haussmannization aggravated features of Paris's early nineteenth-century modernity). In seeing the city as a social body, Haussmann helped to solidify links between public works and public health, between hygiene and infrastructure, which would continue to define Haussmannization under the Third Republic.

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90 Quoted in Pagano, *Experimental Fictions: From Emile Zola's Naturalism to Giovanni Verga's Verism*, London: Associated University Presses, 1999, p. 48.

91 Catherine Kudlick. *Cholera in Post-Revolutionary Paris: a Cultural History* (University of California, 1996); David Barnes. *The Making of a Social Disease: Tuberculosis in Nineteenth Century France* (University of California, 1995).

92 Robert Nye. *Crime, Madness, and Politics in Modern France: the Medical Conception of National Decline* (Princeton, 1984). Eugen Weber. *France Fin de Siècle* (Harvard, 1986). Bruno Latour. *The Pasteurization of France* (Harvard, 1988).

*The Opening of the Avenue de la République: Haussmannization in the Early Third Republic*

July 13, 1891. It was the eve of Bastille Day, but the national celebration had already begun in Paris. Outside his palace president Sadi Carnot boarded a carriage bound for the Place de la République at twenty minutes to two, so as to arrive on the hour. He was accompanied by the Minister of Education, Léon Bourgeois, and several army officers. The driver's most direct route was to head east along the *grands boulevards*, which head straight into the plaza, but there were also symbolic reasons for taking this route on that particular day—it had been an important route for official processions since it was built.<sup>93</sup> Parisians did not miss this political symbolism, turning out by the thousands for the parade. The day's issue of *Le Temps* reported that the president's convoy was greeted with great applause and cheering along its entire course.<sup>94</sup>

Their first destination that day was the inauguration ceremony for a new avenue, *Avenue de la République*, which was to be the final addition to the Place de la République. This had long been an important location in the capital. It housed the north-east gate of Paris in the city wall built by Charles V in 1370, and was later the site of a water tower (formerly called *Place du Château d'Eau*). Under Haussmann it had been systematically connected by road with the north and east train stations (Boulevard de Magenta), with the Place de la Nation (Boulevard du Prince-Eugène, today Boulevard Voltaire), and with the Place de la Bastille (Boulevard Richard Lenoir). This made it an important crossroads for street traffic, in the heart of what was then the most

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<sup>93</sup> Initially built between 1668 and 1705 under Louis the 14th, called the *Nouveau Cours*.

<sup>94</sup> *Le Temps*, July 14, 1891. Another account of the day's events can be found in the *Bulletin Municipal Officiel*, July 15, 1891.

industrialized part of Paris.<sup>95</sup> Even today, “République” as it is known, remains an important traffic hub for Paris's north-east quadrant. Wedged in a corner between the 3<sup>rd</sup>, the 10<sup>th</sup> and 11<sup>th</sup> districts, the *place* is conspicuously networked. It is a point of transfer, from one Métro line to another, from one boulevard to another, from the inner ring of boulevards to the outer ring, from one itinerary to another, from Paris's center to its periphery.<sup>96</sup>

Haussmann's street-planning was not only intended to streamline traffic flows in the city. Roads encourage movement in a single direction, which helped increase the speed and fluidity of traffic in Paris. But the directionality of roads can also make them difficult to cross; motion along their axis is always smoother than motion perpendicular to that axis. As a result they can be used as a kind of barrier, to separate certain parts of the city from each other. Any infrastructural channel can do this: train tracks, a viaduct, a highway, a pipeline, a canal. These channels do not, strictly speaking, physically prevent movement, but function socially, as a barrier that everyone recognizes.<sup>97</sup> David Jordan's discussion of Haussmann's street planning for east-central Paris suggests that Haussmann realized this. The triangle of boulevards he constructed, with the Place de la République at the top, and Bastille and Nation forming the base, both created new spatial barriers and removed existing ones. It completed a barrier of boulevards on all sides of the revolutionary Faubourg St. Antoine, a neighborhood that had long been a source of

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95 By 1872 this meant the 2<sup>nd</sup>, 3<sup>rd</sup>, 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> arrondissements. See the map on p. 90 of Roger Gould, *Insurgent Identities* (Chicago, 1995).

96 No less than five lines of the Métro cross there, which is more than cross at most traffic hubs in other sectors of Paris, even those based around railroad stations, which are important points of transfer between Métro, RER and *grandes lignes*.

97 As 110<sup>th</sup> street forms the limit of Harlem in New York City, or captured in the American expression “wrong side of the tracks.” See Langdon Winner “Do Artifacts have politics?” from *The Whale and the Reactor: a Search for Limits in an Age of High Technology* (University of Chicago Press, 1986), pp. 19-39.

protest and violence. At the same time, the Boulevard Richard Lenoir was used to remove a barrier that Second Empire authorities did not like: a large section of the Canal St. Martin, which had been used as a moat by revolutionaries in June of 1848. The boulevard Richard-Lenoir was built over the top of a large section of the canal, enclosing it in a sewer-like tunnel, bridging the moat, and giving the authorities more direct access to the east side of the city.<sup>98</sup>

Once Haussmann was done with the Place de la République, it formed a sort of gateway to the north-east corner of Paris, providing street access to the 10<sup>th</sup>, 11<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> districts. It also separated this overwhelmingly working-class corner of the city from the more bourgeois parts of the city to the west with a continuous barrier of boulevards running north-south from the foot of Montmartre to the Bastille. Boulevards emerged from the new, Haussmannized *place* to the north-west, west, and south-east, leaving the north-east corner of the city untouched. It now “turned its back” on the working-class north-east quadrant of the city. Its only street link with the 19<sup>th</sup> district was the medieval Rue du Temple; until July of 1891, there was no road from the Place de la République to the 20<sup>th</sup>; Paris beyond it was ripe for Haussmannization. During the “bloody week” which ended civil war in May 1871, this sector of the city was the last bastion of communard resistance (specifically the heights of Belleville).<sup>99</sup> It was also a sector that had been relatively neglected by Haussmann's public works.<sup>100</sup> There was the threat of the radical working class to contain, and an industrial sector of the city that was not yet 'properly

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98 David Jordan. *Transforming Paris*, pp. 185-195.

99 See the map of the eastward-moving front in Harvey, *Capital of Modernity*, p. 307.

100 An important exception, from late in the Second Empire, is the park at the *Buttes-Chaumont*, which transformed several depleted stone-quarries into a striking park, opening in 1867 for the World Exposition, and credited to Alphand. The park is a fine piece of landscape architecture, centered around a look-out point topped by a gazebo (*belvédère*). The gazebo sits at the edge of a cliff which drops into the human-made lake below.

networked' to wider global flows of capital and labor. The *place* had been the focus of two previous Bastille Day ceremonies. The first was in 1880, when the holiday was made official as a national holiday and the plaster model of Morice's enormous statue of Marianne was unveiled. The second was held in 1883 to unveil the final bronze version (figure 1).

That summer day in 1891, the president was on his way to celebrate the place's connection with yet another corner of Paris. Paris's street system being based on concentric rings of boulevards, the new avenue constituted an important cross-town link on the east side, connecting the inner arc of boulevards (the *grand boulevards*) with the outer ring of boulevards. This link was made at the foot of the Père Lachaise cemetery. Here the new avenue took a turn, followed the cemetery's north wall and then continued across the 20<sup>th</sup> district to the eastern limits of the city at Romainville<sup>101</sup>, connecting the industrial center of the city with working-class areas in the 11<sup>th</sup> and 20<sup>th</sup> districts and the nearby suburbs Romainville, Montreuil-sous-Bois, les Près-Saint-Gervais, Lilas and Bagnolet.<sup>102</sup>

The festivities began when the president and company arrived at the plaza. They were received by representatives of the three levels of government in Paris: Levraud, president of the municipal council, Alphand, Director of the Paris Office of Works, Lozé, the Prefect of Police, Péan, president of the departmental general council, Poubelle, Prefect of the Seine, Royer, president of the Senate, and Floquet, president of the

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101 Today Porte de Bagnolet.

102 This was much longer than what is today called avenue de la République, which connects the place de la République and the Père Lachaise cemetery, crossing the northern part of the 11<sup>th</sup> Arrondissement. Today the same road changes name at Père Lachaise. The section that crosses the 20<sup>th</sup> is today called "avenue Gambetta" between Place Auguste Metivier and Place Martin Nadaud, where it changes to "rue Belgrand" and continues to the edge of the city at Porte de Bagnolet.

Chamber of Deputies. A table had been set up at the head of the new avenue, draped in red and gold cloth, accented with tricolor flags and *fasces*, bundles of rods and axes which had symbolized state power since the Roman era. The president was seated at the place of honor, his guests on either side. An entire company of the republican guard was there, their band included. After listening to speeches by Poubelle and Levraud, and watching Alphand present awards to a handful of civil engineers on his staff who were instrumental in planning and building the new avenue, the entire party boarded carriages and led this new, larger parade the length of the new avenue.

Further along the parade route accounts become more colorful. As *Le Temps* described it:

...poles are decorated along the avenue, holding long *oriflammes* [the French royal standard or flag] suspended above the street by a chain, from which hang three shiny ornaments. The houses are all decorated with flags. The scaffolds of buildings under construction have been decorated with flags and garlands of yellow lights. The effect is very picturesque....

Yellow lanterns were spread around elsewhere as well, in the branches of trees, on the triumphal arches, on the rooftops. The chestnut trees have transformed into orange trees, with enormous fruit.

The familiar scenery of east Paris was becoming strange and wonderful, elaborately decorated, the streets flooded with people, giving way to surreal transformations. The president's carriage rolled under successive triumphal arches erected by a group calling itself "the committee of inaugural celebration for the 11<sup>th</sup> and 20<sup>th</sup> *arrondissements*." The first arch stood on columns 20 meters high. The frieze above was painted with a scene of two women on a pedestal, holding a laurel wreath, the pedestal inscribed with a simple signature: "to Monsieur Carnot, the 11<sup>th</sup> *arrondissement*." The second was a similar construction, but even larger, standing on four massive pillars and bearing the signature of the organizing committee.



Figure 1: Morice's Marianne on the Place de la République. The picture was taken some time in the 1890s (image Wikipedia commons).

The procession made a second stop for an inauguration ceremony—this time the unveiling of a renovated school, the *Lycée Voltaire*, located where the new avenue



intersected the exterior boulevards at Père Lachaise.<sup>103</sup> Minister of Education Bourgeois delivered the inaugural address, and Floquet added a personal note, joking that when he was a student at this same school many years ago it was in terrible condition, its walls “black with mold and humidity.” There was a good deal of excitement around this second ceremony. The crowd was growing—and growing younger. *Le Temps* described it as “immense,” joyous and unruly:

Over the entire course the crowd is immense; there are clusters of people on the chimneys of houses. At a certain moment the security service was overwhelmed, and the crowd, flooding into the street, produced a formidable push. Choral, instrumental and gymnastic societies penetrated into the procession followed by two or three thousand young people. It was not until the rue Oberkampf that they could be pushed back.

This story of ceremonious speeches, excited crowds of onlookers, and a thick layer of symbolic decorations (triumphal arches, yellow lanterns, standards, fasces, flags) continued until the carriage finally reached the Porte de Romainville. Here the president got out, took a quick look around, and then returned to the Place des Pyrénées, where he dined at the *mairie* of the 20<sup>th</sup> district with the various administrators who had accompanied him on his way.<sup>104</sup>

The stated reason for all this pomp and regalia was the new avenue and the renovated school, but it goes without saying that Parisians were also there to celebrate several other things: the French nation, its honorable republican form of government, and last but not least, the “universal” progress of civilization, both material and moral. The proximity of Bastille Day, the unequivocal name of the new road, and a heavy dose of ritual make it obvious that there was something deeply *political* going on here. Perhaps it

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<sup>103</sup> Today place Auguste Métivier.

<sup>104</sup> This account of the parade is taken from “Dernière Heure: L’Inauguration de l’avenue de la République,” *Le Temps* July 14, 1891, pp. 1-2.

is not evident to twenty-first century readers what political importance a new avenue might hold. But it was apparently clear to the Parisians who decorated their neighborhoods in preparation for the president's arrival, cheered him on so loudly as he passed, broke through security to join his procession, even rushed his coach. As president of the municipal council Levraud would put it that day: "The Avenue de la République is symbolic by the name it carries and by its function." But what was the new avenue's function? What did this function symbolize? What work were roads supposed to do in the city?

To answer these questions, we need to return to the Place de la République, and to Prefect of the Seine Poubelle's opening speech. He began by noting that "A city like Paris is in a perpetual effort of transformation and growth; the spirit that animates it tends incessantly to renew it...." This growth and transformation, he argued, had always held important consequences for Paris's history, especially where "material changes" were concerned. How many times, he asked the audience, had Paris's population growth "made its city walls crack?" This was followed by a sketchy, but relatively comprehensive historical overview of public works and urban development in Paris since the Roman era. This first part of the speech is awkward, a tired summary of highlights from the official version of French history, as one might find in an encyclopedia.

Poubelle was a better speaker when he turned to closer description of Paris's current infrastructure, and with good reason. He had already been in office for 8 years, and his career as head of the departmental authority in Paris had been distinguished by a sustained effort at transforming the material infrastructures of the city, especially for hygienic reasons. In addition to continuing in good Haussmannian fashion to open new

streets through Paris, there were sewer development, revised building codes, a new system of trash collection (which famously led Parisian landlords to name garbage cans after him), several additions to Paris's system of potable water distribution (new sources of water, aqueducts, hundreds of kilometers of new pipes, new pump and filtration plants), and significant attention to the ecological state of the Seine. Poubelle was perhaps better equipped than anyone in Paris to reflect on why public works were important for the mission of the Republic.

The "magnificent" avenue inaugurated that day, he explained, was about 4 kilometers long—more than a third of Paris's diameter at its widest point. It had taken almost ten years to construct, at a cost of over 40 million francs (38 alone were spent on expropriating the necessary land). He was quite explicit about its function(s):

Thanks to it, the east part of Paris finds itself equipped with a large thoroughfare (*voie de circulation*) which shortens the distances between the place de la République, the veritable industrial center of Paris, and the suburban communes.... Because of it neighborhoods where the working-class population, packed into narrow and unclean little streets, was often decimated by epidemics, are today cleaned up (*assainis*). In the 11<sup>th</sup> district, between the avenue Parmentier and the boulevard de Ménilmontant, it has made a group of factories as dangerous for workers as they are for the neighborhood disappear, and, in the 20th district [it has made disappear] the sordid constructions of the rue des Poirriers, of the rue des Oiseaux, of the impasse des Coudriers, of the passage Robineau and the impasse Fanny-Benoit.

For Poubelle the avenue was not only an artery of traffic; it was also intended to do specific social work. Like many of Haussmann's pioneering roads, this new avenue cut through the middle of recognized spots of urban blight, in this case factories and tenements that the city government deemed unsafe and unclean. It was as much a tool of slum clearance as it was a tool of traffic planning. It was also intended to do hygienic work: "following the formula, [to] bring air and light into these until now deprived

neighborhoods." The formula in question was famously applied by Haussmann as well, the idea being that wider roads allowed neighborhoods to "breathe," so that essential natural resources like light and air could reach them. A healthy city was an *open* city. Hence the fetish among both Parisians and visitors in the 19<sup>th</sup> century for the uncommon width of Haussmann's boulevards. Nineteenth century hygienists regularly proscribed light and air as protections against the many dangers that lurked in urban shadows: disease, vice, crime, immorality—moral and physical degeneration. Poubelle was quite frank in his evocation of the new avenue as a disease-control measure. The new avenue also had aesthetic work to do, embellishing these lackluster working class neighborhoods "with a very picturesque square, from which one discovers the most beautiful panorama of Paris."

Perhaps most importantly, the avenue was designed to help steer the course of urbanization, to influence the movement and settlement of working class populations in the city. The avenue, Poubelle explained, "facilitates access for the population to an important part of the periphery where vast plots of land of lesser value are found, so naturally indicated for the construction of clean and low-cost housing; already we see them rising over the whole plateau which extends from the heights of Ménilmontant, behind Père Lachaise and up to the old quarries of the Buttes-Chaumont." This furthered the spatial effects of Haussmannization: pushing working class populations and industry out of the center of the city, thinning the population out, so that the center could be further embellished, and properties there revalued, gentrified. Meanwhile new development would be encouraged in the periphery. Poubelle explained,

In the new dwellings which are going to be constructed for them [the workers], they will find more favorable conditions of economy and well-being, and they

can enjoy these without being obliged to move too far from their workshops; the steam tramway voted by the general council will bring them yet closer, while a very low special fare will permit them to take advantage of the salubrity of this nice neighborhood, without an appreciable increase in charges.

Poubelle asked a lot from this new avenue—that it clear slums, that it improve standards of living and housing stock for the working class, that it streamline traffic flows, that it help encourage building and settlement in the peripheral areas of Paris, that it beautify a neighborhood, that it allow light and air to circulate, that it make it easy for workers to get to work, etc. Neither essentially “architectural” nor essentially “technological” (engineering-based), the avenue was designed to act in a wide, heterogeneous field where public works, public health, beautification, and traffic planning were all tangled up. The avenue was a streamlined conduit of labor to the workplace, a ventilation shaft, a landscaped public space, a spur to further development of the periphery, a disease-control measure, a foundation for tramway tracks, and a form of social welfare. Ultimately the avenue was an infrastructural response to the social question, and a motor of progress. Its planning was an act of social engineering, giving voice to the republican elite's social fantasies—of a cleaner, healthier, more comfortable, more humanely provisioned working class, “bought off” with social benefits, gifts from the state, an uplifted working class that was politically and biologically neutralized. This was public works in the service of class-collaboration, class harmony and *social peace*.<sup>105</sup>

Poubelle also stressed that this urban renovation was progressive, patriotic, and civilizing. He gave a nod to president Carnot, who had recently visited working-class houses in Paris to show “his solicitude for anything that relates to the improvement of the lot of workers.” Poubelle continued,

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105 Judith Stone, *The Search for Social Peace: Reform Legislation in France, 1890-1914* (SUNY, 1985).

The most noble way to celebrate the national anniversary, is it not to take an encouraging retrospective look at ourselves and our works, because it will lead us to recognize that our efforts are not sterile and that each day we come closer to that future which should assure for all the children of the common mother a more equitable participation in the benefits of civilization, to the very fatherland of those destined and worthy of the constant love of France for liberty and justice.

So the avenue was a fitting thing to celebrate on the eve of the national holiday (“symbolic”) because it was doing the work of social progress that was supposed to lie at the Republic's core, based on universal principles of equality and the mission to bring civilization to everyone in the world, to humanity itself. Poubelle's speech was intended to tell this story, a historical retrospective on “the ensemble of progress accomplished by our dear Paris, under the government of the Republic.”

Seeing the material progress of Paris in its ensemble meant moving on to other infrastructures besides roads. Poubelle's speech, like the parade that followed it, is remarkable for elevating infrastructure, the development of built space, and the material trappings of “civilization” to such heights. They were important not only for the smooth or healthy functioning of the city's daily life, but also for the honor and glory of France as a nation, for the Republic as a political form, and for the “universal” progress of humankind. As he put it:

As important as the avenue inaugurated today may be, it is but one more artery in the network of streets that, for twenty years, have renewed the physiognomy of the capital. The ravages of war slowed this movement of transformation for some time, but, from the moment that France began to recover, Paris put itself to work. Works of general utility proceeded rapidly....

I won't undertake a long enumeration of all the transformations which filled this useful and arduous period (*cette utile et laborieuse periode*). Each year had its project, each *arrondissement* had its part. So much so that, even though Paris offered the marvels of its Exposition to the world in 1889, Paris itself was the marvel that visitors admired the most.

Equally crucial in Poubelle's speech was this twenty-year time-line, 1871-1891.

Poubelle took care to focus on public works *after* Haussmann's term, public works carried out under the Republic and thereby ostensibly republican in character. But what made public works under the republic different from public works under Haussmann?

As Poubelle put it, one of the most pressing preoccupations of both the departmental and municipal governments in these twenty years had been “the addition of potable water, the evacuation and use of contaminated water.” This involved tapping new sources at some distance from the city, more than doubling the city's supply of water, building aqueducts to carry this water to the city (the largest of which was more than 100 kilometers long), building enormous reservoirs to store the water, building pump stations to draw water from rivers in the region and to pressurize water for distribution, and outfitting the city street by street with smaller pipes (*petite canalisation*) to distribute the water to buildings. The same infrastructural plan had to be constructed in reverse for waste water, beginning with Poubelle's decrees of 1883-4 which required that every apartment in Paris to have access to a toilet (whether shared or private), and required that every toilet drain directly to the sewer, known as the *tout-à-l'égout*. These pipes would drain into sewers built into the foundation of each street, collecting at low points and flowing toward a set of 3 main “collector” sewers which carried waste toward the northwest of the city, where waste was dumped into the Seine (1860s to 1899) or transported to water treatment facilities (thereafter).

Going into such great detail describing the progress of Paris's water system, Poubelle was uncovering infrastructures that were less visible, and certainly less glamorous, than Haussmann's boulevards. He descended below street level to expose for his audience the “less apparent but no less appreciable benefits of underground piping.”

And in contrast to the new avenue's multiple purposes and multiple benefits, Poubelle asked only one thing of the revamped water system—that it prevent disease. He said, “typhoid fever has diminished and cholera knocked at the gates of Paris without being able to implant itself there” (a self-congratulating reference to the cholera epidemic of 1884). Where material progress in a broader sense was concerned, Poubelle went straight to the heart of the matter: *hygiene*.

Poubelle had reason to be proud of his administration's work on Paris water system, to dwell on the technical details, citing awe-inspiring figures about liters of water and lengths of pipe. Though he gave the most time and attention to the water system, he listed many other forms of material “progress” as well—renovation of army barracks, public markets, and warehouses, historical reconstruction of the original baroque city hall (torched during the commune). District administrative offices (*mairies*) were renovated, as were the Sorbonne, the national archives and the Ecole de médecine. Five schools had already been redone, and two high-schools were waiting to be inaugurated on Bastille Day proper by president Carnot. Parks, historical buildings, museums, and exposition halls were made over as well.

Poubelle was right that an awful lot of work had been done in Paris between 1871 and 1891. It started with continuing Hausmann's unfinished projects for renovating the city and reconstruction after the conflicts of 1870-1, but the Third Republic also found its own rationales for public works, rationales laid bare in Poubelle's speech. As he put it, “the Paris electorate has the most elevated and generous sentiment about the role of the capital and it is always proud to lend its support to the government of the Republic for anything that can contribute to the honor and the progress of all of France.” In other



words, the infrastructural development of Paris, always understood as progressive, as modernization in the honorific sense, was deeply entangled with the uplifting social fantasies at the heart of French republicanism. Infrastructural development was, in other words, tied to the civilizing mission.

There is a complex vision of city planning here. It involves the idea that lines of transport (the avenue or the tramway to run on its surface) “shorten distances” and increase mobility. But paradoxically when put into practice they served to *lengthen* distances, to integrate the center and the periphery, to move the working classes out away from the center of the city, and to encourage them to live farther from their places of work. This distancing of home and work suggests that something like the functional separation of cities into zones—what we call “zoning”—was also at work here. It also reflects a much older nineteenth century notion that industry did not belong in cities.<sup>106</sup> There is also a budding “environmentalism” at work here. City administrators and engineers were starting to think about the ecological impact of large human populations. More than that, there was a sort of diffuse environmental determinism borrowed from the human sciences.<sup>107</sup> The key idea here was that human well-being depends on the quality of the environment in which humans live. This in turn suggested that the way to influence human behavior and achieve social progress was through reform of our environment. In city planning this often meant putting attention on infrastructure in order to solve social problems. A key example here is the design of water inputs and outputs to improve water quality, and thereby control water-born diseases like typhoid and cholera. So there is a

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106 See Schivelbusch, *The Railway Journey*.

107 Schivelbusch, *The Railway Journey*; Rabinbach, *The Human Motor*; Alain Cottureau's “glissement ecologique,” plus Shapiro, *Housing the Poor of Paris*, Marcus, *Apartment Stories* and Horne, *A Social Laboratory for Modern France*.

fairly rich set, here, of different ideas about how to improve everyday life in the city through planning and infrastructural development, a will to shape life by shaping its material circumstances. And behind it all, there is the imperative of *hygiene*, the cleaning up (*assainissement*) of the city.

Hygiene drove the use of roads to clear slums, it drove the idea of cleaning up working-class life by housing the working classes in a greener environment, and it drove the fantasy of separating out the different functional parts of the city, keeping residential areas separate from industry. The most basic principle here was what we call “standard of living” or “quality of life.” Alongside measures of material development (such as industrialization), measures of hygiene like this were marshaled as evidence for claims of civilizational superiority. As Dr. Brouardel put it in a brief reflection on the progress of hygiene in France, “is it not certain that one may judge the state of a country's hygiene, I would almost say of its civilization, by the number of people it loses to smallpox?”<sup>108</sup>

This elevation of hygiene to a motivation of the first rank distinguishes public works in Paris under Alphant (Director of the Travaux de Paris, 1871-91) and Poubelle (Prefect of the Seine, 1883-96), from public works under Haussmann. Of course Haussmann *was* interested in hygiene, but he was also interested in military strategy and state power, in the flow of capital and labor and the growth of the industrial economy, and in aesthetics and geometry. Much of the literature on Haussmann is dominated by the question of which set of interests took priority for him (Benjamin, Jordan, Harvey, Evenson, etc.). But bringing hygiene to the fore was the mark of Poubelle's age. Recall American Albert Shaw's observation that

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108 Brouardel, Preface to *L'étude et les progrès de l'hygiène en France de 1878 à 1882* (Paris: G. Masson, 1882), p. x.

...the public works that have been executed in the twenty years from 1875 to 1895 have in all likelihood cost a larger sum in the aggregate than those carried out in the twenty years following the *coup d'etat* of July, 1851. The Haussmann transformations were begun when Paris had only a million people and an area of only thirteen square miles.... But in 1875 the authorities had to provide for nearly two million people, a number that in 1895 was fast approaching three millions. These last two decades have witnessed transformations less pretentious and not so widely advertised, but touching more closely and deeply the lives of the people, and ministering more perfectly to the best demands of modern civilization. Services of education, of cleanliness and of health, on a vast and varied scale, have occupied the administrative machinery that was once so engrossed with boulevards and architecture.<sup>109</sup>

As Shaw argues, the urban transformations of the early Third Republic may have been less decorative, less pompous, and ultimately less *visible* than those of the Second Empire, but they had “more closely touched the lives of the people,” actually changing the texture of everyday life in the city. Daily life in Paris now “more perfectly” fit the ideals of “modern civilization.”

After Poubelle was done speaking, *Le Temps* reports, M. Levraud got up to speak, "examining the double character of the *assainissement* of Paris—moral and physical." According to Levraud, improving the material infrastructures of the city could attenuate the social inequalities brought on by modernization. He said:

In the old Paris, which is disappearing day by day, the classes of society were more often mixed than they are in our days. In the neighborhoods reputed to be the most aristocratic stood tall houses whose upper floors were divided into a great number of lodgings destined for workers, the lower floors being reserved for apartments of a more elevated price. The fortunate in life and the less fortunate were thus brought together. There was more fusion, more contact between different social strata, and, if friction sometimes resulted from this, attractions and sympathies resulted from it more often. Richness rubbed shoulders with poverty, joy, sadness, ignorance, knowledge, and from this fusion of various elements in the same crucible resulted the mentality (*pensée*) of Paris: ardent, generous, complex, but one.

Haussmann, he argued, changed all this:

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109 Albert Shaw. *Municipal Government in Continental Europe*, pp. 12-13.

Recent public works have completely changed this situation. By the force of things, the proletariat was little by little pushed from the center of the city and from certain *arrondissements* to concentrate itself at other points. Today we know rich neighborhoods and poor neighborhoods. The unity of Parisian mentalities exists less, we are particularizing ourselves.

In the face of this growing segregation and stratification, public works projects like the new avenue had an important role to play: “In diminishing distances, in facilitating the rapidity of communications between the different parts of the city, we are attenuating this fatal consequence.” Levraud didn't foreground infrastructure as much as Poubelle did, but his vision of its social and political purposes was the same. Like Poubelle, he displayed his patriotic credentials in making a gesture to president Carnot, saying “you accentuate the character of social peace, union, and republican solidarity which emanates from this popular celebration...” This was the social “function” of public works that Levraud spoke of—that public works should attenuate the social frictions of class society, bringing all social classes together under the sign of the Republic in “social peace, union, and republican solidarity.” Public works, in other words, were held up on this day of republican and national celebration as a means of social engineering, a way to separate the good and bad features of modernity, and to strengthen the social body.

Poubelle's speech has been quoted several times since he delivered it.<sup>110</sup> The following year (1892) the Paris city government reproduced excerpts from the speech in a book-length treatment of the same subject: a glowing patriotic review of progress in Paris public works, entitled *The Social Work of the Parisian Municipality, 1871-1891*.<sup>111</sup> These two decades corresponded rather neatly with Jean-Charles Alphand's term as director of

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110 It was reproduced in “Dernière Heure: L'Inauguration de l'avenue de la République,” *Le Temps* July 14, 1891, pp. 1-2, and in the *Bulletin Municipal Officiel*, July 15, 1891.

111 Le Mansois Duprey, *L'Oeuvre sociale de la municipalité parisienne 1871-1891* (Paris: Imprimerie municipale, 1892).

the Paris office of public works (from his appointment to his death), so the book served as a fitting tribute to a man who had done so much to renovate Paris. The book was jointly ordered by Poubelle and the Municipal Council, and organized by Le Mansois Duprey from the Municipal Council secretariat.

Commenting on Poubelle's speech, Le Mansois Duprey wrote:

All of the works enumerated by the Prefect of the Seine have assuredly contributed to the moral and material improvement of the conditions of life in Paris. But some of them, such as the piercing of new streets, the construction of barracks, markets, etc., constitute only the development of a city assured by a municipality vigilant and concerned for the interests it represents, in view of the incessant growth of the population. Others, on the contrary, have as an immediate goal either assuring the material well-being of its inhabitants, the poorest in particular, or contributing to the elevation of their spirit. Among those of first importance are public assistance, clean-up (*assainissement*), hygiene, education, fine arts and numerous special creations which don't exactly fit in any of these major divisions. Its to these that this work is consecrated.<sup>112</sup>

Parsing this passage carefully is crucial. First, he drew a tendentious distinction between public works that “constitute only the development of a city...in view of the incessant growth of the population,” and those which “have as an immediate goal either assuring the material well-being of its inhabitants, the poorest in particular, or contributing to the elevation of their spirit.” The former kind of public works were merely a question of keeping up with a growing population, of meeting the most basic infrastructural standards. The latter, uplifting kind of public works were the real focus of the book, those which assured the material well-being of the poor, or elevated the spirit—in other words, those public works which constituted, as the title put it, a social *oeuvre*. For Le Mansois Duprey, there were public works that met minimum standards, and there were progressive public works that *raised* standards; his book was consecrated to the latter kind.

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112 p. x.

Second, he further divided this uplifting kind of public works in two: those that focussed on “material well-being” and those that “elevated the spirit.” Like Levraud before him, Le Mansois Duprey was evoking one of the Republic's most repeated mantras—as he put it, “moral and material improvement of the conditions of life.” He organized the entire book around this dual formula. Part one concerned “moral and intellectual development,” and part two the “amelioration of the material conditions of life: public health.” The author admitted that this division “is a bit arbitrary,” because

The more educated man knows his real needs better, observes the laws of hygiene with more care, in such a way that his health and well-being increase. From another side, guaranteed by the extent of what is possible against sickness and poverty, more vigorous and healthier; he has less bad thoughts and becomes better. There is thus a sort of repercussion of the spirit on the body and vice-versa (p. xii).

We ought not miss the way that “material conditions of life” are easily and vaguely equated with “public health” here. Health was the end, hygiene the means—and hygiene took the form of a material transformation of the built environment. So again, like Poubelle and Levraud, Le Mansois Duprey put *assainissement* at the center of his argument.

This dual formula, “moral and material improvement” (*amélioration morale et matérielle*) embodied one of the deepest commitments of the Third Republic, and expressed its peculiar anthropology. No scholar has done more to further our understanding of this formula than Alice Conklin. Like Duprey, Alice Conklin divides her work into chapters on material development and moral development, citing the common formula repeatedly as a statement of French imperial intentions in West Africa.<sup>113</sup> Add Eugen Weber's argument that this fundamental desire to improve (or

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113 Alice Conklin, *A Mission to Civilize: The Republican Idea of Empire in France and West Africa*

civilize) its subjects was not limited to France's approach to the colonies, we can see that it was equally applicable to the lower classes in France.<sup>114</sup> But unlike Weber's study of rural development, I'd like to stress its application in the capital city itself. In outfitting the city with new pipes, roads and schools, Poubelle and company were continuing to civilize the city.

The earliest use of this phrase I have found comes from E. Lajoulet's 1848 work *Moral and Material Improvement of the Condition of the Worker*. A later example can be found in Armand Baron's 1882 work *Pauperism: its Causes and Remedies*, wherein he speaks of "...the voluntary contribution of bosses; its advantages even for them.— Sacrifices that the bosses have already freely imposed on themselves in view of the moral and material improvement of the lot of their workers."<sup>115</sup> There is also E. de la Hautière's 1895 study of government, *The Constitution and Institutions*.<sup>116</sup> In his discussion of taxes, he argues that a standard liberal account of taxes—that they are justifiable as a *prime d'assurance*, a minor insurance fee paid to the state for protection—ignores the ways in which taxes are used for basic services that benefit the entire population. He explains that some small portion of taxes is always "consecrated to public works, to education, to the improvement (*amélioration*) of the material and moral conditions of the nation." The state, he says, must put money towards these things, because of its "civilizing and moral mission."<sup>117</sup> When the Métro opened in the summer of 1900, one journalist wrote "I

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(Stanford, 1997), pp. 73, 184, 240, 313.

114 Eugen Weber, *Peasants into Frenchmen: The Modernization of Rural France, 1870-1914* (Stanford, 1976), Conclusion, pp. 485-96.

115 Armand Baron, *Le paupérisme : ses causes et ses remèdes* (1882): "...la contribution volontaire des patrons; ses avantages même pour eux. - Sacrifices que les patrons se sont déjà librement imposés en vue de l'amélioration morale et matérielle du sort de leurs ouvriers" (Art. 7, pp. 233-256).

116 *La constitution et les institutions* (Garnier frères, 1895).

117 *Ibid.*, pp. 115, 199-200.

salute the Metro as an admirable agent of moral and material progress.”<sup>118</sup>

What Poubelle and Le Mansois Duprey did for Paris in reviewing its infrastructural progress, Guizot did for all of Europe and ultimately the globe, reviewing the progress of civilization itself. In his *Course in Modern History*, Guizot offered “a general tableau of the history of modern Europe, considered in terms of the development of civilization, a general look at the history of European civilization, its origins, its course, its goal, its character.”<sup>119</sup> For Guizot, the definition of civilization was also dual, moral and material:

Two facts are thus comprised by this greater fact; it subsists under two conditions, and reveals itself in two symptoms: the development of social activity and that of intellectual activity, the progress of society and the progress of humanity. Everywhere that the external condition of man expands, vivifies, improves, there the intimate nature of man shines with grandeur in these two signs, and often in spite of the profound imperfection of the social state of affairs, humankind applauds and proclaims [it] civilization.<sup>120</sup>

There are two ways to read this argument. On the one hand, Guizot may merely replicate Le Mansois Duprey's argument discussed above, which claimed a reciprocal influence of the moral and the material. On the other hand, Guizot might be read as claiming a sort of materialism or foundationalism. There is a whiff of determinism here, in which material changes are prior to, and more fundamental than, moral changes. But either way, the relationship between material development and moral development is given special importance in thinking through the details of the civilizing mission. The sparkle (*éclat*) of enlightenment in the second sentence is much more important than working out the precise relationship between the moral and the material. Both were necessary components of civilization; the key was to strike a balance between the material and the moral (i.e.

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118 *Le Radical*, July 19, 1900.

119 Guizot. *Cours d'histoire moderne*, p. 3.

120 *Ibid.*, p. 19.



infrastructure and practice).

With the conceptual coupling of the moral and material in mind, we can shed new light on the two ceremonies held on July 13, 1891: the inauguration of the new avenue represented material improvement, while the inauguration of the renovated school represented moral improvement. Hygiene played a crucial role in both projects, as it did in notions of civilization. The development of hygiene, as much as literacy, morality, industry or Christianity was regularly evoked as a measure of civilization.

As the events of July 13, 1891 demonstrate, many of Haussmann's central concerns were reproduced in the design of the new Avenue de la République—slum clearance, moving industry out of the center city, civilizing the urban working class, beautification, hygiene, and the careful sculpting of traffic flows. The heavy symbolic and political work expected of the new avenue also connected it with its Haussmannian past, although this symbolic and political work was done in service of republican, not authoritarian, ideals. As Levraud revealed, the radical party, of which president Carnot was a member, had created its own myths of modernity and rupture. Unlike Haussmann's public works, Levraud argued, which increased inequality and segregation in the city, the public works of the Poubelle administration would attenuate the social ills of modernity, bringing about moral and material improvement for all, both strengthening the social body and making social peace.

The project also tested the limits of Haussmannization in some ways. The avenue was not a Haussmann-era plan that remained incomplete; it was a plan that emerged independently in the Third Republic, a continuation and reworking of Haussmannization. Rather than “turning its back” on working class parts of the city, the Poubelle

administration offered this new road as proof that it would work to truly uplift the condition of the working classes in the city, renovate their neighborhoods, and to respond to the city's housing crisis. The avenue also pushed the Haussmannian envelope of the exterior boulevards, designed to further integrate the center city with the periphery and suburbs. The avenue's design also integrated street planning and plans for mechanized mass transit; 1891's dream of a steam tramway was realized in 1896 as a new electric tramway. And just like the opening of the new avenue, this tramway's opening became an occasion for celebration, in which a parade of experts took a ride along the new line of infrastructure, making two stops to eat a “lunch” along the way.<sup>121</sup>

These post-Haussmannian twists and turns—now for Haussmannization, now against it, freely appropriating and modifying Haussmann's urban ideas—show Parisians coming to grips with the consequences of Haussmannization. By 1891, they had already been doing this for some time. We can look back at some brief examples from 1872 to flesh this out.

In January of 1872, only months after the end of Paris's civil war, Prefect of the Seine Léon Say was overseeing the installation of ten new gaslights on the *Place de l'Opéra*, where the new opera house was still under construction. Conservative newspaper *Le Figaro* called them “brilliant New Year's gifts,” writing, “It was only just barely that one could circulate last night in the streets, where gas [light] was almost absolutely absent. We're talking about the center of Paris. How will it be in the farther-out neighborhoods?”<sup>122</sup> The note of fear sounded in this question was clear. Security was an important topic in post-Commune Paris, and street lighting an important 19<sup>th</sup> century

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121 “Le tramway électrique de Romainville à la place de la République,” *Le Temps*, June 2, 1896, p. 3.

122 “Faits-Paris,” *Le Figaro*, no. 2-3 (weekend), Jan. 2-3, 1872, p. 2.

security measure. For *Le Figaro*, the problem was that while the public, commercial, high-traffic spaces of the center city were gradually being lit, opening the night to traffic and making it penetrable for the authorities, it left what were commonly understood as the most dangerous parts of the city (its margins) untouched. But if lighting was still unfinished in the center, how long would it be until the periphery, which always lagged behind, was fully equipped?

The following day, center-left daily *Le Temps* took a much more energetic stance, questioning the Prefect's infrastructural priorities.<sup>123</sup> *Le Temps* was impressed with the power and beauty of the lights; their glow was “lively, intense, sustained and plentiful: it has a light bluish tint which recalls electric lighting.” If all of Paris were lighted like this, the city “would become a veritable fairy play,” *but*:

why must the splendors of the *place de l'Opéra* be like a lamp in a tomb? I'm exaggerating on purpose, but everyone knows that the administration, in a commendable attempt at economizing, claimed, as far as gaslights are concerned, to reduce our capital to the bare minimum (*la portion congrue*).

What good was lighting the theaters at night, if the rest of the city languished in the darkness of a *tomb*? The image was eerily appropriate in post-war Paris. While *Le Temps* could agree that economizing was necessary in lean times, reigning-in gaslight development was a step in the wrong direction for a city so little lit. It was not necessary to light everything to the same degree, but “the major arteries and their off-shoots, the streets which put the principle neighborhoods into contact with one another, these should enjoy integral lighting.”<sup>124</sup> The lighting on the *place de l'Opéra* was *éclatant* (striking or sparkling), but it was far from sufficient. The editorial insinuated that the Opéra should

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123 “Chronique de Paris,” *Le Temps*, Jan. 4, 1872.

124 “que les grandes artères et leurs amorces, les rues qui font communiquer entre eux les principaux quartiers, jouissent de leur éclairage intégral.”

not have taken first priority, spelling out a basic principle of city planning: the heavier the traffic in a given neighborhood, the more artificial light was needed.

Although *Le Temps* was generally more critical than *Le Figaro*, neither paper was fully satisfied with Paris lighting system. Both suggested a future in which there would be more gaslights, and the government, in this case the *local* government<sup>125</sup>, would provide them. But the two papers took different views of the city. *Le Figaro* was concerned about the periphery, *Le Temps* was concerned about the center. The editors of *Le Temps* didn't particularly care if the peripheral neighborhoods were well lit—these areas, they argued, could be left to the bare minimum, because the flow of traffic there was “weak” (*faible*) at night. They were more concerned that lighting in the center city was not yet *intégral*, i.e. comprehensive. The editors of *Le Figaro* were more confident that development of the center would come with time; their anxiety was directed at the periphery, where they saw gaslight development not as a foreseeable future, but as an open-ended question.

*Le Temps* also connected street lighting with street sweeping: “Same observation for sweeping: it is an easy enough fact to establish, that one no longer sweeps the streets of Paris.” This journalist noted “puddles of liquid sludge which accumulate along the edges of the sidewalks,” a stinky, slippery mess which was “a shame for a capital.” Waste

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125 The term “local government” here refers to both the municipal council and the departmental government, both of which had an important hand in infrastructural development in the city. There is an important problem here in the interpretation of political references in fin-de-Siècle sources. Journalists often use the term Hôtel de Ville (“City Hall”) as a stand-in for local government. Sometimes this phrase signified the municipal council, sometimes the departmental government, i.e. the Prefecture of the Seine. Other times both organs of government were intended to be lumped together. A contemporary with a more finely-grained political knowledge would be able to tease out these nuances much more easily than I can in hindsight. For us, the source remains ambiguous. But given the political importance of City Hall during the Commune, it is not difficult to understand just how complex and loaded such a phrase could become. It is also plausible that many Parisians didn't fully understand how the pair of governments which shared a building were different. For example, on May 4, 1872, *Le Temps* referred to the Prefect's Special Commission on local railways as *la commission municipale*, even though the commission was called by the departmental, not the municipal, authority.

in the streets was also a health and safety hazard, a problem linked to insufficient lighting: “In addition, as the municipal council well knows, we hold them responsible for all the unseemly sludge stains and all the slips and falls taken in poorly lit streets.”

*Le Temps* appealed to the misguided Prefect himself: “Lighting and sweeping are the two teats of Paris. M. Léon Say will pardon us for addressing this maxim to him.”<sup>126</sup> The editors called out the Prefect early in his term in office, letting him know that infrastructure was a priority for them, and that they would be keeping an eye on him. A rather staged confrontation of press and government, perhaps, but there was something more hidden in this imagery of the breast that feeds Paris. The editors of *Le Temps* suggested that street life in Paris, the famed life of the boulevards, with all of its connotations of circulation, communication, culture and commerce, could not continue at a healthy clip, day and night, rain or shine, summer or winter, without being properly *nourished*, as an infant draws life from its mother, through constant attention to provisions like lighting and sweeping. Street life had to be *maintained*, and the editors of *Le Temps* were letting the Prefect know that they knew this was his responsibility. In fact, both newspapers used the word *étrennes*, implying that the gaslights were gifts given by the state. If this word suggested a note of gratitude, it also meant that the editors held the state responsible and accountable to the citizenry in matters of infrastructure. The new importance of public works was nourishing new forms of interaction between the public and the state. Cracks were visible in the Haussmannian edifice even before it was completed. And just like the Commune, these new relations between citizenry and state were played out on the terrain of Paris, in a struggle to determine the shape and fate of

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126“Eclairage et balayage sont les deux mamelles de Paris. M. Léon Say me pardonnera de lui adresser cet apophthegme.”

the city.

For both newspapers, gas lighting was crucially related to the flow of traffic, *circulation* in French. *Le Figaro* wrote, “one could barely circulate last night in the streets, where gas [lighting] was almost absolutely absent,” suggesting that the degree of lighting could determine circulation. *Le Temps* wrote “...it is not necessary to light everything to the same degree: the neighborhoods where circulation is weak or even non-existent in the evening should be limited to strict necessity...,” thus suggesting the converse, that circulation should determine the degree of lighting. Would people go where the lights were, or should lights be fit to where people were already? Should infrastructure be designed to steer practice, or to serve practice? In spite of these differences in perspective, the two newspapers could agree that there was some important relationship between infrastructure and practice, and that deciphering it was an integral part of making traffic in Paris flow more quickly and more smoothly.

*Le Temps* returned to the subject of traffic again in the days after Mardi Gras, 1872. A rare winter storm had dumped cold rain on Paris, threatening to freeze and jeopardizing the city's roads, which were already in bad shape.<sup>127</sup> Post-war street reconstruction was moving slowly, and the municipal council was preoccupied with the poor state of roads. Director of Works Jean-Charles Alphand, meanwhile, had not done much to improve the situation: “M. Alphand alone remains passive in the midst of these atmospheric movements: he gave them neither another sweep of the broom nor another pan of asphalt.” Alphand defended himself by explaining that his crews had to wait until the temperature was warm enough to avoid all risk of freezing. Given that the method used to clean the streets then, as now, relied on water, he had a point: sheets of ice hand-

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127 “Chronique de Paris,” *Le Temps*, Feb. 16, 1872.

made by municipal road crews would have been even more damaging to traffic than taking no action at all.

Still, *Le Temps* wasn't satisfied, and didn't fully trust the Prefect:

I forcefully engage our excellent Prefect to keep an eye on all this....This year we are going to begin, by way of fairly heavy taxes, the liquidation of the Empire: *the population cannot ignore to whom we owe these extra charges...*(emphasis added).

It was a clear reference to Haussmann and the Prefecture. The point was that in a city with a budget as large as Paris's, and as many anxious taxpayers looking on, the basic needs of street maintenance and public works more generally should be met. *Le Temps* evoked a social contract, the exchange of taxes for basic public services, suggesting that Prefect Say had better uphold his end of the bargain, because Haussmann had not. *Le Temps* took up the republican cause of keeping public works *public*.

Weeks later *Le Temps* confronted Haussmann head on, opening a column with “We have come back somewhat to the pretended benefits of the Haussmannization of Paris.”<sup>128</sup> As *Le Temps* put it, while everyone recognized that opening new roads had let light and air into “deprived” neighborhoods, “many find that this upheaval, excessively extended to all the largest and best constructed streets, touches on monomania and, before even recognizing the price of these high fantasies, they find grave inconveniences in it.” Notorious financial difficulties aside, while it was intended to improve traffic flows, Haussmannization ironically ended by disrupting traffic a great deal. For *Le Temps*, the problem was the Prefecture's obsession with the geometry of the straight line:

That sometimes produced bizarre results, improbable acute angles or unbelievable obtuse angles, streets cut up, slashed, where one cannot enjoy more than three minutes of free sidewalk, unformed squares, or the absence of landmarks [which] force the pedestrian into the most complicated topographic exploration.

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128 “Chronique de Paris,” *Le Temps*, Mar. 8, 1872.

Hausmann opened the boulevards to heavier vehicle traffic, forcing pedestrians to seek refuge on the sidewalks, “in order not to be smashed in the unbridled whirlpool of cars.” The result was crowded sidewalks, full of pedestrians afraid to cross these heavy flows of vehicle traffic, pedestrians stuck waiting as if on a “steep island with no coast,” stranded there “something like deportation within a fortified area.” This imagery placed everyday Parisians in the shoes of the Communards exiled just months before to New Caledonia. Hausmann had worked to more clearly define vehicle traffic and foot traffic, routing them on separate networks (streets and sidewalks), increasing their speed and intensity. This made them difficult to cross.

The perfection of the system has been realized on the *Place du Château-d'Eau*: grand roads vomiting and absorbing torrents of pedestrians and vehicles wildly, with no rule and beyond any direction. If one has the bad fortune to stray into this wasteland in the evening, where the cyclone of vehicles runs wild, one is not certain to make it home in the integrity of one's material person: remember that they count on average *two accidents a day*, the official figure.

In his attempt to improve street traffic (vehicle traffic), Hausmann inadvertently struck a major blow against pedestrian traffic. The street won out over the sidewalk.

While the press debated Hausmann's legacy in 1872, the Prefecture of the Seine was beginning work on the city's new urban rail network, the subject of my next chapter. Here we'll see journalists, architects, engineers and politicians imagining plans for Paris's Métro between the 1870s and 1895. In dreaming about the future Métro, Parisians struggled to imagine the city differently than Hausmann had and to cope with the consequences of Hausmannization. This was a way to negotiate the meaning and impact of public works in the city—how should they function, how should they be regulated, who should pay for them, who should they serve?



### **Part One: Circulation, The Flow of Traffic**

Today the Métro is one of the first things any visitor to Paris encounters, a system I found in 2005 to be a ubiquitous part of the city's everyday life. The Métro punctuates the daily routine, hence the French expression *Métro—Boulot—Dodo* (“to the Métro, to work, night night”).<sup>1</sup> Just as national rail networks contributed to the standardization of time across Europe in the 19<sup>th</sup> century, today the Métro helps organize the social and economic life of Paris, separating work time from 'free' or 'leisure' time, and encouraging traffic at certain times of day.<sup>2</sup> The Métro also has discernible geographic or spatial effects. First, the Métro, like the tramways that preceded it and the RER (“regional express network”) that followed it, has helped to tie the suburbs to the city, encouraging longer commutes, meaning a longer average distance between the homes of Parisians and the places they work, and thus contributing to the sprawling growth of the greater

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1 The sense of dull compulsion in the expression makes “the daily grind” a good English translation. The expression leaves out the Métro ride home from work, but that is no less a part of the daily routine. There are other common steps in the Parisian routine, like stopping in a café to have a drink after work or doing some quick grocery shopping before going home for the evening. Hence the routine might more precisely be *Métro—Boulot—Café—Métro—Dodo* or *Métro—Boulot—Métro—Marché—Dodo*. These are only two of countless variations.

2 For example through special fares at rush hour. At different historical moments, special fares have been both lower than usual prices (as they were 1900-1910, to encourage use by the working class), and higher than usual (today). Special prices are deployed strategically by the city government or the Métro administration, to offset costs and influence riders to use the trains in certain ways.

Parisian agglomeration. As this pushes the homes of the working classes out away from the center of the city, it continues a basic social-spatial tendency of Haussmannization. Second, the Métro's network of tracks overlaid the city with a map, a grid of coordinates on which places and events can be plotted. Stations become anchors for neighborhoods, communities and cultural scenes. This cognitive map of the city is even conveyed each day to newcomers—tourists, students, and immigrants—by the iconic Métro maps distributed for free at stations throughout the network.<sup>3</sup> Already in 1911 Kafka could write, “Because it is so easy to understand, the Métro is a frail and hopeful stranger's best chance to think that he has quickly and correctly, at the first attempt, penetrated the essence of Paris.”<sup>4</sup> For more than a century, the Métro has been a powerful influence on the organization of space and time in Paris.

The Métro is also a fixture of Paris culture, used by Parisians everyday for any number of purposes. The first Métro line was opened July 19, 1900, while Paris was hosting the Universal Exposition. Visitors riding the Métro that summer not only enjoyed the railway's speed and reliability, but also enjoyed the coolness of its tunnels, a welcome relief from the heat of the streets above. Thus, it became an air-conditioning system.<sup>5</sup> In the 1930s, the national government renovated certain Métro tunnels to serve as bomb shelters in case of war. This foreshadowed the use of parts of the Métro, sewers, and catacombs during the German occupation in World War II as a sort of “underground

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3 David Pike discusses this mutual semiotic implication of the map and the city for both Paris and London. See *Subterranean Cities*, pp. 20-33. Anthropologist Marc Augé has argued that a similar spatial logic allows the Métro map to function as a “memory machine,” linking past events to the places they occurred. See *In the Métro*, p. 4.

4 From Kafka's diary, 1911. See: *A Place in the World Called Paris*, ed. Steven Barclay, forward by Susan Sontag, illustrations by Miles Hyman (Chronicle Books, 1994), p. 43.

5 *Le Temps*, July 21, 1900.

railroad” for Jews and resistance fighters.<sup>6</sup> In the postwar era, the Métro became a favorite setting for French books and films, a convenient way for writers and directors to evoke the labyrinthine complexity of the city, charged with deep symbolic meaning.<sup>7</sup> Today, abandoned Métro stations serve as ideal destinations for urban explorers and graffiti artists. Indeed, youth culture and local artists show a deep bond with the Métro as a symbol of what makes the city urban, and a grid of spatial intelligibility that pins Parisians' identities to the places they live, work, or go out to enjoy the nightlife. The Métro has become iconic, hence the popularity of Guimard's wrought-iron station entrances and the global recognizability of the Métro's style of visual communication: the circle M logo, the matching font (with every line number or letter inside a brightly colored circle), and all of it printed on signs, maps, t-shirts, hats and other consumer goods.

Métro stations continue to be important spaces for advertising posters and street performers. Homeless Parisians may sleep there; well-dressed Parisians may use the Métro to get out of the rain. It is also a place to eat, to make out with a lover, to beg or pick pockets, to deal drugs, and to shop at impromptu markets.<sup>8</sup> Since its beginnings, then, the Métro has been much more than an electric-powered underground rail network. Among other things, it has been a clock, a map, an air-conditioner, a bomb shelter, and a

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6 See Nicolas Didon, “Le meilleur abri de Paris: le rôle du métropolitain au sein du programme de Défense passive.” From *Métro-Cité: Le chemin de fer métropolitain à la conquête de Paris 1871-1945*, pp. 153-164.

7 David Pike, p. 66. The chase scene in Melville's *Le Samourai* (1967) is particularly memorable. There was also Queneau's 1959 novel *Zazie dans le Métro*, adapted for film by Fassbinder in 1961. For a general discussion of the semiotic importance of the urban underground, see Rosalind Williams *Notes on the Underground*, and Rob Zaretsky's appearance on *The Engines of Our Ingenuity*, a radio program from the University of Houston's KUHf. Zaretsky appeared in episode 1966, “The Sewers of Paris,” available online at: <http://www.uh.edu/engines/epi1966.htm>

8 Thanks are due to Ken Garner for a lively discussion about the many uses of the Métro in September of 2007.

place to shoot film or write graffiti. It has become interwoven with society and culture in countless ways.

The Métro thus offers dramatic proof that technological systems (or even individual devices) can be used in a variety of ways, and not only those ways intended or foreseen by engineers. Historians of technology call this “interpretive flexibility,” the ability for technologies to be appropriated, reinterpreted and used in various ways by users.<sup>9</sup> But this importance of the Métro, this all-over integration of the Métro into the city's everyday life, is a 20<sup>th</sup> century thing. Whereas today it is difficult to imagine Paris *without* the Métro, until 1900 it was difficult to imagine the city *with* the Métro.

#### *Historical Background: Transportation in Paris Before 1870*

Before 1900, Parisians moved to the rhythm of different modes of transportation—horse-powered cabs, omnibuses and tramways, steam-powered riverboats, but most of all foot traffic. Walking remained the dominant mode of transport in Paris (as in most other European cities) until well after 1900, and horses remained as important a source of motive power for vehicles as steam or electricity. A number of different human-and-animal-powered vehicles—rickshaws, coaches, horse-carts, and sedan chairs—had circulated in its streets since the 1600s, when Pascal famously argued that the city needed a coach service.

During the massive urbanization of 1800-1850, coaches for hire boomed alongside the population. With very little oversight from the state, numerous small companies offering coaches for hire emerged. Hence the dizzying lists of names for

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<sup>9</sup> Wiebe Bijker, *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change* (MIT, 1997, 1999).

different kinds of coaches.<sup>10</sup> Coaches could be hired by the hour or hired for a single ride, whereby different rules and rates applied. Some could be hailed at any point, others only at a fixed place. According to Maxime du Camp, by the early 1870s there were two important facts about these various coaches. First, “everyone” used them—which is rather an exaggeration, but rings truer for the upper-middle-class milieu in which he orbited. Second, apart from gross divisions like which ones were powered by people and which by horses, those with more or fewer seats, etc., he claimed that “no one” could tell the different kinds of cabs apart.

Du Camp shows us something crucial, here. While this wide range of different coaches might seem confusing to outsiders, for 19<sup>th</sup> century Parisians it was so familiar that 'everyone' knew how to use the coaches, even if he or she couldn't understand all their complexities. All coaches were required by the Police to carry cards (*numéros*, literally “numbers”), which served as menus of the different services and rates offered. Any rider who couldn't judge the type of cab from the outside had the option of reading the card once inside. The coaches were not organized with enough homogeneity of equipment or fares to be considered a transportation 'network' or 'system' by our 21<sup>st</sup>-century standards. There was too little rationalization and standardization. But it was subject to more-or-less uniform regulation by the Police. What it lacked in uniformity at the level of infrastructure, it made up for in simplicity at the level of practice—one got in the cab, and then read the menu to decide what to order. The coaches were organically integrated into other routines of city life. Hiring a cab from the menu was thus

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10 Maxime du Camp lists: *Citadines*, *Urbaines*, *Deltas*, *Cabriolets Compteurs*, *Luteciennes*, *Cabriolets Mylords*, *Thérèses*, and *Cabs*. See *Paris, ses Organes*, vol. 1, p. 167. Transit historian Jean Robert lists several others: *Dames Blanches*, *Tricycles*, *Orléanaises*, *Diligentes*, *Ecossaises*, *Béarnaises*, *Carolines*, *Batignollaises*, *Parisiennes*, *Hirondelles*, *Joséphines*, *Excellentes*, *Sylphides*, *Constantines*, *Dames Françaises*, *Algériennes*, *Dames Réunies*, *Gazelles*. See *Les Tramways Parisiens*, pp. 19-20.

comparable to ordering merchandise or food in a shop or café. The coaches crisscrossed the social and cultural life of the city, as the Métro would come to in the 20<sup>th</sup> century.<sup>11</sup>

The beginnings of centralization and industrialization in Paris's transport networks date, predictably, to the Second Empire. Haussmann's first move, in preparation for the 1855 Exposition, was to work toward the centralization and standardization of the coach companies. To this end, they were bought out by the *Compagnie Générale des Omnibus* (CGO), a private company granted a monopoly on providing coach transport in Paris.<sup>12</sup> The CGO was also given exclusive rights to operate a horse-drawn tramway line, Paris's first experience with a railway inside the city. Haussmann's second move was to laterally connect the ten outer districts with a loop of two parallel rails, the *chemin de fer de la ceinture* or “belt railway,” which ran in open trenches across most of its course, constructed from 1852 to 1869. This beltway connected the various rails leaving Paris from several major train stations (what in French are called *grandes lignes*, meaning the large-scale *national* rail network), carrying freight as well as passengers. As tourist guides began to recommend in the 1870s, it provided a convenient way to tour the ten peripheral districts of Paris annexed in 1860.<sup>13</sup> It did not, however, connect *all* the train stations, and provided no access to the center of the city inside the limit of the interior boulevards. Here again, I argue that Haussmann did not upset the balance of forces in

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11 For more on the Paris coaches, see Karl Baedeker, *Paris and its Environs: Handbook for Travellers* (1878), pp. 23-25. One historian in particular devoted a large portion of his career to the coaches, Nicholas Papayanis. See: (1) “Un secteur des transports parisiens: le fiacre, de la libre entreprise au monopole (1790-1855).” *Histoire, économie et société* 5/4 (1986), pp. 559-572; (2) “The Development of the Paris Cab Trade, 1855-1914.” *The Journal of Transport History* 8/1 (1987), pp. 52-65.

12 Hereafter “CGO.” To be precise, they had a monopoly on large, horse-drawn omnibuses, which were drawn by 2 horses, and provided 20 places or more for passengers. There were still many smaller, independently owned coaches for hire.

13 See: (1) *La Clé des omnibus et tramways* (Paris: l'administration de l'affichage, 1876); (2) *Le Petit Guide Parisien. Chemins de Fer, omnibus, tramways, renseignements pratiques et historiques. Plan de Paris. 3me Edition* (Paris: Lassailly Frères, 1876); (3) *Paris and its Environs: Handbook for Travellers* (Karl Baedeker, 1878).

Paris, but rather suggested the directions that future development would take. His conception of transportation was centered around the horse-powered omnibus network. What few railways he installed in the city were either trials (the first tramway line), or more geared toward national centralization, connecting Paris with the provinces for strategic and commercial reasons (the beltway). He did not imagine that railways could meet the local, day-to-day transportation needs of Parisians.

Yet the idea of a metropolitan rail network was already in the air. Looking back over the history of the idea of the Métro in the fall of 1883, the engineer Frémaux suggested that discussion of the Métro had begun in the mid-1830s, about the time that France started to develop railroads at all.<sup>14</sup> The first published records of plans for metropolitan railways come from 1837 and 1845.<sup>15</sup> Plans continued to emerge throughout the Second Empire.<sup>16</sup> During the urban crisis of the 1830s and 40s, then, the idea of a “metropolitan network” emerged in Paris as a possible solution to the problem of traffic flow, but remained a historical path not taken. Instead, Parisians turned to development of more and more horse-drawn vehicles, a trend which continued through the 1870s and 80s with the expansion of Paris's horse-drawn tramways, notwithstanding the newness of rails in the city.

This historical background is important for understanding that the Métro's overall integration into Paris's everyday life was not inevitable. In the beginning, it was often difficult. The process of Métro planning that officially began in 1872 occurred against the

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14 J. Frémaux. *Rapport de l'Inspecteur Général. Chemins de Fer Métropolitain de Paris. Avant-Projet. Résultats de l'Enquête d'Utilité Publique*. Sept. 12, 1883. AN F 14 9154.

15 See Papayanis, *Planning Paris before Haussmann*, Ch. 5 “Planning the Paris Underground,” pp. 201-225.

16 We know that Arsène-Olivier was making plans in the 1860s (see Evenson, pp. 102-3). Larmanjat's 1868 plan for a monorail system is preserved in the Archives Nationales: *Les Chemins de Fer D'Intérêt Local a un seul rail considérés au point de vue de leur construction et de leur exploitation économique*. (Paris: Imprimerie de l'illustration, 1868), AN F 14 9189.

backdrop of this already existing transport regime based in human and animal power, which had become deeply ingrained in the life of the city over centuries. As a result, the era of Métro planning between 1872 and 1900, what Norma Evenson called “the long debate,”<sup>17</sup> forms a relatively compact period of transition and experiment, one in which Parisians accustomed to human-and-animal-powered transport imagined, debated, negotiated, and finally planned how their city would be transformed by industrialized mass transit. By 1900, the old animal-powered forms of transportation were fading, and the new forms of mobility that emerged in the 1890s—bicycles for individual travel and electric-powered light rail, (streetcars, subways and elevated trains) for mass transit—were enjoying their first boom, as would the automobile, especially the autobus, after the First World War.

In the next two chapters, we will see Parisians trying to write scripts for the novel phenomenon of urban railways, as they slowly transformed a city whose nineteenth-century scripts assumed a city of horse-drawn coaches.

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<sup>17</sup> *Paris: a Century of Change*, pp. 91-105.



## Chapter 2: The Dream Life of the Métropolitain, 1872-1895

- “After 1872, the question of the Métropolitain slept for a long time.”<sup>1</sup>

A technical system like the Paris Métro is interpretively flexible; it can be used for many purposes. But *how can a technical system be used before it actually exists?* This chapter seeks to answer that question, not as paradoxical as it seems. From 1872 to 1895, though the Métro was not a reality, it already held a real place in the Parisian imagination, a tool for imagining the city's future. Before the Métro was an actual vehicle for moving around the city it was a vehicle for dreams, imagination, fantasy and desire. Nineteenth-century Parisians imagined using the Métro for many things other than transportation.

In the 1870s, Parisians debated underground Métro plans to keep rails out of the socially sensitive space of the street, but this put rails in the culturally sensitive space of the underground. In imagining that the Métro would add to existing, inadequate means of transport, connect the city's train stations by rail, and carry information, commodities and passengers, they debated the meaning of urban railways and their compatibility with urban everyday life. In the 1880s, debate on the Métro turned to elevated tracks, which could keep Métro trains off of the streets and become an integral part of the city's built environment and street life. In this decade, Parisians on both the left and the right hailed

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<sup>1</sup> A letter of May 22, 1894 from engineers Vauthier and Deligny to the Minister of Public Works: “A partir de 1872, la question Métropolitaine dormit longtemps.” AN F 14 9154.

the Métro as an agent of social peace, which could diffuse class conflict. A comprehensive urban rail network, it was argued, could help shape the spatial development and organization of the city, facilitating motion in and out of the city, thereby encouraging the working classes to live farther from the city center. The Métro was imagined as a tool for relieving urban density, and improving the quality, cost and supply of housing. In the 1890s, Parisians arrived at the compromise of mixed systems, combining underground and elevated sections, dreaming that the Métro could revitalize France's economy in this age of international competition, create work for Parisians, serve as a showpiece for the 1900 Universal Exposition, and shed light on long-standing debates about public works.

But dreams of the Métro were not always happy. The idea of underground trains connected the Métro with long-standing associations of the Paris underground with sewers, mines and catacombs (disease, danger and death), provoking denunciations like “nécropolitain” and “sewer train.”<sup>2</sup> Conservatives worried that the Métro would damage Paris's cityscape and monuments, France's architectural patrimony. But the greatest difficulties in imagining the Métro were *practical*, not symbolic. There were five main practical difficulties: (1) the financial problem of funding such a large project, (2) the social and cultural problems of integrating railways into everyday life, (3) the spatial and architectural problems of integrating the Métro into the built environment, (4) the technical problems of traction and construction, and (5) the Métro's constant and contentious entanglement with local and national politics. Behind these difficulties was a

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2 The most famous example here is Hugo's *Les Misérables*. For more on this spooky field of meaning, see David Pike, *Subterranean Cities* (cited above), Rosalind Williams' *Notes on the Underground*, and Rob Zaretsky's appearance on *The Engines of Our Ingenuity*, a radio program from the University of Houston's KUHf. Zaretsky appeared in episode 1966, “The Sewers of Paris,” available online at: <http://www.uh.edu/engines/epi1966.htm>

deeper question: *were railways compatible with the city at all?*

These difficulties were rooted in the historical newness of urban railways. To capture the period from 1870-1900, any story of transportation and mobility in Western cities must follow the rails. It is not public transit *per se* that is historically at issue here. Paris's horse-drawn omnibus service, begun under the Second Empire, surely counts as a public transit system.<sup>3</sup> New in this era was the attempt, made across the Western world, to solve urban traffic problems by applying practices and technologies from the railway industry.<sup>4</sup> This emphasis on railways marks an important historical shift. During the first four decades of European railway development (c. 1830-1870), railways were used for travel *between* cities, not travel *within* cities. As Wolfgang Schivelbusch brilliantly illuminated in *The Railway Journey*, the industrial origins of railroads (i.e. English coal mines) long stigmatized them as incompatible with the humane dwelling space of the city.<sup>5</sup> Their danger, noise, speed, smoke and sparks also made them incompatible with the social-cultural space we call “the street.” Street life moved at the speed of humans and horses until the advent of urban railways, and was scripted by shared ideas of civility.

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3 What I mean by “public transit” here is what the French call *transports en commun*, low-cost and high-speed transportation services available to a broad segment of the public, in which strangers travel together in groups. In the next chapter, we'll see the emergence of a truly mass market for transportation in Paris.

4 In the German-speaking world, the period of development spanned from Berlin's *Ringbahn* (1871-77) and *Stadtbahn* (1882) to Vienna's Metropolitan (1898). In New York, the early 1870s witnessed both Alfred Beach's pneumatically-powered subway and the elevated trains; by 1904 there was a subway, too. San Francisco's famous cable-cars date to 1873. Brussels and Milan opened new tramway lines in 1876. There was a compact period of foundational railway development in the 1870s across the Western world. See David Pike, *Subterranean Cities*, p. 47. Railways provided the model for urban traffic management again in the 1920s, when railroad signals were adapted to automobile traffic.

5 Schivelbusch, *The Railway Journey*, Ch. 11-12, pp. 171-187. Schivelbusch's reading of the dual character of railway station architecture is particularly illuminating. Across Europe, from the 1830s-70s, stations were typically located outside the center city. Their facades were made of cut stone in the historical style, in an attempt to integrate them better into the fabric of the city, while the arrival halls and other 'industrial' parts of the back of stations faced away from the city, and were made of iron and glass, the standard of the era in industrial architecture. The stone facade thus hid the parts of the station which were thought inappropriate for the city.

These rules of civility set the terms of social peace in the public sphere and the marketplace, a calm broken by the entrance of the railway.

There was also a technical incompatibility of rails and streets. Traditionally trains stayed on track thanks to a mechanical 'lock' between grooved wheels and raised rails. This meant that rails stood up above any surface on which they were installed, encumbering roadways and potentially damaging the wheels of street vehicles. Until the system was reversed, with the groove cut into the rail rather than into the wheel, so that rails could be sunk in the street, roads and rails were technically conflicting.<sup>6</sup> In order for railways to be successfully integrated into city life, both railways and the city would have to change.

Far from a simple question of the kind of railways Paris needed, the questions asked about the Métro after 1872 concerned sewers, cemeteries, groundwater, street life on the boulevards, commerce, traffic, Haussmannization, health, hygiene and safety, noise pollution, architectural aesthetics and property values, among other topics. Dreaming the Métro was always dreaming the future of Paris, including its geographic growth, population growth, social and cultural life, built environment, etc.—it was a remarkably heterogeneous affair. The Métro was not overlaid whole onto the existing urban fabric, but gradually woven into it. Parisians did not accommodate themselves to the new Métro only after 1900 as actual users; by then they had already been dreaming of the Métro for three decades. The social, cultural and political work needed to make the Métro fit into Paris's daily life began as soon as technical work began. This far-reaching

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6 This invention, the so-called “grooved rail” is often credited to French Engineer Alphonse Loubat, who designed one of New York's first tram lines in the 1830s, and won the concession to install Paris's first tramway line in 1853, for the 1855 World Exposition. For more on this, see: (1) Norma Evenson, *Paris: a Century of Change 1878-1978*, p. 80; (2) John P. McKay, *Tramways and Trolleys: the Rise of Urban Mass Transport in Europe*, p. 14.

imaginative work was not a thin layer of cultural meaning projected onto urban railways after their design in order to make sense of them. It was no 'mere talk,' but rather an integral part of the design process. Imagination was necessary at this stage of railway development, because the technologies and practices involved were so new. Designs were still fresh, not yet solidified, standardized, or accepted.<sup>7</sup> The Métro reminds us that cultural meanings are not only projected onto finished technologies, but also built into them.

Something similar can be said for technology and politics. Thanks to scholars in urban studies like Norma Evenson and David Pike, we already have a sense of the political conflicts that enlivened the Métro debate from 1872 to 1895.<sup>8</sup> According to the standard account, the future Métro became the object of a prolonged and bitter battle between the municipal and national governments. The left-leaning Municipal Council imagined the Métro would meet the population's day-to-day transportation needs, while the center-right national government supported a mixed-use system, for passengers, freight and mail, serving as a centralized point connecting all the lines of France's national train network. This caused a jurisdiction battle, in which the national government wanted the Métro legally defined as a *chemin de fer d'intérêt général*, a "general interest railway," or part of the national railway network, while the Municipal Council wanted it defined as a *chemin de fer d'intérêt local*, a "local interest railway," giving the municipal and departmental governments more control.

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7 Wiebe Bijker uses the terms "closure" and "stabilization" to refer to this final stage in the design process. See: *Of Bicycles, Bakelites, and Blulbs: a Theory of Socio-Technical Change*, pp. 84-88.

8 Perhaps the classic version of this argument comes from Norma Evenson, "The Métro: the Long Debate" from *Paris a Century of Change* (Yale, 1978), pp. 91-105. David Pike's argument comes from *Subterranean Cities: the World Beneath Paris and London, 1800-1945* (Cornell, 2005). Other important re-workings of this basic narrative come from the collection of essays *Métro-cité: Le chemin de fer métropolitain à la conquête de Paris, 1871-1945* (Paris Musées, 1997).

This story of local-national conflict has become *the* standard scholarly account of the Métro's prehistory in the last 30 years.<sup>9</sup> It is not so much *inaccurate* as *incomplete*. I argue that there are four main problems with it. First, it gives a political-reductionist explanation of urban railway development, which short-changes the interest of technological history in itself, making the Métro a mere instrument in struggles that were “fundamentally” political. Second, it neglects the political elephant in the room: the Paris Commune. There is no arguing that the main axis of conflict here was local-national, but scholars should have noticed that this reproduces the battle lines drawn by the 1871 civil war. Struggles over whether the Métro would be put to local socialist or national liberal uses continued the civil war of the Commune in peacetime by other means, using public works to solve the burning question of local or national government. These two visions of the Métro reflected two conflicting visions of Paris. It was the Communards vs. Haussmannization all over again.

Third, the standard account ignores the fact, plainly visible in both archival and secondary sources, that this conflict had more than two sides. It oversimplifies a conflict that involved not only the municipal and national governments, but also the departmental government of the Seine, the Council of State, the General Council of the *École des Ponts et Chaussées*, the CGO, the national railway companies, a handful of civil associations, a handful of journalists, the Paris Chamber of Commerce, and the broader Parisian public.<sup>10</sup>

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9 In part this is due to the undeniable quality and cogency of Norma Evenson's work. But it is also due to the fact that scholars continue to rely on Louis Biette's 1906 series of essays “Le métropolitain de Paris,” in which he foregrounds this conflict. Louis Biette, *Le métropolitain de Paris* (Paris: Chaix, 1906).

10 Michel Margairaz, “Le réseau métropolitain et les pouvoirs publics: du compromis républicain à l'emprise technocratique.” *Métro-Cité*, p. 165.

The fourth and final problem with the standard account is that it leaves the Paris tramway networks out of the Métro's history. Scholars have overlooked the fact that when the Parisian authorities first asked the question of urban railways in 1872, they discussed both tramways and the Métro as possible solutions. The Métro was the newer, more controversial response, so it took some time to develop; horse-drawn tramways, by contrast, were a non-controversial response. The CGO was already operating Paris's first horse-drawn tramway since 1855, and adding more lines would not upset the city's existing animal-based transportation regime. Hence, while Parisians took their time imagining the Métro, the authorities quickly approved the new tramways and started construction in 1873.

While Parisians imagined the Métro from 1872 to 1895, they were actually experiencing urban railways in the form of horse-drawn, and later mechanically-powered, tramways. While Parisians used the imaginary Métro to intellectualize the question of urban railways, they used the actually-existing tramways as a field of practical experiment, a way to test different responses to the question—new systems of mechanical traction, new paving materials and rail designs, train cars, track routing, signaling techniques, etc. The question of urban railways was worked out on two planes at once, the practical everyday and the imaginary. If the difficulties of the tramways sometimes cast the Métro question in a somber light, the opportunity to test dreams of the Métro on the tramways ultimately improved the Métro opened in 1900. By the same token, these experiences doomed the tramways to failure. As I show in this chapter, the crisis in the tramways plainly announced itself by 1895. Dreams of the Métro, both dark and bright, had their waking mirror in the tramways.

In this chapter, I reintegrate the tramways into Métro history, to reveal the unevenness and contingency of urban rail development in Paris, which proved ready for rails long before it was ready for mechanical traction. The tramways represent a transitional phase between the animal-powered transportation of the 19<sup>th</sup> century and the mechanized transportation of the 20<sup>th</sup>. Métro dreams grew more urgent as the 19<sup>th</sup> century drew to a close, as tramways and omnibuses were decreasingly able to satisfy the city's growing demand for transportation. Parisians expected that their dreams could become reality, and when this realization did not progress as quickly as hoped, transportation became an increasingly politicized and contentious issue. The tramways teach that entire transport networks can fail to become fully integrated into a city's everyday life, even after many years of operation. Whereas the Métro dug itself deeper into Paris over time, the tramways came and went, neatly demarcated by 1855 and 1929 (or even more narrowly by 1872 and 1900). No matter how familiar the routines of riding the trams became for Parisians by the early 20<sup>th</sup> century, Paris's everyday life never came to revolve around the tramways as it would around the Métro by that century's end.

*Troubles Above and Troubles Below: the Beginnings of Paris's Métro and Tramways in the 1870s*

Railway development was part of post-war reconstruction in Paris, healing the wounds afflicted on the capital's railways by Prussian sabotage.<sup>11</sup> In January, 1872 Haussmann's successor as Prefect of the Seine, Léon Say inaugurated a special commission to study “local interest railways and tramways” for the department of the

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<sup>11</sup> On national railway development under the Third Republic, see Eugen Weber, *Peasants into Frenchmen*, pp. 195-220.



Seine.<sup>12</sup> This marks the first governmental work on planning the rail network which would henceforth be called *réseau métropolitain* (“metropolitan network”), and eventually simply *Métro*.<sup>13</sup>

Constantly evoking London as a model, the commissioners compared seven railway plans, but none satisfied them. They had several concerns. First were the high start-up costs, which would have to be offset by receipts to finance the project, but receipts could only be roughly estimated and the massive debt inherited from Haussmann's public works loomed. Second, the commission had difficulty considering any form of mechanical traction besides steam locomotion, even though compressed air and funicular (cable) traction were already available. This led down a path which dead-ended in the 1890s at electrification: trying to make the noise, smoke, steam and sparks of locomotives compatible with city life. Third, they sought a system that would not interrupt street traffic, which disqualified steam-powered tramways and elevated trains like New York's. Finally, as they put it, the Métro should not damage “the beauty of the Capital.” These concerns and London's example predisposed the commissioners to accept an underground network. Their report reveals tensions between deep-set cultural ideas about the nature of the street, urban space, the public sphere, civility, etc., and the practical/technical demands of a railway network. Locomotives didn't fit neatly into the city they knew, and so they imagined routing the network under the city to bypass it. The commission made few decisions, but recommended further study of London and its

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12 This is an important term to parse. Legally speaking, railways fell into one of two jurisdictions under French law: “local interest,” which put them in the hands of departmental or municipal authorities, and “general interest,” which made them the charge of the national government.

13 *Rapport de la Commission Spéciale sur L'étude des Chemins de Fer et Tramways d'Intérêt Local à établir dans le département de la Seine*. Paris: Charles Mourgues Frères, Imprimeurs de la Préfecture de la Seine, 1872 (AN F 14 9153).

railways.

As we've already seen, the commissioners were not the only Parisians looking to London in 1872. "Railways interior to Paris" as Parisians called them were "a contemporary question" and conversation often turned to London.<sup>14</sup> London was special for several reasons: the world's largest city, it was also one of the first cities to industrialize transportation in the 1860s.<sup>15</sup> Its 1863 *Metropolitan Railway* was the world's first subway. London was a model city for Haussmann and Napoleon III, and remained a model for many Parisians because it excelled in the material trappings of modern civilization, what the 20<sup>th</sup> century would call "modern conveniences" (which of course depended heavily on the development of networked infrastructures). London was a dream city for Parisians, an inspiration for the future Paris they hoped to create: a model modern metropolis.<sup>16</sup> It is often said that Paris was the envy of the world in the 19<sup>th</sup> century—maybe so, but in 1872 London was the envy of Paris.

Center-left daily newspaper *Le Temps* published an anonymous letter from London:

London is the city of railways. Not only is it connected by major lines to all parts of the kingdom, as befits a capital; not only do its suburban lines open it, as in Paris, to easy communication with the belt of towns and villages which surround it, but, what is particular to London [is that] three of its major railways, the south,

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14 F. Sérafon. *Etude sur les chemins de fer, les tramways et les moyens de transport en commun à Paris et à Londres* (Paris: Dunod, 1872). Sérafon wrote that "all the major cities of Europe seek to imitate London," installing tramways or railways because "In terms of transport facilities, London is the premier city in the world..." The same year, poet Arthur Rimbaud was living in London, and wrote a famous prose poem called "Métropolitain," which one critic has linked to his experience riding the London subway, see: Michael Spencer, "A Fresh Look at Rimbaud's 'Métropolitain,'" *The Modern Language Review*, Vol. 63, No. 4. (Oct., 1968), pp. 849-853.

15 Another example is New York, whose elevated trains date to 1868.

16 Arnold Lewis as argued that at the end of the nineteenth century, many Europeans looked to Chicago for "an early encounter with tomorrow." This city of the future, especially the tall buildings around the Loop, was imagined as a "time warp," a virtual museum of Europe's own technological, industrial, and commercial future, a glimpse of what urbanism might look like in the 20<sup>th</sup> Century. See: Arnold Lewis, *An Early Encounter with Tomorrow: Europeans, Chicago's Loop, and the World's Columbia Exposition* (University of Illinois Press, 1997).

south-east and the west, pushed their stations into the heart of the city....and these new stations are connected to one another by rail. Finally, an underground railway, the *Metropolitan*, passes by these three stations and puts them in contact with all the others. The great arc it inscribes in the interior of London is complete and closed.

These new railways, with their numerous intermediate stations, singularly facilitate entering and exiting London; but their principal advantage is to put the most far-flung neighborhoods of this immense city in rapid contact with one another. The interior circulation of London operates on this network of rails. Instead of going on foot, by bus, or in a cab, one transports oneself from one neighborhood to another by railway.<sup>17</sup>

Unlike Paris, where transportation was still powered by humans and horses, London had industrialized transportation, breaking the decades-old taboo on railways in the city. Londoners solved the spatial and technical tensions between rails and streets by routing trains on viaducts, in trenches and in tunnels, weaving them into the urban fabric. This author focused on two qualities which made London's train network seem particularly systematic: first, it was *centralized*, connecting London with “all parts of the kingdom,” “as befits a capital”; second, the network was *comprehensive*, reaching all parts of the city, its lines inscribing a “complete and closed” arc. This vision of London's railways organized and coordinated to form a total *system* suggested a model of urban perfection that Paris should work towards, a totalizing vision like Haussmann's.<sup>18</sup>

The author assumed his readers would find two kinds of *ennui* in underground

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17 “Lettres de Londres,” *Le Temps*, Jan. 8, 1872. *Le Temps* was founded under the Second Empire. In spite of liberalized press laws which made the founding of an independent republican newspaper legal under the empire, the editors often 'played it safe' with the censors by running anonymous columns. It is likely that this letter was written by Hippolyte Taine (1828-1893), famous for his 5 volume history of English literature (1863) and historical work on the French revolution. Taine spent the better part of the year 1871 in England teaching at Oxford and avoiding the conflicts in France. A useful index to *Le Temps* can be found in *Tables du Journal Le Temps, vol 3 1871-1875* (Paris: Editions du Centre National de la Recherche Scientifique, 1968). In the appendices there is a list of editors and writers who contributed anonymously to *Le Temps*; on p. 643 Taine is listed as the correspondent in England for the early 1870s.

18 Stephen Graham and Simon Marvin, *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition* (Routledge, 2001), pp. 49, 52 and 62. Graham and Marvin speak of “the notion of the ordered, unitary city, mediated by standard ubiquitous infrastructure networks,” calling this the “modern infrastructural ideal” or “modern unitary city ideal.” James C. Scott's *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (Yale, 1998) does similar things with the concept of “high modernism.”

trains.<sup>19</sup> First was the *ennui* of riding in tunnels filled with steam and smoke, where visibility and air quality were poor; second was the *ennui* of riding in tunnels with no daylight or view. As we will soon see, the author was right about these issues, as well as others rooted in the newness and unfamiliarity of underground trains.<sup>20</sup> Indeed, a broad cultural bias against the underground, with all of its associations of death, hell, and sewers, was one of the most persistent sticking points in the process of imagining the Métro. At times the Métro's dream life was nightmarish.

But not for this author. For him, London's shining example inspired a dream of perfected Paris. In a utopian mode, the author detailed “my dream” for Paris, imagining himself hovering over the city, reaching down to transform the urban fabric “with a touch of the [magic] wand,”<sup>21</sup> drawing lines on the map of Paris from above, just as Haussmann and Napoleon III did in the early 1850s. The author argued that traveling in underground tunnels could be humane, so long as sufficient light and air could flow freely through them. London's train stations provided a model of a humane space organized for the smooth, comfortable flow of foot traffic. Overall such a system could achieve what Parisians had been talking about for decades—streamlining the flow of street traffic—in a way that left the scripts of urban living intact.

By July, 1872 the Prefect's commission finished a preliminary plan, and published a map in *Le Temps* (figure 2). The plan centered around a limited central underground rail network (*shown in black on the map*), powered by locomotive, which would connect to

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19 The French word *ennui* can mean many things—boredom, angst, discomfort, bother, annoyance, etc.—but it always carries a negative connotation, signifying humanity's dissatisfaction with its situation.

20 It is very difficult to determine historically whether this concern about underground trains was really a widespread public opinion, or merely the perception of the engineers, journalists, and others who wrote about the topic. But no matter which one is the case, this concern about underground trains was expressed often enough by opinion-makers like engineers and journalists that it was, in fact, a major cultural obstacle to reaching any consensus about rail design and development.

21 “D'un coup de baguette...”

the *Ceinture* in three places (Montmartre, Boulogne, Porte d'Orléans), connect the major train stations (except for St. Lazare and Montparnasse), and serve the north-south axis of the grande croissée, the grands boulevards, and Les Halles. The rest of the city would be served by horse-drawn tramways (*represented by dotted lines on the map*): on the east-west axis of the grande croissée (the quays of the Seine), across most of the Left Bank, on the exterior boulevards, and the radial lines connecting Paris with the suburbs.

Underground trains would bypass the center city, where traffic, monuments and population were densest, while horse trams would travel on the larger streets in the sparser periphery.

As we've seen, different rules often applied in the center and in the periphery. Aesthetics was as big a problem as traffic. The historical and recently Haussmannized center city was an outdoor trophy-case of France's architectural patrimony. Pride in the beauty of their city prevented many Parisians from imagining street-level railways here. In the periphery, on the other hand, traffic and monuments were sparser and property values were lower. Rather than bypassing this space, planners dreamed of linking it with both the center and the suburbs, to encourage its development. Both the center and the periphery needed railways, but for different reasons. The commission of 1872 thought the center needed a mechanically-powered underground railway, while the periphery needed horse-powered street-level tramways.

While the new Métro plan awaited a bidder (and one never came), three concessions for new tramways were quickly gobbled up by hungry investors: (1) a “north network” following major radial roads from the Right Bank into the northern periphery and suburbs, (2) a “south network” which did the same on the Left Bank, also covering

the southern arc of the external boulevards, and (3) an arc following the Right Bank external boulevards, granted to the CGO (figure 3).<sup>22</sup>

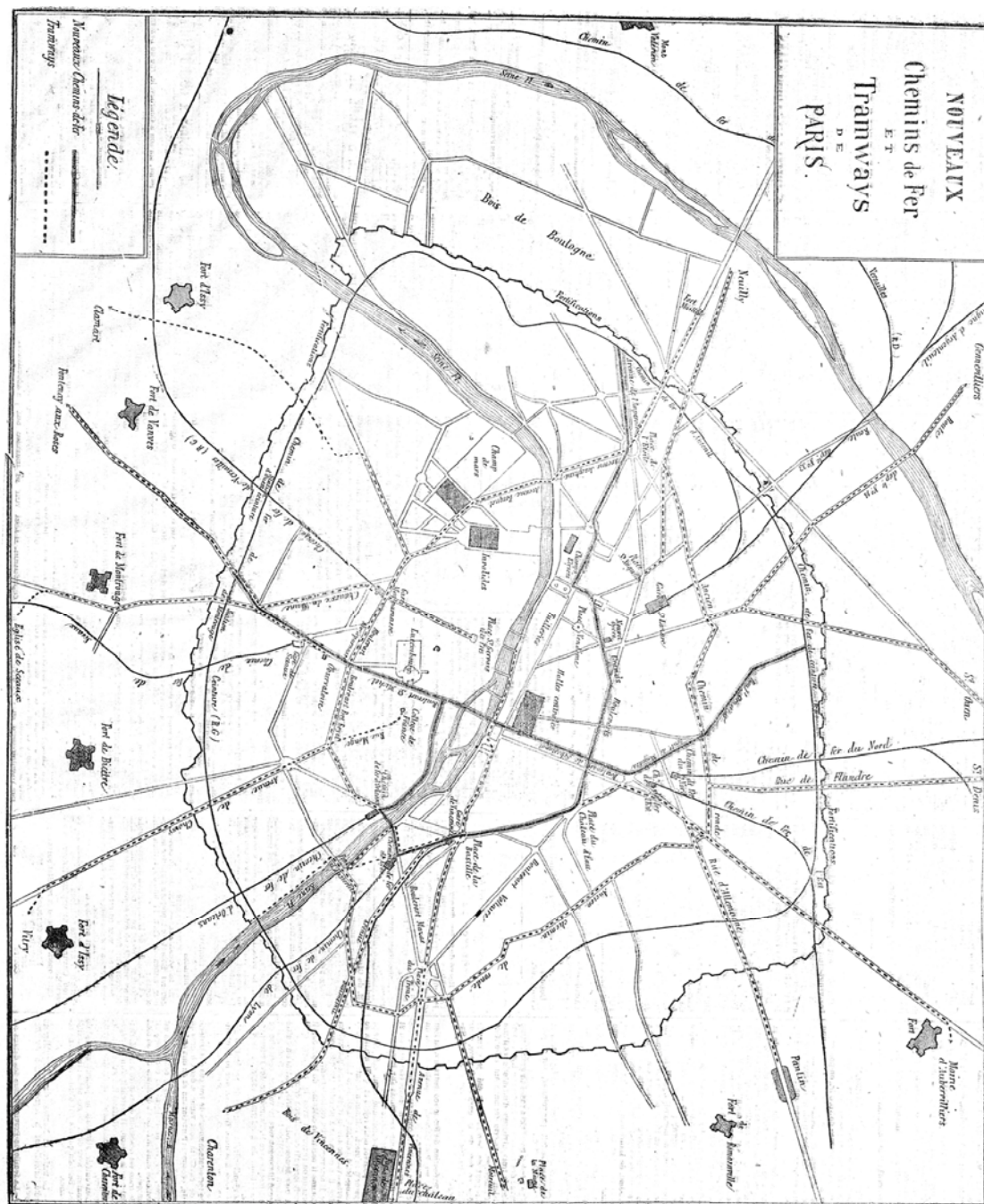


Figure 2: The departmental commission's 1872 Métro plan (taken from *Le Temps*, July 29, 1872, p. 4)

<sup>22</sup> Préfecture de la Seine. *Tramways du Département de la Seine: Cahier des Charges*. Paris: Imprimerie Charles de Morgues Frères, 1873. The carton AN F 14 9189 contains the *cahiers* for the network within Paris and the north network.

All three contracts specified horse power, a system often called *chemins de fer américains* (American railways) after the mid-19<sup>th</sup> century American boom in horse trams. While Parisian dreams of underground railways modeled England, dreams of tramways modeled the United States. France's jealous gaze at the anglophone world to its west was tied to having its administrative, technological, military and economic pride hurt by Prussia in 1870. Many nationalists suffered an inferiority complex, one journalist writing: "We won't forget that our great city, which has so often taken the initiative of perfecting and embellishing [itself], has remained 25 years behind in adopting American railways."<sup>23</sup> Construction began in 1873, service in 1874-5.<sup>24</sup> This was Paris's first tramway boom, lasting until 1879 and continuing a long-standing pattern in the city's history, of booms in transportation development leading up to Universal Expositions. The first tramway boom was conditioned by fear of being embarrassed before an international audience with out-of-date or inadequate means of transport at the Universal Exposition of 1878. Accordingly, the Exposition inspired Métro development as well.<sup>25</sup>

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23 "Communications et Avis Divers" *Le Temps*, Sept. 6, 1872.

24 There is an invaluable collection of tramway statistics, with dates, in the Minister of Public Work's office documents from 1894 (AN F 14 8588), hereafter "Tramway Stats 1894."

25 Napoleon III and Haussmann worked toward consolidating the mess of coach providers under the city-wide *Compagnie Générale des Omnibus* and the *Compagnie Générale des Voitures* in order to organize service for the 1855 Exposition. See Nicholas Papayanis, "The Development of the Paris Cab Trade, 1855-1914." *Journal of Transport History* 8/1 (1987), pp. 52-65 (see esp. p. 55). A whole host of public works were undertaken in the 1860s in preparation for the 1867 Exposition: the park at the *Buttes Chaumont*, Belgrand's unfinished sewer system and tour site near Alma, the *petite ceinture* railway, the network of pneumatic tubes under the city for moving information and paperwork, and the *rue des Pyrénées*, Haussmann's only attempt at cutting a new road through the eastern periphery of Paris. The exception to this rule is the 1889 Exposition, which saw no major development of transportation infrastructures. 1900 witnessed not only the opening of the Métro, but also the planning of several new tramway lines. The contracts given out for new tramways in 1876 are mixed in with Jean-Baptiste Krantz's report from the 1878 Exposition. See: (1) *Exposition universelle de 1878, à Paris. Rapport sur l'installation et la mise en mouvement*; (2) *Prefecture de la Seine, Tramways du Département de la Seine. Cahier des Charges*. (Paris: Imprimerie Centrale des Chemins de Fer (Chaix), 1876); (3) *Chemins de Fer de l'Exposition à l'Opéra et au Palais-Royal: Memoire a l'appui de la demande de concession* (Paris: imprimerie centrale des chemins de fer (Chaix), 1876); *Chemins de Fer de l'Exposition à l'Opéra et au Palais-Royal: Memoire a l'appui de la demande de concession*. Paris:



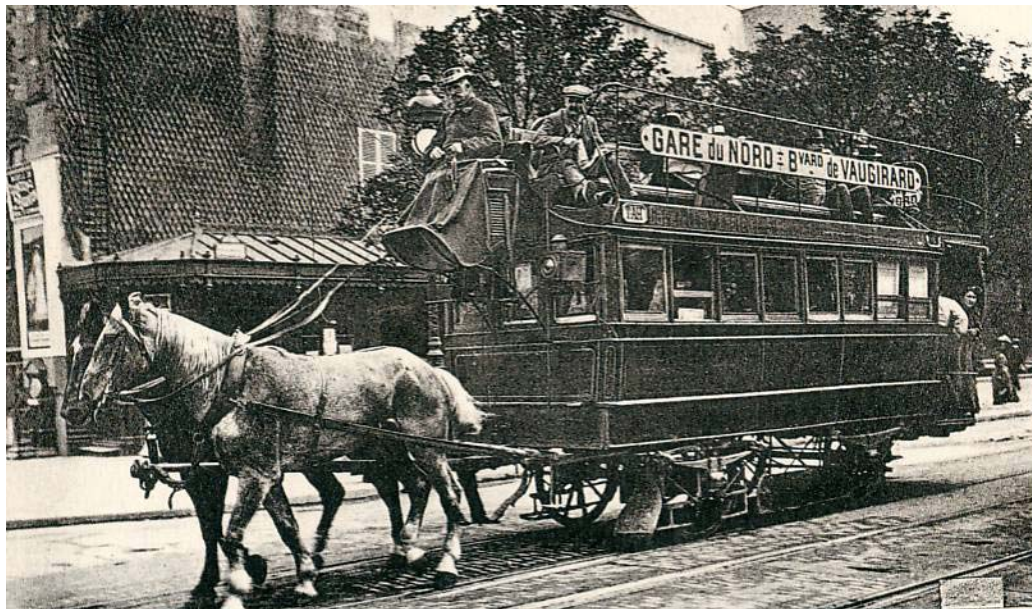


Figure 3: A standard CGO horse-powered tram (image wikipedia commons)

On a national scale, French tramway development stretches quite neatly from 1855 to 1929, with most growth between 1872 and 1914. Three successive booms are evident: a boom in horse-powered trams between 1872 and 1884, a smaller crest in mechanically powered trams between 1875 and 1889, and finally the largest boom: electric-powered trams between 1890 and 1919 (including the Paris Métro).<sup>26</sup> In the period examined in this chapter, tramway development in the department of the Seine followed a similar pattern. In 1894, Minister of Public Works Yves Guyot collected comprehensive statistics on tramway development. From 1874 to 1879, 49 new tramway lines were installed; 46 of these were horse-powered, 2 were steam-powered and 1 was

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imprimerie centrale des chemins de fer (Chaix), 1876. All of the documents are bound as BN 4-V Piece-340 in France's National Library.

26 Pierre Lanthier, "The Relationship between State and Private Electric Industry, France 1880-1920" in Norbert Horn and Jürgen Kocka, eds. *Law and the Formation of the Big Enterprises in the 19<sup>th</sup> and Early 20<sup>th</sup> Centuries*. (Göttingen: Vandenhoeck and Ruprecht, 1979), pp. 590-603, see p. 593 for tramway statistics: 1855-9: 1 horse tram; 1860-9: no trams; 1870-4: 3 horse trams; 1875-79: 10 horse trams and 4 mechanical trams; 1880-4: 8 horse trams and 4 mechanical trams; 1885-9: 2 horse trams, 4 mechanical trams; 1890-4: 1 horse tram, 3 mechanical trams, 8 electric trams; 1895-99: 1 horse tram, 4 mechanical trams and 38 electric trams; 1900-4: 1 mechanical tram, 28 electric trams; 1905-9: 1 mechanical tram, 9 electric trams; 1910-4: 9 electric trams; 1915-9: 2 electric trams; 1920-24: no trams; 1925-9: 2 electric trams; 1930-4: no trams.



electric. In the 1880s, only 5 new lines were installed (3 horse-powered, 1 pneumatic and 1 steam). From 1891-3, Guyot counted 16 new tramways; 10 were horse-powered, 2 were pneumatic, 2 were steam-powered, 1 was electric and 1 was a funicular. Guyot's numbers show us the first boom in horse trams, from 1874 to 1879, and just barely capture the beginnings of the second boom, which started gradually after 1889 with various attempts at mechanical traction, followed after 1895 by a surge in electrical traction leading up to the 1900 Exposition. We will return to this surge in electrical traction in the next chapter.<sup>27</sup>

A tramway company first suggested mechanical traction for Paris's tramways, seeking to cut costs. Horse traction was incredibly expensive, and mechanical traction promised to be cheaper. As Émile Gauthier would later put it, “animal traction is the ruin of the tramways. Thus all cities are preoccupied with replacing it with various methods of mechanical traction.”<sup>28</sup> Each tram required its own horses, which were worked hard and vulnerable to disease; they often had short careers. So operators owned large numbers of horses, which necessitated stables (i.e. land), veterinary care, food, and employees to feed horses, tend stables, clean up manure, etc.<sup>29</sup>

In November 1875 the North Tramways Company asked the Minister of Public

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27 Source: Tramway Stats 1894. Archives Nationales, F 14 8588. One of the last things Minister of Public Works Yves Guyot did in February 1892 before leaving office was to request information on tramways from every department in France. The next several years were spent compiling materials sent in by the Prefect of each department. All results were in by 1894. The 33 new tramway lines proposed in 1896 constituted a “réseau de pénétration” which would complement the original tramway network of the 1870s. Most of the concessions went out 1899. See AN F 14 14999 and AP 25W 100, and see Chapter 3.

28 Émile Gautier, *l'Année scientifique et industrielle* yr. 39, 1895 (Paris: Hachette, 1896), p. 310.

29 For more on the cost savings of mechanical traction, see (1) Hector de Backer, *Tramways: la traction par chevaux et la traction par machines sur les tramways: aperçu comparatif* (Paris, Auguste Ghio, 1877); (2) John P. McKay, *Tramways and Trolleys: the Rise of Urban Mass Transport in Europe* (Princeton, 1976); (3) Alain Beltran and Patrice A. Carré, *La fée et la servante: la société française face à l'électricité XIXe-XXe siècle* (Paris: Belin, 1991), p. 77. By 1900 there were nearly 100,000 horses in Paris.

Works, Eugène Caillaux, for permission to modify their contract and power trams with English engineer G. Palmer Harding's new steam engine. Tests began the following spring and summer, with the Minister calling a special commission to compare three systems of mechanical traction.<sup>30</sup> These were Mékarski's system of compressed air, Harding's *locomotive avec foyer*, and Léon Francq's *locomotive sans foyer*. Mékarski's motors were powered by cylinders of compressed air produced in a central plant then distributed to trams. Cylinders hung from the bottom of the cars (figure 4). Mékarski argued that mechanical traction would only work if tramways could switch the amount of power used in an instant, for going up and down hills, and stopping and starting a lot: "The motor of tramways should therefore have as an essential mechanical quality a very great flexibility."<sup>31</sup> The commission tested Mékarski's system from February to July, 1876 and was impressed by the power and maneuverability of the vehicles, but remained concerned that the cylinders of compressed air might explode. Even so, the commission granted permission to operate the vehicles on a trial basis from 1876-79.<sup>32</sup> The CGO began to develop compressed air trams like the one in figure 3 after 1880. Pneumatic traction enjoyed a modest career overall; Guyot's 1894 tramway statistics show that only four of Paris's more than forty tramway lines were powered by compressed air.<sup>33</sup>

The next system tested was Harding's locomotive avec foyer, a traditional locomotive with a furnace on board for creating steam. Initial correspondence between the Minister of Public Works and the engineers of the Ponts et Chaussées was optimistic,

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30 The Commission's work can be found in AN F 14 9198.

31 Société des Ingénieurs Civils, *Discussion sur L'emploi de l'air comprimé pour la locomotion mécanique par la procédés L. Mékarski*. Paris, Imprimerie Viéville et Capiomont, 1876. See p. 3: "Le moteur des tramways doit donc avoir pour qualité mécanique essentielle une très-grande souplesse" (quote from a speech by Mékarski reproduced in the pamphlet). AN F 14 9189

32 Second Dossier from the Commission on Mechanical Motors, 1876: "La machine a air comprimé (système Mékarski)." AN F 14 9198.

33 Karl Baedeker noted 44 tramway lines in 1888 Paris, see: *Paris and Environs* (1888), p. 21.

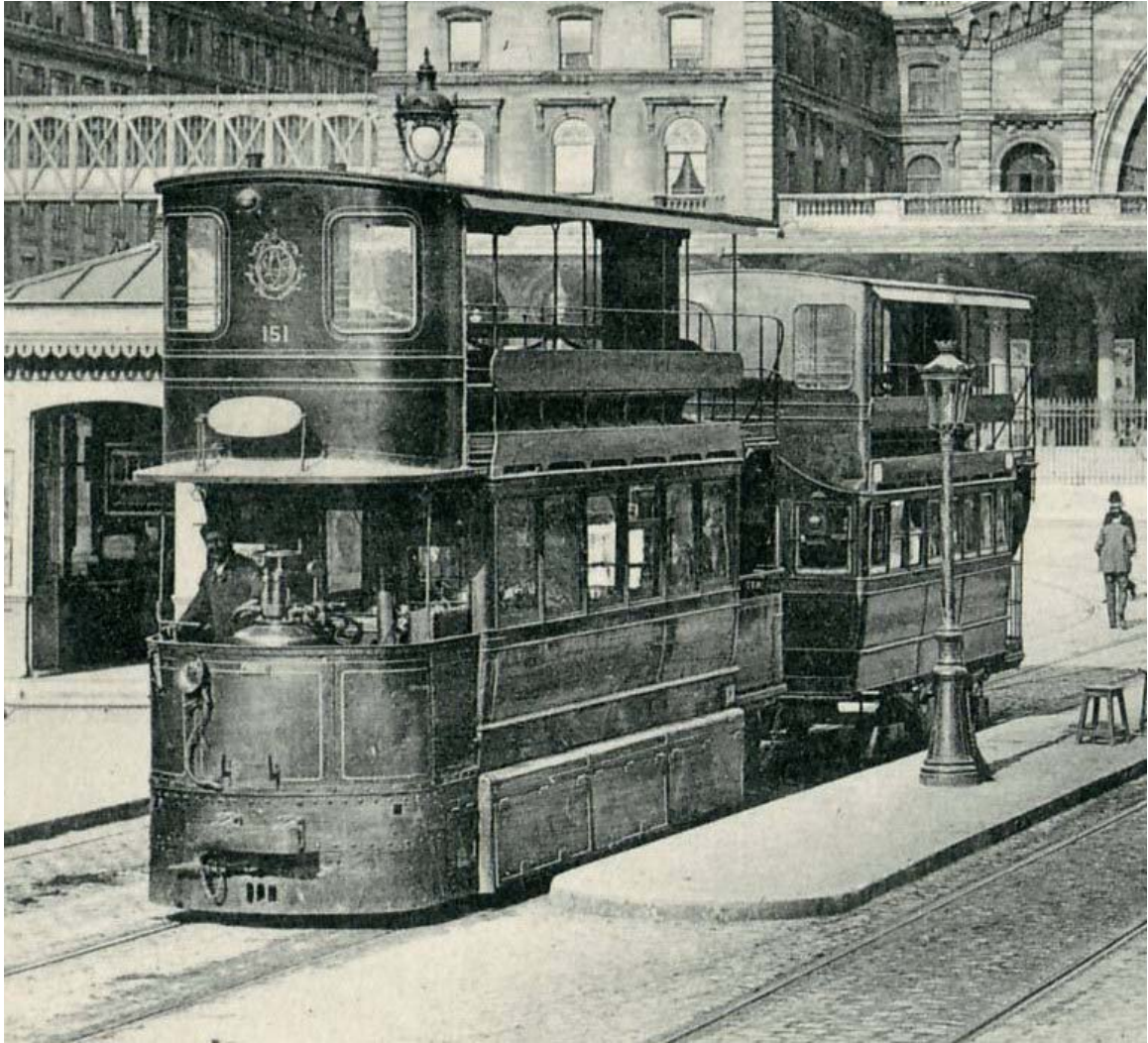


Figure 4: CGO Mékarski system compressed air tram, circa 1900 (photo Wikipedia commons)

one engineer raving that Harding's locomotive might cost half as much as horse traction.<sup>34</sup> This would have been true, if not for further safety concerns. A year later, as the Ministry approved the South Tramway Company's use of the Harding system on the line from *Montparnasse* to *Austerlitz*, it specified one fatal condition: each train would have only one motor car, piloted by two agents, a main conductor and an assistant.<sup>35</sup> The Ministry was worried about fire, and intended the second employee to monitor the

34 First Dossier from the Commission on Mechanical Motors, 1876: Locomotive Avec Foyer (Harding), AN F 14 9189.

35 Letter from Inspecteur Général des Ponts et Chaussées Graeff to the Minister, Paris, July 10, 1876, AN F 14 9189.

equipment while the first employee operated it. But the cost of hiring two employees per car largely outdid the savings of steam traction. By 1878, the South Tramway Company was suffering from major financial difficulties, and founder G. Palmer Harding was retiring his steam locomotives from service.<sup>36</sup>

The final system examined by the commission of 1876 was Francq's *locomotive sans foyer*, a steam-powered engine with no furnace, powered by metal canisters filled with pressurized hot water (figure 5). Like Mékarski's system, power would be produced in a plant at the end of the line, stored in tanks and distributed to cars. This system also tested smoothly and was authorized on several lines.<sup>37</sup> Francq knew that safety was a primary concern for both the authorities and the tramway companies and tried to sell his system as the safest alternative:

As the *foyer* [furnace] doesn't exist on this locomotive, the drawbacks of smoke, sparks, soot, odor, the glow, the grill, the noise of friction or of exhaust from the smokestack, are completely and absolutely removed. The metal no longer has reasons for alteration; incrustations are no longer possible; there is no longer a rigorous surveillance to exercise over the apparatuses of power or of security in general. Finally, the dangers of explosion are definitively removed, and *security becomes complete, absolute*.<sup>38</sup>

The commission greeted Harding and Mékarski with worries about passenger safety, but trams also had to share the road safely with other vehicles. Francq's system provoked questions about whether new mechanically-powered tramways would frighten horses with their noise, steam, sparks, etc., or blind horses pulling other vehicles, causing accidents with horse-trams, omnibuses, coaches, or pedestrians.<sup>39</sup> These were not

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36 See F. Sérafon, *La Verité sur les Tramways-Nord & Sud de Paris*. Paris: Imprimerie de la Publicité, 1882.

37 Francq's system continued to be used in Paris right up to the beginnings of electrical traction, 1890-4.

38 Compagnie Continentale de Locomotion par la Machine Thermo-Spécifique, *Précis sur la Locomotive sans Foyer*. Paris: Boyer, 1875, p. 7. AN F 14 9189.

39 See *Rapport* from the 3<sup>rd</sup> subcommittee of the Minister's Commission, July 18, 1876. In: Third Dossier from Commission on Mechanical Motors, 1876: Locomotive Sans Foyer (Léon Francq). AN F 14 9189.

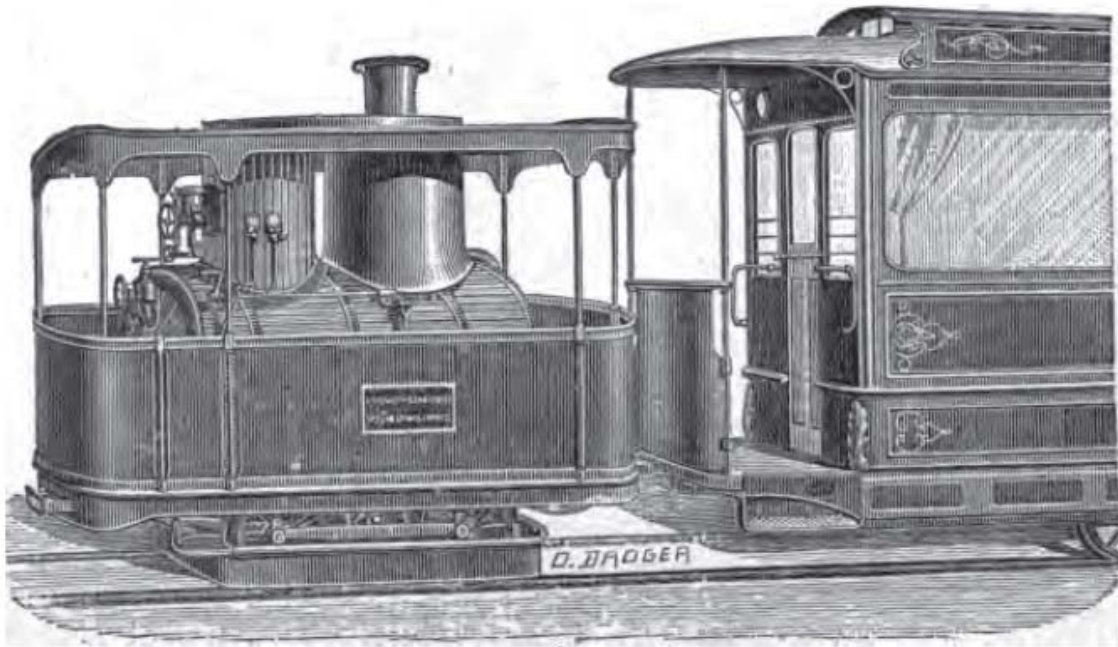


Figure 5: Francq's locomotive sans foyer. Note the separate engine car, equipped with a body catcher. Image from Adolphe Schoeller, *Les chemins de fer, les tramways, les chemins de fer électriques* (Paris: J. Baillière et fils, 1902).

problems intrinsic to horse traction or mechanical traction, but problems rooted in mixing the two systems. Could mechanical traction be used at street level without disrupting street traffic? Could mechanical traction be effectively used in a city in which horse traction was already so deeply entrenched? Could animal power and mechanical power coexist? At this historical moment, engineers like Mékarski, Harding and Francq were not ready to imagine a whole new system of traction for the special circumstances of the city.<sup>40</sup> Instead they worked to adapt the traditional locomotive to these circumstances.

Other safety questions emerged, too. In a city which averaged 'two accidents a day,' any way to make accidents less lethal was welcome.<sup>41</sup> Since February of 1876, the

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40 Neither were the engineers at the Ministry of Public Works and the *Ecole des Ponts et Chaussées*, but electricity would provide this in the 1890s.

41 At least one engineer had argued years before that his plan for the Métro would reduce the number of accidents, by relieving traffic at street level. See: M. L. LeHir. *Réseau des Voies Ferrées Sous Paris* (Paris: Mémorial du Commerce et de L'industrie, 1872). BA 206329

Prefect of Police had been reviewing designs for a *chasse-corps* (“body catcher”), a sheet metal skirt to cover tramway wheels and prevent objects or people on the tracks from going under oncoming trams (visible in figures 3 and 4). The daily press occasionally produced lurid stories, to remind the public of the dangers of modern life. *La Lanterne* wrote in May, 1879: “We have already demanded body catchers for the tramways. Here is yet another demonstration of their utility.” The paper then told the story of a nurse, carrying the little child she cared for, who was hit by a tramway on the *Place du Châtelet*. “Without the body catcher...the unlucky woman was literally cut in half.” The little girl was luckier: thrown from her nurse's arms, she rolled away from the wheels and survived.<sup>42</sup>

Progress in equipping trams with body catchers was slow and uneven after 1876. The Ministry of Public Works received submissions for new body catcher designs and citizen complaints through 1880.<sup>43</sup> In October 1877 an old man named Melon from Neuilly, a west suburb, sent the Ministry a letter: “Since the tramways have existed in Paris and notably in Neuilly, accidents happen quite often, either by the fault of the agents of this administration, or by the inattention of the public.” Conductors “sit on their benches and read the newspaper,” he claimed, when they should be paying attention to passengers approaching the tram.

Melon referred to an important fact of tramway *practice*: until 1896, Paris tramways, like the omnibuses before them, did not use fixed 'stops' or 'stations'—passengers could hail them and board anywhere along the line. Conductors were

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<sup>42</sup> *La Lanterne*, yr. 3, no. 770. May 31, 1879.

<sup>43</sup> From the *Archives Nationales*. Carton F 14 14999 contains plans for Tronchon's “Frein Protecteur Tronchon,” 1876. Carton F 14 9189 contains plans for body catchers designed by Folacci (1879) and Marsillon (1880).

officially required to stop trams to pick up passengers, but in practice they often just slowed down. Hence the popular image in Parisian literary and visual culture of people running to catch the tram.<sup>44</sup> Boarding passengers while trams were moving obviously demanded the attention of conductors, who were also officially supposed to blow the horn as people approached the tracks. As he didn't trust tram drivers, Melon suggested equipping trams with body catchers and equipping horses' collars with "little bells" (*petit grelots*). He did not realize that some trams in Paris already had body catchers as early as 1876, writing as if he was the first to think of the idea. Melon wrote again in 1878 to complain that tramways west of Paris were still not equipped. When he finally wrote in 1879 to acknowledge that the tramways in his neighborhood had been outfitted, he demanded remuneration for "his idea" to supplement his pension. This was the battiest letter yet from the senile citizen, provoking the Ministry's curt dismissal.<sup>45</sup>

In the fall of 1878, a tramway conductor named Vallet was sentenced to eight days in jail for punching a complaining passenger in the eye. M. Dubard, a businessman from Neuilly, told Vallet that he wanted to make a complaint, because Vallet had "made

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44 One 1870s Paris transportation guidebook was embellished with cartoons, little scenes of daily life, including several where people ran for the train. *La Clé des omnibus et tramways, (administration d'affichage, 1876).*

45 The Ministry forwarded Melon's letter to the administrators of the three tramway companies (North, South, and the CGO), and each responded that body catchers were a good idea, but rejected the idea of bells on the horses' collars. Both sides of this correspondence put Melon's complaints through the proper channels only grudgingly; both sides saw him as a foolish old crank. The President of the North Tramway Company admitted that his drivers might not always use the horn properly, but dismissed the bells as bad for business and an annoyance to the public. Ruthier from the CGO rejected the bells because they would "produce a constant disagreeable noise" for people living near the tracks, as did the President of the South Tramway Company. The South Tramway Company also suggested that the bells would not be loud enough to be heard by pedestrians "amidst the noises of the street," and might confuse tramway drivers, who would take the bells for a signal that demanded their attention. See: (1) Letter from the President of the South Tramway Company to Rouselle, Chief Engineer for the Dept. of the Seine, Oct. 27, 1877; (2) Letter from Ruthier of the CGO to Rouselle, Nov. 2, 1877; (3) Letter from the President of the North Tramway Company to Rouselle, Nov. 7, 1877; (4) Letters from Melon to the Minister of Public Works, Feb. 13, 1878 and Oct. 20, 1879; (5) Directeur des routes et de la Navigation to Melon, Nov. 19, 1879. All of these letters can be found in AN F 14 9189.



me run,” i.e. not brought his tram to a complete stop for Dubard to board. Vallet rejected Dubard's complaint, insulted his intelligence and his manhood, and finally decked him.

The *Directeur des Routes et de la Navigation*, Rousseau, wrote to the Prefect of Police:

As facts of this kind, just like the fairly numerous accidents which have happened on various tramway lines, are generally being attributed, by the public, to a lack of surveillance, I beg you, Monsieur Prefect, to examine well...what dispositions might need to be taken in view of assuring an effective control of operation....<sup>46</sup>

Attached to his letter was an unidentified news clipping about the incident, dated Oct. 9, 1878<sup>47</sup>:

In this affair, we need to know if a tramway or omnibus conductor can honor his duties and help people get on and off, and pay their fares; then again, maybe he should, when he is on his stand, pay attention to those who give him the sign to stop and thus spare the elderly, women and children the *ennui* and even the danger of running after the vehicle. One sometimes sees people following one of these large vehicles, at a run, for several minutes, making desperate gestures at a conductor whose attention is wholly elsewhere.<sup>48</sup>

The examples of Melon and Vallet show that tramway *practice* remained just as new and unfinished during the first tramway boom as tramway *technology*.<sup>49</sup> There was

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46 Letter from Rousseau to the Prefect of Police, Oct. 29, 1878. AN F 14 15000: “Les faits de cette nature de même que les accidents assez nombreuse qui se produisent sur les diverses lignes de tramways, étant généralement attribués, par le public, à un défaut de surveillance, je vous prie, Monsieur le Préfet, de voulez bien examiner, de concert avec M. l'Ingénieur en Chef du dept. de la Seine, quelles disposition il pourrait y avoir lieu de prendre en vue d'assurer un contrôle efficace de l'exploitation, et, le cas échéant de porter ces dispositions à la connaissance des compagnies intéressées, en les invitant à tenir la main à leur rigoureuse exécution.” A *Service du Contrôl des Tramways* was not created for the department of the Seine until 1889.

47 Attaching a newspaper clipping to administrative correspondence, especially to justify claims about public opinion, was common administrative practice in 1870s Paris. Secretaries in offices at various levels of public works administration regularly kept press reviews, files of news clippings about controversial infrastructural topics. These press reviews are the governor's way of keeping up with the governed, which turns the press into the arbiter of public opinion, the governors relying on the press to provide them accurate information about the public. Press reviews *do* give us historical access to public opinion, but public opinion as paraphrased by the press, and then the government.

48 AN F 14 15000.

49 In addition to systems for mechanical traction, plans also poured into the Ministry of Public Works concerning new rail designs, ways of making rails more durable, more rigid, cheaper, etc. These plans are conserved in the National Archives. Carton F 14 14999 contains M. St. Yves's design of 1877. Carton F 14 9189 contains Michaux's design of 1878 and Waddington and Ridley's design of 1879. A company calling itself the “Society for Compressed Air Motors” wrote in to demand permission to operate two new tramway lines specifically to serve the 1878 Exposition, but the proposal was rejected



significant uncertainty about the basic materials and processes of the tramway (or more generally light-rail) industry among engineers, operators and users. One contemporary suggested that this uncertainty would work itself out in time: “In effect horses are frightened, but the education of horses happens in time just like that of humans.”<sup>50</sup> Both people and horses accommodated themselves slowly to the tramways. This uncertainty, combined with the financial burdens of horse-traction, spelled trouble for the tramway companies. So the first tramway *boom* was answered after 1878 with an equally significant *bust*. As with any railway, tramway development depended on heavy initial investment which could (ideally) be paid back later with ticket sales. Hence the presence of big financial interests like the *Société financière de Paris*, the Franco-Italian Bank and several Belgian firms in the tramway industry, and ongoing talk of mergers and acquisitions.<sup>51</sup> Paris's first tramway boom was a good, old-fashioned investment craze, and when growth plateaued in 1878, the gamble didn't play out.

The crisis first struck the South Tramway Company, which was operating several Harding steam engines on the Left Bank boulevards. Manning each tram with two agents was simply too expensive; the years 1879-1881 brought 3 million francs in losses.<sup>52</sup> Soon the North Tramway Company was in trouble, too. The legal problem behind this financial trouble was the CGO's Second Empire “monopoly” on transportation in Paris. Because the North and South tramways crossed from the suburbs into Paris, their 1873 charters

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(F 14 14999), as was Mr. Harvard's plan for *Portenses à Vapeur*, steam powered buses that would run on the street rather than on rails (F 14 9189). In hindsight, it is plain to see that Harvard's idea was about 40 years ahead of its time; autobuses did not start to appear in Paris until the 1910s.

50 H. Blerzy, “Études sur les travaux publics: routes, chemins et tramways.” *Revue des deux mondes* 27 (1878), p. 657.

51 The real stars of international tramway finance in this era were Belgian. See Alberte Martinez Lopez, “Belgian investment in tramways and light railways : An international approach, 1892-1935,” *The Journal of Transport History* 24/1 (March 2003), pp 59-77.

52 F. Sérafon. *La Vérité sur les Tramways Nord & Sud de Paris* (Paris: Imprimerie de la Publicité, 1882), p. 17.

specified that the CGO would build and maintain all rails within the city, and the tramway companies would pay the CGO to use them. On top of small maintenance rates per franc and per kilometer, the tramway companies also owed “an indemnity for privation of traffic and the partial abandoning of the rights conceded the Omnibus Company by the city of Paris.”<sup>53</sup> As public comfort with and demand for the tramways increased in the periphery and suburbs from 1873 to 1879, the North and South companies looked to extend their lines further onto the CGO's turf, in turn increasing the amount they would have to pay the CGO.

This expense was compounded because the CGO's trams rode on rails without *entretoises*, bars of wood or metal like railroad ties, which helped increase resistance and keep rails evenly spaced. The CGO's Loubat-style (or “American”) rails were simply sunk in the pavement, whether cobblestone or asphalt. As the CGO was responsible for constructing tracks it installed them to its own standards. But these tracks did not match the North and South Tramway Companies' cars, whose axles did not pivot, making them vulnerable to smaller changes in the height and width of rails. The North and South Tramway companies spent extra time, labor and money (according to one engineer, an additional 2.25 francs per meter) retrofitting the tracks to their cars. Conveniently, the CGO's trams had no trouble circulating on the modified tracks.<sup>54</sup>

In spite of growing sales and ongoing talk of an anxious public clamoring for more means of transport, use of the North and South tramway networks was not yet heavy enough to finance initial investment or operating costs. Under such economic

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53 *Compagnie des Omnibus. Tramways dans Paris. Cahier des Charges* (Paris: Ch. De Mourgues Freres, 1873), Article 22, pp. 12-13. AN F 14 14999

54 As the lingo of the era had it, the CGO's cars were “derailable,” while the North and South Tramway Companies' cars were “underailable.” See Sérafon 1882, pp. 5-6.

pressure attempts to grow the network were doomed. In 1881 rising costs proved too much for the tramway companies and a plan emerged for the CGO to acquire them. This sparked controversy and a flurry of pamphlets in which *vérité* (truth) was an important buzzword.<sup>55</sup> The whiff of Haussmannesque financial impropriety was unmistakable. As Sérafon put it, speaking of various plans for recombining failing and successful companies, “Each day sees another new combination, whose authors, little known in the financial world, hide behind them speculators interested in staying in the shadows.”<sup>56</sup> The authorities didn't support the merger any more than these outspoken pamphleteers, and so denied the CGO's bid. The North and South Tramway companies went bankrupt in 1884, to be replaced by two new companies in 1887.<sup>57</sup>

As the tramways rolled from boom to bust, new Métro plans continued to emerge. On November 23, 1875, the General Council of the Seine approved 30,000 francs for further study of the Métro question. A year later, Ponts et Chaussées engineer E. Huet and Paris Director of Works Alphand produced a plan for a series of lines radiating out toward the *Ceinture* from a new central underground station beneath the *Palais Royal*. The plan had one key technical detail—its rails would be the same gauge as those of the national railway network, whose trains “could be called to circulate on the metropolitan network.” Accordingly, traction would be provided by traditional locomotives. Huet and

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55 (1) Marsoulan. *Vérités Nécessaires...!* (Paris: Imprimerie Moderne, 1879); (2) Em. Lemoine. *Etude sur la Formation et l'Emploi des Capitaux Engagés dans les Tramways-Nord & Sud de Paris* (Paris, Imprimerie de la Publicité, 1881); (3) Sérafon 1882; (4) The pamphlet *Observations présentées au Conseil Général de la Seine* was published by a group of administrators from the two tramway companies: Coste and Fourchault of the North Company, Wallut and Mercier from the South, and finally Vidal, a member of both companies (Paris: Chaix, 1882).

56 *Ibid.*, p. 22.

57 These were the *Tramways de Paris et du Département de la Seine* (TPDS) in the North and the *Compagnie Générale Parisienne de Tramways* (CGPT) in the South. See: Jean Robert, *Les Tramways Parisiens*, pp. 29-30. Financial collapse in railway investments was a common theme in these years. The stock market crash and well-known failure of the Freycinet plan in 1882 are perfect examples. See Allan Mitchell, “Private Enterprise or Public Service? The Eastern Railway Company and the French State in the Nineteenth Century.” *The Journal of Modern History* 69/1 (March 1997), pp. 18-41.

Alphand intended their “urban network” to run mostly “underground or more precisely in a covered trench.” In order to make locomotives work underground, they stressed that tunnels and trenches would be carefully ventilated.<sup>58</sup>

In their June 15, 1875 deliberation, the General Council of the *Ponts et Chaussées* had suggested that any Métro plan should integrate the *Ceinture*, then operated by a syndicate composed of the five major national railway companies. The council thought it only logical that the syndicate should build and operate the Métro, seen as an extension of existing railways. The state would hand the national rail companies a profitable enterprise so that Paris could become a workable *plaque tournante* (turning plate) for the nation, where trains could switch from any one network to any other without leaving the rails.<sup>59</sup> To seal the deal, the entire project would be legally declared “general interest,” falling under the jurisdiction of the Ministry of Public Works, not the departmental or municipal governments. As the Minister of Public Works put it that summer in a letter to the Prefect of the Seine, emphatically combating the words ‘local interest’ in Huet’s project title: “The establishment of a network of railways in Paris presents to an eminent degree the character of GENERAL INTEREST. Because this network does nothing but connect the stations of all the major general interest networks to a common center, its concession should emanate from no authority other than that of sovereign power.”<sup>60</sup> It was a tautology: assuming a general interest purpose for the Métro, the network should

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58 E. Huet. *Chemin de Fer d’Intérêt Local du Département de la Seine. Réseau Urbain. Rapport de l’Ingénieur en chef des Chemins de fer municipaux* (Paris: Chaix, 1876), pp. 5-6. Huet’s plans of 1876-77 are also conserved in the National Archives, F 14 9153.

59 (1) *Ibid.*, p. 27; (2) Karen Bowie, “Paris, « plaque tournante » du réseau ferroviaire” in Karen Bowie, ed. *La modernité avant Haussmann: Formes de l’espace urbain à Paris 1801-1853* (Paris: Editions Recherches, 2001); (3) Alexandre Ossadzow, “Les pères du métropolitain: l’intervention des ingénieurs” *Métro-Cité* (Paris Musées, 2001), pp. 57-72.

60 Letter from Minister of Public Works to the Prefect of the Seine, Versailles, July 12, 1876. AN F 14 9153

be declared a work of general interest. In practice this would have meant a network with largely commercial and military applications, which would carry freight, information and passengers. Huet estimated the total cost at 159 million francs, 40 to come from the municipality and 79 from the national budget.

The municipal council, dreaming of a local interest Métro, saw the national government's intentions and refused to even discuss the departmental council's plan.<sup>61</sup> Instead, the municipal council sent its own mission to study London in 1876, which returned inspired to finance a local interest Métro project on its own and cut the national government out of the deal. These moves and counter-moves form the beginning of the twenty-year stalemate between local and national authorities that forms the backbone of the standard historical account of the Métro. The next twenty years would indeed be difficult ones for the Métro, but Louis Biette's term "sterile," which lingers in prehistories of the Métro is a misnomer; there was actually a lot going on in these "sterile" years. For example, take the *grande ceinture*, a loop of rails around the outside of Paris put into law in 1875 and opened in 1877. This new railway was clearly a way for the national government to team up with the departmental government, outside the municipal council's jurisdiction, to push through the long-discussed national "turning plate" plan, with or without the Métro. It was run by a syndicate of four major rail companies (North, East, PLM and Orléans), as the General Council of the Ponts et Chaussées had suggested for the Métro in 1875. This second beltway was a more or less direct response to being snubbed by the municipal council in 1875-6; it was "plan B," an alternate route to the nationalist vision of the Métro.

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<sup>61</sup> Max de Nansouty, *La Question du Réseau Métropolitain de Paris et le Projet de la Compagnie des Etablissements Eiffel* (Paris: Publications du Génie Civil, 1891), p. 10-11.

As the municipal and national authorities struggled for jurisdiction, architects and engineers continued to imagine solutions for the special problems of underground trains. In 1877 architect Louis Heuzé published a plan for an elevated Métro, following New York's example.<sup>62</sup> Heuzé imagined elevated tracks standing seven meters above Paris's larger streets on slender wrought-iron viaducts. These tracks would form a roof over the center of avenues and boulevards, creating a *rue speciale* (“special street”) for pedestrians, protected from the weather. Heuzé imagined that this space could be embellished with lamps, benches, gates, or the classic iron and glass store fronts of Paris's arcades. An elevated Métro would relieve street traffic and improve pedestrian traffic, ensuring what Heuzé called “a double circulation.” It would be cheaper than cutting new boulevards through the city, and would ensure “No railways underground in the lower parts of Paris, no more tramways on the interior boulevards.”

Heuzé argued that underground tunnels invited problems with groundwater, sewers and the Seine, possibly making the Métro vulnerable to flooding or polluting the groundwater. Underground tunnels might also collapse parts of the city above, damage monuments or bring down property values. Like many others, Heuzé thought Parisians preferred to ride in daylight and open air. He was moved by the morbidity of it all: “For the adjective *métropolitain*, Parisians will soon substitute that of *Nécropolitain*, for a railway obliging the public to descend by way of long staircases into veritable catacombs!”<sup>63</sup> Another Parisian used the term “sewer train.”<sup>64</sup> Here was the gothic

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62 Louis Heuzé, *Chemin de Fer Transversal à Air Libre Dans Une Rue Spéciale. Passage Couvert pour Piétons* (Paris: A. Lévy, 1876 & 1878). There is record of one elevated plan before this, Arsène Olivier's of 1868.

63 *Ibid.*, p. 5. This pamphlet is often cited as the origin of this pun. We'll see this vocabulary again in Chapter 3, after the 1903 Métro accident.

64 Quoted in Evenson, p. 93.

scenery of the *fin de siècle* with a vengeance, reflecting deep-set public uneasiness about the underground plans of the 1870s.<sup>65</sup>

Like Alphand and Huet's 1876 plan, Rammell's 1878 plan for a pneumatic underground railway sought to overcome the technical tensions between underground railways and conventional locomotives, but Rammell did this by rejecting locomotives altogether. Like Mékarski's tramways, Rammell's railway was powered by compressed air, but rather than compressed air driving engine parts to create movement, tube-shaped train cars with a "screen" at the back "like...the sail of a ship" would be pushed by bursts of air in sealed tunnels. This system, Rammell boasted, avoided all the inconveniences of the locomotive: "no heat, no smoke, no steam, no noise, no vibration." Ingeniously, compressed air could simultaneously solve the problem of traction and the problem of ventilating tunnels. Rammell followed the example of similar pneumatic trains operated in London and New York in the 1870s.<sup>66</sup>

Heuzé and Rammell designed solutions for the special problems of underground railways: lack of light and air, which in turn made locomotives impracticable, driving the search for other forms of traction (cables, compressed air, Francq's compressed steam). These were not problems of a purely technical nature. With its florid language and evocation of public opinion, Heuzé's pamphlet spoke in a voice not unlike that of *Le Temps* in 1872, self-appointed mouthpiece of the public, speaking truth to the Prefect's power. Planners (in this case an architect) could be just as emotive, as driven by meaning,

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65 There are a number of good portrayals of this spooky cultural mood in the library of French history, including Robert Nye's *Crime Madness and Politics in Modern France: The Medical Concept of National Decline* (Princeton, 1984) and Eugen Weber's *France Fin-de-Siècle* (Harvard, 1986).

66 T. W. Rammell. *Tramway Souterrain à Propulsion Atmosphérique ou Pneumatic-Railway Système Rammell. Note sur une demande de Concession faite pour l'application de ce système à Paris* (Paris: Chaix, 1881). For more on New York's pneumatic railway, see *Le Magasin Pittoresque* 47 (1879), p. 168.

and as politicized in elaborating plans for the Métro as journalists were in writing editorials; the Métro was recruited into many different otherwise “cultural” or “political” projects, many of which, like Heuzé's and Rammell's Métro plans, were never realized.

For many Parisians, dreams of underground trains called to mind a netherworld of dangers cast out by civilization: waste, crime, disease, revolution, etc. So engineers Alphand, Huet and Rammell had to combine competent technical design with sustained argumentative assault on this field of meaning. As they recommended devices that could make the underground safer—artificial lighting, ventilation shafts and mechanically-powered fans—they also assuaged public fears of the underground. Technological problem-solving was never separated from the social, political and cultural task, as urgent in 1879 as it was in 1872, of imagining how railways could be worked into the physical fabric of the city, and into its culture, customs and daily routines. “Tracks in the city,” as Schivelbusch called them, were still problematic.<sup>67</sup>

Darker dreamers like Heuzé knew that the public's fear of the underground ran deep and tried to exploit it. Heuzé's necrotic imagery, the taboos it broke, and the horror evoked link his text with a broader climate of opinion not well conserved in the historical record, in which everyone was talking excitedly about the Métro, but few failed to note some anxiety about what monumental changes the railway might bring to the city. We'll soon see more anxiety in the 1880s. Railways, as a stand-in for all industrial technology, often served the nineteenth-century as a demiurge of progress. Parisians were accustomed to thinking of their historical situation as shaped by technological forces, motors of

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<sup>67</sup> For a good general account of the cultural work which always accompanies engineering, see Ruth Oldenziel, *Making Technology Masculine: Men, Women and Modern Machines in America, 1870-1945* (Amsterdam University Press, 1999).



history like the railway and the steam engine.<sup>68</sup> In the 1870s, the dream life of the Métro was prey to frequent and dramatic changes of scene: flights of utopian fantasy, morbid expressions of fear, general hyperbole. This excitement and anxiety about underground trains set the tone for debate in the 1880s, a decade in which elevated Métro plans far outnumbered underground and street-level plans.

### *The Métro, Politics and Urban Planning in the 1880s*

We already know a lot about the 1880s; it has attracted more attention than any other decade in existing literature on the Métro's prehistory. This is partly because sources for traditional architectural and engineering history—drawings, pamphlets and correspondence—abound in the archive.<sup>69</sup> In spite of all this activity, however, the standard account of Métro history subsumes the entire 1880s under the stalemate between the local and national governments. This may work from the state's point of view, but not from the point of view of designers and users. While the authorities were caught in a slump, architects, engineers and contractors continued to privately create plans for submission to the authorities, and citizens began to form organized groups (which pushed for an elevated Métro, for example, or protested the Métro altogether). The decade opened with continuing optimism and imagination, a wide range of new visions and uses

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68 French libraries contain a wealth of different 19<sup>th</sup>-century sources that turn the railway into a driver of history. For example: (1) Famous popularizer of science and technology Louis Figuier led the way with his *Les merveilles de la science, ou Description populaire des inventions modernes*, vol. 1 (Paris: Jouvet et Cie, 1867); (2) Henry Fevre, *La Locomotive: Poésies* (Paris: Flammarion, 1883); (3) Louis Delmer, *Les chemins de fer: petite encyclopédie populaire illustrée* (Paris: Schleicher Frères, 1899). Delmer mentions Zola and Hugo as other Frenchmen who saw the railway as a force of history.

69 I can account for about 45 distinct plans for the Métro produced between 1845 and 1897. 20 of these 45 were produced in the 1880s, a far more productive decade for imagining the Métro than either the 1870s or 1890s. And of these 20 plans produced in the 1880s, 11 were for exclusively elevated systems, and at least 3 of the remaining 9 included at least some elevated component in a mixed system. These 45 plans are either extant in the archives or cited in secondary literature. In 1902, engineer Adolphe Schoeller claimed that there were close to 100 plans in total. See: *Les chemins de fer: les tramways, les chemins de fer électriques* (Paris: Librairie J.B. Baillière et Fils, 1902), p. 318.

for the Métro, but as the decade wore on the question of the Métro and transportation in general became more and more politicized. Parisians of many stripes grew impatient and tried to intervene in the process of Métro planning.

Following the bust of 1878-1881, there was a slump in tramway development from 1882-1887. A new law on local interest railways (law of June 11, 1880), gave the municipal and departmental authorities more control over railways deemed “of local interest,” in hopes of resuscitating the boom.<sup>70</sup> But the bubble burst soon after the law was passed and Paris saw no new tramways before 1887. The law's actual effect was to add fuel to the fire burning between the municipal and national governments concerning the Métro. The law stated that any rail network remaining within the boundaries of a single *commune* would be under municipal jurisdiction, while a network spanning multiple communes would be departmentally controlled.<sup>71</sup> In Paris, this influenced the routing of rails (the municipal council, for instance, imagined a Métro network that did not leave the city limits), and put the departmental authority in the middle of the ongoing conflict between the municipal and national governments. The municipal council struggled to keep its Métro plans out of the suburbs, in spite of their constant demand for more transport to and from the city. Meanwhile the national government courted the departmental government by arguing their plan would meet suburban transportation needs better than any purely municipal plan.

There were also attempts to break the stalemate. In 1882, the Prefect of the Seine

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70 For the full text of the law, see: A. Doniol, *La réglementation des chemins de fer d'intérêt local des tramways et des automobiles* (Paris: Librairie polytechnique Ch. Béranger, 1900), p. 241.

71 (1) Pierre Lanthier, “The Relationship between State and Private Electric Industry, France 1880-1920” in Norbert Horn and Jürgen Kocka, eds. *Law and the Formation of the Big Enterprises in the 19<sup>th</sup> and Early 20<sup>th</sup> Centuries* (Göttingen: Vandenhoeck and Ruprecht, 1979), pp.590-603; (2) Pascal Desabres, “The Parisian Subway, 1880-1900: A Local or National Interest Line? On the Concept of Globalization” *Business and Economic History On-Line* 1 (2003).

called an *enquête d'utilité publique* (investigation of public utility), a tightly scripted process for collecting public opinion about prospective public works.<sup>72</sup> Registers were opened for one month (February 15 to March 15) at the *mairie* of each district in Paris and each suburban commune, where citizens were invited to present suggestions and criticisms to a specially appointed commission of experts, landowners and local officials. Plans for a network with the typical cross-inscribed-in-a-circle shape were drawn up, with rails in the center underground and rails in the periphery on viaducts, and trains powered by either steam or compressed air. Responses were very favorable overall. The one registered criticism came from the CGO's President, concerned that the Métro would take his revenue, and thus violate his monopoly.<sup>73</sup> The CGO's notorious “monopoly” not only allowed it to dominate the tramway companies, but also inspired periodic attempts like this to block the Métro's progress. The bloated, Haussmannian structure was founded on horse-drawn omnibuses and tramways, hence its financial interest in preventing competition from mechanically-powered alternatives. The CGO contributed to the

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72 For a contemporary account, see *The Nineteenth Century* (London: Henry S. King & Co., 1892), p. 139-140: “Every railway and tramway that is constructed in France has to obtain its sanction from Paris. In cases of trifling importance that sanction may be given by the Council of State, but in all ordinary cases a *loi*—or, as we should say, an Act of Parliament—is required. But, before that sanction is finally given, no less than three separate local inquiries must have been held. The first, known as the *enquête d'utilité publique*, is of a general character, and is held in the chief town or towns, as the case may be, of the district concerned, by a commission 'composed of members selected by the prefect from amongst the landowners, merchants, and representatives of the local authorities.' Notice of the commission's time and place of meeting is widely published. A summary sketch of the proposed undertaking, with an estimate of expense, and a schedule of the rates and fares proposed to be charged, is made accessible beforehand to every citizen. Chambers of commerce, and even individual private persons, are invited to criticise both verbally and in writing.”

73 *Chemins de Fer Métropolitain de Paris. Avant-Projet. Résultats de l'Enquête d'Utilité Publique. Rapport de l'Inspecteur Général* (J. Frémaux), 12 Sept., 1883. AN F 14 9154. Apart from these three comments, the results of the *enquête* were unequivocal: Parisians were ready for the Métro. Other public works subjected to an *enquête*, like the sanitation measures of the 1880s and 1890s under Prefect Poubelle, did not fare as well before the court of public opinion. In spite of how much such opinion-collecting measures could filter or distort public opinion, they provide the only archival evidence available to corroborate the claims made throughout the late 19<sup>th</sup> century by journalists and engineers that the Parisian public was constantly talking about and/or demanding a metropolitan rail network. As usual, historians have very little direct archival access to public opinion; we have to tease it out of those few opinions that were published or conserved.

governmental stalemate as much as the local and national governments did. If historians of the Métro have been slow to realize this, nineteenth-century Parisians were not.<sup>74</sup>

Parisians were able to imagine the Métro long before they could realize a dream of this magnitude. Year after year, scattered across published and archival sources, one finds similar references to 'everyone' in Paris anticipating the Métro, while new plans piled up with little movement toward realizing them. If an organ of government created a project, either no investors would demand its concession, or another organ of government would veto it. If a group of investors created a project, an organ of government would veto it. Because of Haussmann's heavy hand, expropriation of land for public works was a sore subject. Many Parisians feared being evicted by a government buyout. If the buyout was deemed “for public utility” (*d'utilité publique*), both landlord and tenants would have to leave. Yves Guyot argued the municipal council's entire Métro policy was an attempt to protect landowning, taxpaying constituents (and their socially disgruntled tenants) from expropriation.<sup>75</sup>

Guyot also argued that politicians were hungry for sovereignty and displeased with the power of engineers, because the opinions of *Ponts et Chaussées* engineers were an integral part of all public works administration. Guyot also accused engineers of ignoring the legal and financial work required for Métro projects. These multiple lines of

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74 As we'll see in the next chapter in the case of Paul Vibert, 1896. It is also worth briefly giving some more depth to the conflict between the city and the state. A 21<sup>st</sup> century member of the *Ponts et Chaussées*, Alexandre Ossadzow, reminds us that there were more than two positions in this debate (at least at the very highest administrative levels). The *Conseil Général des Ponts et Chaussées*, the highest authority in France dealing with railways, had maintained since 1883 that the Métro presented special circumstances, neither local nor general, and so should be specially conceded to the city by the state. Meanwhile, the *Conseil d'Etat*, the highest juridical authority in France, held that the Métro was definitely a general interest project. See: “Les pères du métropolitain: l'intervention des ingénieurs,” *Métro-Cité*, p. 61.

75 Yves Guyot, *Trois ans aux Ministre des Travaux Publics: Expériences et Conclusions* (Paris: Léon Chailley, 1896), p. 86.

conflict—government vs. landowners, Parisians vs. national government, politicians vs. engineers, government vs. CGO—show that Parisians were actively imagining and debating the Métro in the 1880s, so much that no consensus could be reached. As a technical system, the Métro's design was not yet stable or closed; it remained interpretively flexible, all things to all Parisians.<sup>76</sup> As a cultural artifact, its meanings were still unfixed, and as a political entity (a public works project), its regulation was still unfinished.

So the “stalemate” was much more than a simple, two-sided legal-jurisdictional tug of war. Alain Cottereau recently argued that the local and national visions of the Métro hid deeper concerns about urbanization and city life, a point the standard account of Métro history overlooks. Cottereau shows that the design choices made from 1870 to 1900 did not reflect purely technical concerns: “Progressively, veritable choices of urbanization and of modes of life were unleashed, under cover of technical arguments.” In the 1880s, the municipal and national camps considered how the Métro might contribute to the city's development as a whole, making what Cottereau calls *choix d'urbanisation* (city planning choices) and *choix de mode de vie* (a choice of way of life). Their two conceptions of the Métro can thus be read for two different models of Paris.<sup>77</sup>

The first model, supported by the increasingly left-leaning municipal council, was based in extending the city center's dense urban fabric into the ten outer districts.<sup>78</sup>

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76 This vocabulary of “closure,” “stabilization” and “interpretive flexibility” as phases in technological development comes from Wiebe Bijker, *Of Bicycles, Bakelites and Bulbs: Toward a Theory of Sociotechnical Change* (MIT, 1995).

77 (1) Alain Cottereau, “Les batailles du métropolitain : la compagnie du chemin de fer du Nord et les choix d'urbanisation,” in *Métro-Cité: le Chemin de fer métropolitain à la conquête de Paris, 1871-1945* (Paris-Musées, 1997), pp. 75-84; (2) Alain Cottereau, “Les batailles pour la création du Métro: un choix de mode de vie, un succès historique pour la démocratie locale,” *Revue d'histoire du XIXe siècle* (March, 2005), p. 89-151.

78 The municipal council moved steadily to the Left over the course of the 1880s. Pascal Desabres

Cottureau calls this the “dominant” conception (meaning widely accepted by Parisians, not the view of the dominant classes). This conception was more traditionally Parisian, envisioning a city with dense population, mixed use of space (no zoning), and people living near work (within walking distance). The second model, supported by the national government, followed Haussmann in wanting to thin out the city center and extend the city's residential space into the periphery and suburbs, to increase zoning and push the working classes out of the center and farther from their places of work.<sup>79</sup>

The first model envisioned renovating the existing city as living space for its inhabitants, while the second model envisioned draining it of its inhabitants. The first was more left wing (municipal socialism), the second more center-right (national liberalism); the first concentrated more on public services, the second on private investment. The first saw the Métro as “public works,” meaning that it should be used and enjoyed by the public, while for the second “public works” meant appropriate to the needs of the nation-state and therefore in the public interest. The first suggested that infrastructure should serve existing social practice, while the second suggested that infrastructure should steer practice. The national option was state-centered and technocratic, while the local option domesticated the Métro as an instrument of social mobility and equality. As in the Commune, this conflict pitted everyday Parisians and the local government against the Haussmannizing agenda of the national government.

These two models also recruited the Métro to help solve another problem of the

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connects this nicely with the administrative stalemate concerning the Métro, in “The Parisian Subway, 1880-1900: A Local or a National Interest Line? On the Concept of Globalization.” *Business and Economic History On-Line* 1 (2003), p. 3.

<sup>79</sup> This urban vision was another borrowing from London. Janet Polasky, “Transplanting and Rooting Workers in London and Brussels: A Comparative History” *The Journal of Modern History* 73 (Sept, 2001), 528-560.

day, the crisis of housing.<sup>80</sup> The price of rents, the quality of working class housing, development of the peripheral districts—many questions about the politics, finance and social-cultural consequences of infrastructural development that first opened during the Second Empire flared up again in the early 1880s.<sup>81</sup> J. A. Théry, an engineer and partisan of an elevated Métro, wrote of

an unrest and an inexpressible anxiety in the Parisian population, due to the expense of rents, to the hygienic conditions of the city, to the encumbering and uncleanness of the center, to the insufficiency of, and the difficulty of moving between, livable spaces located in the extremities of Paris....

For Théry, this “unrest” made metropolitan railways “the most urgent among many other creations being studied.”<sup>82</sup> Several factors brought the price of rents, among other urban issues, to the fore. Rents had already been contentious under the Second Empire and the Commune, but now exiled communards were allowed to return to Paris (1879), arriving just in time to witness rents inflated by the development boom around the 1878 Exposition. A revived Left built new socialist and trade-union groups, buoyed by the free press law of 1881, and talk of rent reform and rent strikes flared up.<sup>83</sup>

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80 For more on the housing crisis see Chapter 4.

81 For a brief political economy of the situation behind the crisis of rents, see Othenin d'Haussonville, *La vie et les salaires à Paris* (Paris: A. Quantin, 1883). In this pamphlet, excerpted from the April 15<sup>th</sup> edition of the *Revue des Deux Mondes*, he wrote: “Since two years ago [when] I noted (not the first, assuredly) the deplorable conditions in which a great part of the Parisian population is lodged, the question of rents has never stopped figuring into the preoccupations of many souls,” p. 16.

82 J.A. Théry. *Les Chemins Métropolitains de Paris. La vérité sur l'exécution et la dépense des Chemins Métropolitains Souterrains* (Paris: Lambert, 1882). “Un malaise et une anxiété inexprimable de la population parisienne, dus à la cherté des loyers, aux conditions hygiéniques de la ville, à l'encombrement et à l'insalubrité du centre, à l'insuffisance et aux difficultés de communiquer vers les parties habitables situées aux extrémités de Paris, fait diriger un extrême attention sur les Chemins Métropolitains la plus urgente parmi plusieurs autres créations à l'étude.”

83 For a good general account of the boom in left-wing civil activity in late-nineteenth-century France, see Kenneth Tucker, *French Revolutionary Syndicalism and the Public Sphere* (Cambridge, 1996) and Ann-Louise Shapiro, *Housing the Poor of Paris 1850-1902* (Wisconsin, 1985), pp. 112-13. Shapiro analyzed police records to show that the authorities were keeping an eye on all of this political activity, noting that between 1881 and 1883, the rent strike was a common topic of discussion. As she put it, “heightened political activity among urban workers during 1879-83 was sufficiently disturbing to authorities to draw public attention to housing problems.” Sérafon, one of the most widely published voices of the era in this field, would write in 1885: “...the high price of rents is less redoubtable in

Amidst the housing crisis, Parisians dreamed that the Métro might help everyday Parisians find better housing. The Métro was also being recruited into the Third Republic's booming debate on social reform and hygiene. One engineer explicitly suggested that the Métro might buy off socialists and other radicals: "Concede the workers a railway!"<sup>84</sup> More often planners suggested that it could help steer the shape and direction of the city's growth. Increased mobility would increase the population's access to housing:

The centralization of commerce and the decentralization of inhabitants depend on the good or bad disposition of rapid lines [of transport]. The more centers of manufacturing are brought together, the easier commerce is; the more the population disperses itself, the more it should find lodgings of better price, clean, sometimes with gardens and always with promenades, in the neighborhoods called "eccentric," and even in the greater suburbs.<sup>85</sup>

In this passage, Heuzé evoked the national government's vision of an expanded, globalized city, well-connected with other centers of population, commerce and industry in the department of the Seine and beyond. This vision also incorporated long-standing bourgeois fantasies of Paris cleansed of hygienic and revolutionary dangers, with a neutralized working-class removed from the habitual sites of barricade building and transplanted into brand new homes in a ring of suburban garden villages in the periphery and suburbs. The city's core could be further developed as a center of commerce, finance, administration, public buildings and monuments through which capital, labor, power and information would smoothly flow. These flows would be animated by the Métro, enabling workers to live farther from their jobs, in the cleaner, greener spaces of the

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London than in Paris, where it is becoming a veritable calamity for the less privileged class." *Chemins de Fer Métropolitains et les moyens de transport en commun à Londres, New-York, Berlin, Vienne et Paris* (Paris: Baudry, 1885), p. 79.

84 Anonymous, *Deux Métropolitains* (Florence: Imprimerie Coopérative, 1882), p. 4. BA 206329(8)

85 Louiz Heuzé (1878), p. 1-2.



suburbs. This became one of the most repeated arguments of the 1880s.<sup>86</sup>

These “city planning choices” thus asked the Métro to help thin out the city center, increase zoning, and increase working-class access to quality housing. The Métro was recruited for various social and political projects, which sucked it into the political troubles of the early Third Republic: challenges to republican power from both the Right and the Left, increasingly organized, mass action on the part of everyday Parisians, and a Parisian public constantly crying out against conditions of urban crisis, inadequate housing and inadequate means of transportation. The Métro became a vehicle for urban development, an object of technopolitical struggle among politicians, architects, engineers, activists and citizens. Organized civil responses to the Métro began to emerge, a citizen reaction to the legislative stalemate of these years. Parisians became impatient with the authorities, dreams of the Métro diversified, and it became more and more difficult to imagine a Métro that could meet the diverse needs of several million people. Those who wanted their vision of the Métro realized would have to organize and fight for it. Dreams of the Métro were thus pulled away from the state and toward civil society.

1884 saw the founding of the Society for the Friends of Parisian Monuments, a historical preservation society concerned that the Métro would damage Paris's

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86 The departmental administration of the Seine and the General Council of the *Ponts et Chaussées* hoped in 1883 that “the Chambers could rule as soon as possible on the declaration of public utility of works whose execution will singularly simplify the solution to the problem of low-cost housing, in procuring for the working population rapid and economic transport facilities from the center of the city to its periphery or to its suburbs” (*que les Chambres puissent prononcer les plus tôt possible la déclaration d'utilité publique d'un travail dont l'exécution simplifierait singulièrement la solution du problème des logements à bon marché, en procurant à la population ouvrière des facilités de transport rapide et économique du centre de la ville à sa périphérie ou à sa banlieue*). See: *Chemins de Fer Métropolitain de Paris. Avant-Projet. Résultats de l'Enquête d'Utilité Publique. Rapport de l'Inspecteur Général* (J. Frémaux), 12 Sept., 1883, p. 23. The Milinaire Brothers repeated the mantra in 1885. With the Métro, “the working class being able to transport itself rapidly and cheaply could thus live in better housing conditions in the suburbs” (*La classe ouvrière pouvant se transporter rapidement et à bon marché pourrait aussi se loger dans de meilleures conditions de loyer dans la Banlieue*) 1885 Brochure, p. 14. The Milinaire brothers' plans for the Métro from 1883-6, like Frémaux's report, are conserved in the Archives Nationales, F 14 9154.

architectural patrimony.<sup>87</sup> Specifically, the Society was worried about structural damage from rumbling trains and construction, the possibility of tunnels collapsing, and the possibility of tracks disrupting monuments and streetscapes. The group waged an opinion campaign against both underground and elevated plans.

Nothing more vividly or succinctly illustrates the Society's views than an 1886 drawing by Albert Robida, science-fiction author, then editor/illustrator in chief of *La Caricature*. On June 19, 1886, Robida put his own drawing of “The Embellishment of Paris by the Métro” on the front cover of the magazine (figure 6).<sup>88</sup> Following a classic Parisian convention, he represented Paris as a woman. For Robida, she was a queen, wearing a five-point crown whose points morphed into the historical windmills on the hilltops of Paris. Railways enter and exit her body, smoke pouring from her mouth, ear and nose. The drawing evokes a specific moral outrage: a lady—a *queen*—has been violated. She is tangled in an inscrutable network of railways going over the tops of certain famous monuments (the Tour St. Jacques and the Vendôme Column), and cutting through the core of others (the Hôtel de Ville). The Panthéon has been as profaned as lady Paris herself, turned into a transfer station pierced by intersecting rails and loudly advertising its *buffet* (cafeteria). The message was clear: the Métro would violate the *grande dame* of Paris, in all her architectural splendor. Here was another turn for the

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87 Evenson, 103-4; Evenson gives the founding date as 1885, which was the first year the Society published a Bulletin. The year before Charles Normand published a manifesto: *Société des Amis des Monuments Parisiens, constituée dans le but de veiller sur les monuments d'art et la physionomie monumentale de Paris (architecture, peinture, sculpture, curiosités et souvenirs historiques)*. But Elisée Reclus addressed a letter to Normand September 24, 1879 calling him “secrétaire de la Société des Amis des Monuments Parisiens,” so the Society must have been in the works much longer. See Reclus's *Correspondance* (Paris : Schleicher Frères : A. Costes, 1911-1925), vol. 2, p. 216.

88 Elizabeth Emery, “Protecting the Past: Albert Robida and the Vieux Paris exhibit at the 1900 World's Fair” *Journal of European Studies* 35/1 (2005), pp. 65-85. See pp. 74-5. Emery reports that Robida's drawing had a marked impact on the members of the Society for the Friends of Parisian Monuments.

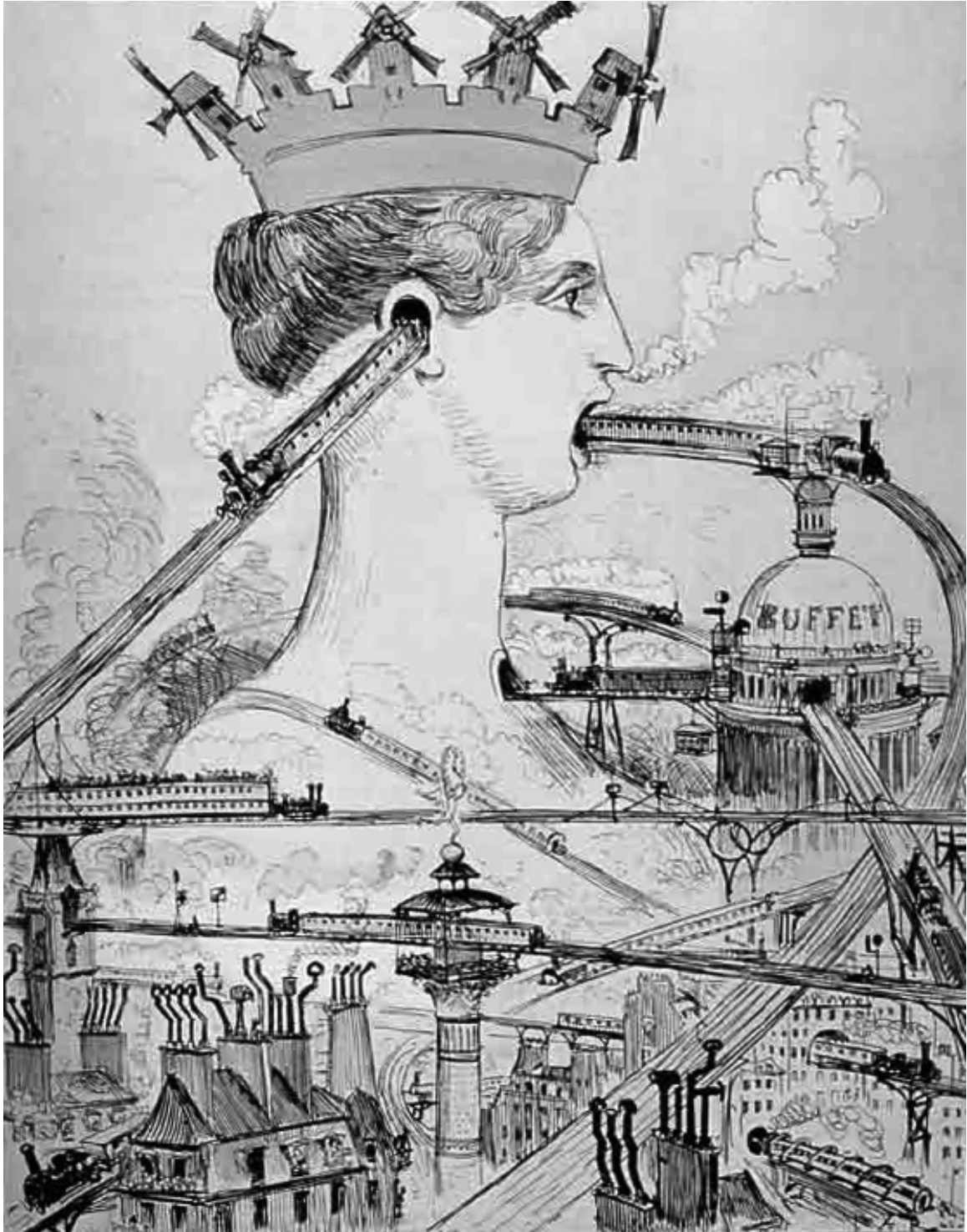


Figure 6: Albert Robida, *L'Embellissement de Paris par le métropolitain* (1886)

nightmarish, expressing the conservative's or traditionalist's fear of and fascination with modernity.

Along with its surreal, cartoon ugliness, there is biting irony behind the drawing's

title. The word *embellissement* translates as both “embellishment” and “beautification” (em-belle-ish-ment). It was one of Haussmann's buzzwords, and a common principle of city planning: public works should *embellish* the city.<sup>89</sup> Robida mocked the idea, so popular among engineers in the 1880s, that an elevated Métro could actually help beautify or embellish the city, adding meaningful architectural detail.<sup>90</sup> The irony plays the image off of its title: the title speaks of beautification, but the image is not beautiful.

The Friends of the Paris Monuments and Robida represented a traditionalist-conservative wariness of the Métro. Indeed, wealthy, educated traditionalists, aristocrats and academics were the only groups in Paris during the 1880s where one might find opinions that were not merely skeptical of underground or elevated plans for the Métro, but skeptical of the Métro *in general*. This segment of Parisians simply could not comfortably accept the novel idea of “tracks in the city.” Ultimately, theirs was a losing battle; with so many different dreams invested in the project, the Métro was already a foregone conclusion.<sup>91</sup>

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89 Nicholas Papayanis stresses that the word connotes “both adornment and infrastructural amenities,” see *Planning Paris Before Haussmann*, p. 16. This suggests another dimension to Robida’s critique, a sense that the Métro is not progressive, and will not add to the city’s technical acumen any more than to its cityscape.

90 This case was made, for example, in a Letter from Eugène Chardon, engineer and member of the Society for the Friends of Parisian Monuments, to its President, Charles Garnier, Apr. 30, 1887. BN 8-V Piece-6342. In this letter, Chardon protests that while it is often taken for granted that members of the Society are opponents of the viaduct, he is a member, and not at all opposed to the viaduct, *provided* that “this routing allows us to conceive of this grand construction as an essentially artistic work” (*ce tracé permet de concevoir ce grand travail comme une oeuvre essentiellement artistique*). Under the right conditions, then, “the viaduct can be a veritable work of art” (*le viaduc peut être une véritable oeuvre d'art*). Chardon's main concern was the underground.

91 Norma Evenson collected the most sweeping statements to come out of this camp. As the realization of the system approached, in 1895, a municipal councilor pessimistically predicted that, “with our Métropolitain, all the life of the boulevards, the great arteries, will disappear. The merchants, the manufacturers, the workers coming out of their offices and workshops will have but one objective: to run to catch the train.... There won't be any more intelligent beings. There will be only animals. In sum, with the face of Paris destroyed, the stores ruined, the small shopkeepers closing their boutiques, intellectual life no longer existing,...there will no longer be a Paris.” Possibly the most sweeping statement of opposition to the proposed transport system came in 1889 from a member of the National Assembly, Madier de Montjau, who insisted, “The Métro is anti-national, anti-municipal, anti-patriotic,

Another organized attempt to steer Métro development came from the Society of Civil Engineers and their publication *Le Génie Civil*. As of August 3, 1883, the society campaigned for an elevated Métro, joined by professionals like civil engineer Jules Garnier, architect Louis Heuzé and contractors the Milinaire Brothers.<sup>92</sup> In their March 2nd session that year, society member Revin identified two principle benefits of elevated trains. First, they were cheaper and could bypass landlords and expropriations. Because viaducts could only run on wide streets, space already owned by the city, no new expropriation of terrain would be necessary. Second, the elevated option would “damage the aspect and the circulation of public ways as little as possible,” a mantra that was to be repeated again and again by partisans of both elevated and underground trains.<sup>93</sup> Elevated trains also offered less restriction on traction than underground trains, thus easing the ongoing struggle with mechanical traction, but they brought city planning choices of their own.<sup>94</sup>

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and detrimental to the glory of Paris.” ” (*Paris, A Century of Change*, p. 93).

92 They voted to formally get behind an elevated Métro on August 3, 1883. Millinaire Brothers (1885), cited above, p. 1-2.

93 Société des Ingénieurs Civils de France, *Mémoires et compte-rendu des travaux*, vol. 1, first semester (Paris, 1883), pp. 265-269. The Society made frequent comparative glances at other major cities. They discussed Paul Haag's elevated plan, based on the urban railways of Berlin, from March to June, 1883 (Ibid., pp. 313-330, 614-617 and 635-6, and 775-781, respectively). In July, they turned to discussion of New York's elevated railway and San Francisco's cable cars (Ibid., vol. 2, second semester, July 6, pp. 9-27 and July 20, 33-42). The final decision was made Aug. 3, 1883. See *ibid.*, vol. 2, pp. 166-196. This decision has since been cited by many, including Jules Garnier (1884), the Milinaire Brothers (1885), Norma Evenson (1978) and David Pike (2005).

94 Systems of traction, for both tramways and the Métro, continued to be an important subject in the 1880s. The decade opened with J. Mareschal's Métro plan, in which underground trains would slide down sloping tracks by the power of gravity alone, to be lifted up again at the next station by elevators (see Evenson, p. 104). 1881 witnessed the International Electrical Exposition in Paris, at which Berlin's Siemens and Halske was allowed to operate a short section of electric-powered tramway from Concorde to the Champs-Élysées. This was still cutting edge technology fit for an exposition, only two years since the first time Siemens had publicly shown how electricity could produce locomotion, but it demonstrated quite clearly how feasible electric traction was. See: (1) “Souvenirs de l'exposition d'électricité: II La transmission de la Force à distance (dynamos, tramways)” *Le Magasin Pittoresque* 50 (1882), pp. 59-62; and (2) Dossier of materials on the electric tram at the 1881 Electric Expo, AN F 14 14999. That same year, engineer Chrétien penned a plan for an electrically-powered, elevated Métro (see Evenson, pp. 95-97). The Ministry of Public Works continued to receive plans from engineers in

Unlike the underground plans of the 1870s, the elevated plans of the 1880s put the Métro back into the street, threatening to disrupt flows of pedestrian and vehicle traffic. Familiar social, cultural and aesthetic problems resurfaced, too, as Parisians debated whether elevated tracks could become pieces of Haussmannized street furniture. This meant two things. First, viaducts would have to be stylized and sculpted to match the architectural forms of Haussmannization, combining wrought iron with concrete, brick and stone. Second, it meant that viaducts would have to be worked into the social scripts that governed the street (figure 7), for example, Chardon's 1887 plan to turning viaducts into shopping arcades.<sup>95</sup> Engineers dreamed of integrating an elevated Métro into the physical space of the city, as well as integrating it into everyday life, by linking it with scripted parts of the daily routine like going to work, going home, taking a stroll, or going shopping. As the Milinaire Brothers put it in 1885, the spaces under viaducts could have many uses, "such as kiosks for the sale of newspapers, drink-halls, police posts, a place for employees to stow their tools, advertising columns, water closets, etc." They would also provide refuge for pedestrians against traffic and the weather.<sup>96</sup> Engineer's drawings can help us visualize these fantasies of social life under the viaduct (figures 8 and 9).

Elevated tracks also posed special problems for built space. There were two popular ways of routing elevated tracks in the 1880s: first was to route viaducts over

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their Bureau des Inventions (Inventions Office) for new systems of traction, including Montclar's gas-powered locomotive of 1882 and Vooght's funicular (cable) system of 1883. By far the most unusual plan received by the Inventions Office was Duplessis's 1885 system for powering trains by water wheel (see Letter from the Bureau des Inventions to Duplessis, Feb, 22, 1885, AN F 14 9189). This continuing interest in traction shows that the tension between locomotives and the spaces of the city, both tunnels and streets, was far from solved in the 1880s. Engineers were busy at work imagining ways of making mechanically-powered vehicles fit better in the fabric of the city.

95 Eugène Chardon. Letter to M. Charles Garnier, Member of the Institute, and President of the Société des Amis des Monuments Parisiens, Apr. 30, 1887. BN 8-V Piece-6342

96 Milinaire Brothers, cited above, p. 1: "tels que kiosques, pou la vente des journaux, trinkhals, postes de police, remise pour les outils de cantonniers, colonnes d'affichage, water-closets, etc."

existing major arteries of traffic (boulevards, avenues, the Seine), second was to cut new



Figure 7: Jules Garnier's Haussmannized Viaduct, 1884

arteries through the city specially for the tracks, as Haussmann had done for his boulevards. For plans following existing arteries, slender wrought-iron viaducts were usually recommended, while cutting new paths through the city was only necessary for heavier installations like tracks on masonry arcades. In 1883 engineers at the Prefecture of the Seine rejected the elevated plans of Heuzé, Théry and Haag, on grounds that they “caused an uproar” because they would require “making major cuts through houses in the



interior of Paris.”<sup>97</sup> As Guyot suggested, the authorities hoped for a solution to the Métro question which would upset the center city and property owners less.

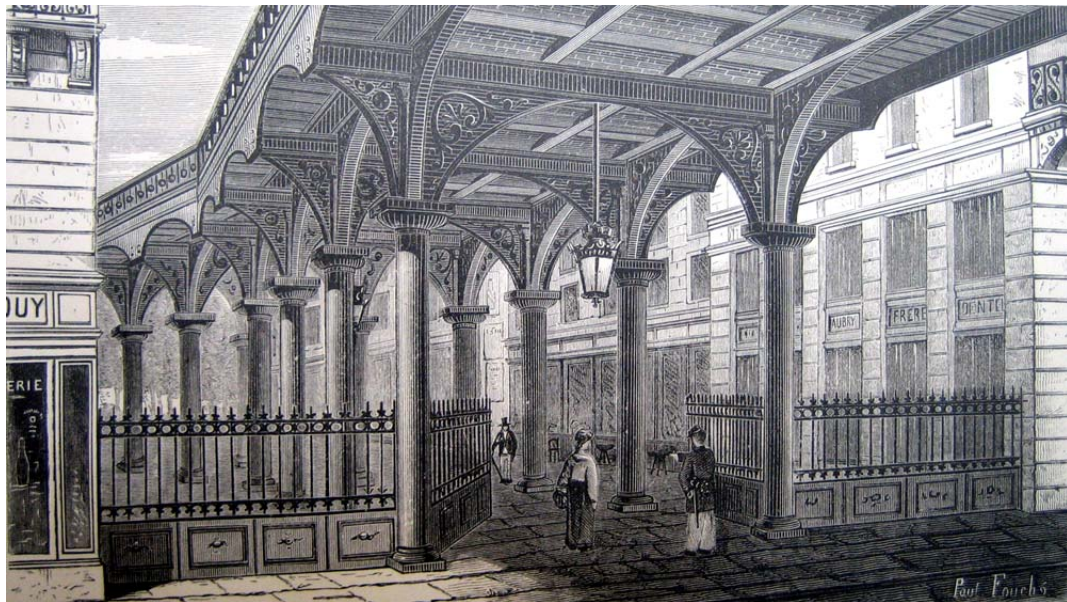


Figure 8: from Louis Heuzé's 1878 Pamphlet

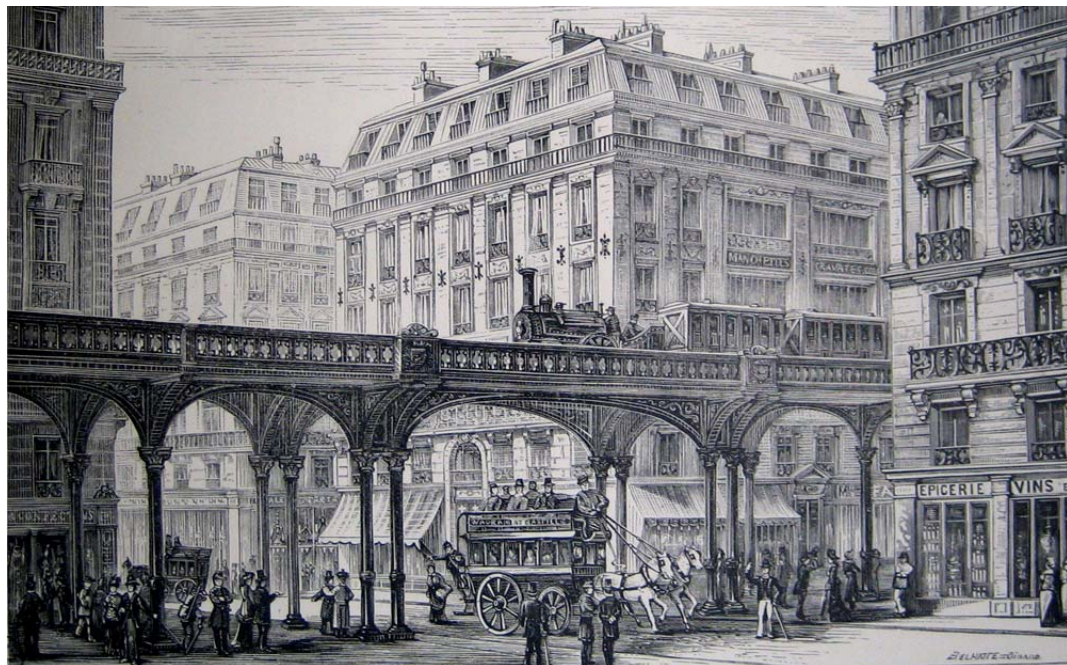


Figure 9: from Louis Heuzé's 1878 Pamphlet

There was also the question of how much viaducts (and/or their construction) might interrupt life on the surface of the city. Elevated rails would pass the windows of

<sup>97</sup> Frémaux (1883), cited above, p. 25.



houses, making noise, perhaps depressing property values or violating the privacy of the indoor world. Engineers often designed viaducts slender enough to fit down the middle of the boulevards without touching the famous chestnut trees planted along their sides, leaving the planted promenade—the nexus of Paris street life—unchanged.<sup>98</sup> If viaducts were the right height (about 3-6 meters), the lines of trees might even block the view of passengers into the houses they rode past, at least in the leafy season. Engineers proved adept in the 1880s at such conceptual turnarounds. For another example, to the criticism that the viaducts would prevent light from reaching the street below, making it somber, an engineer might respond that it was not somber, but shady.

In 1887 the Society of Civil Engineers organized a new association called the *Ligue parisienne du métropolitain aérien* (Parisian league for the elevated Metropolitan), already the swan-song of the campaign for a fully-elevated Métro, only three years after it first coalesced. Meanwhile the authorities were looking to mixed systems combining underground and elevated tracks (as in the 1882 *enquête*, or Minister of Public Works Bairet's plan of 1886). The Society of Civil Engineers failed to understand just how deep Parisian attachment to the theater of street life built by Haussmann's crews could be, and thus how effective the Friends of the Paris Monuments could be in their opinion campaign. Many Parisians were uneasy throughout the 1870s and 1880s about their city being spoiled by industrial infrastructures, even if they thought the city needed new railways for practical reasons.

Moreover, for those in power, the call to 'save' Paris always meant a call to save *Haussmann's* Paris, the rebuilt historical core of the city and the fancied-up bourgeois districts to its west. Different rules held in the east and in the west, in the center and in

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98 Examples include Chrétien (1882), Garnier (1884), Milinaire Bros. (1885) and Haag (1887).

the periphery, for the Left and Right Banks, and for elevated and underground railways. These cognitive maps of the city made mixed systems the only likely choice for a workable Métro. By 1889, even the Society of Civil Engineers was sponsoring Le Chatelier's mixed system plan for the Métro. The map of Le Chatelier's plan shows this uneven geography, this divided city, quite clearly (figure 10).<sup>99</sup>

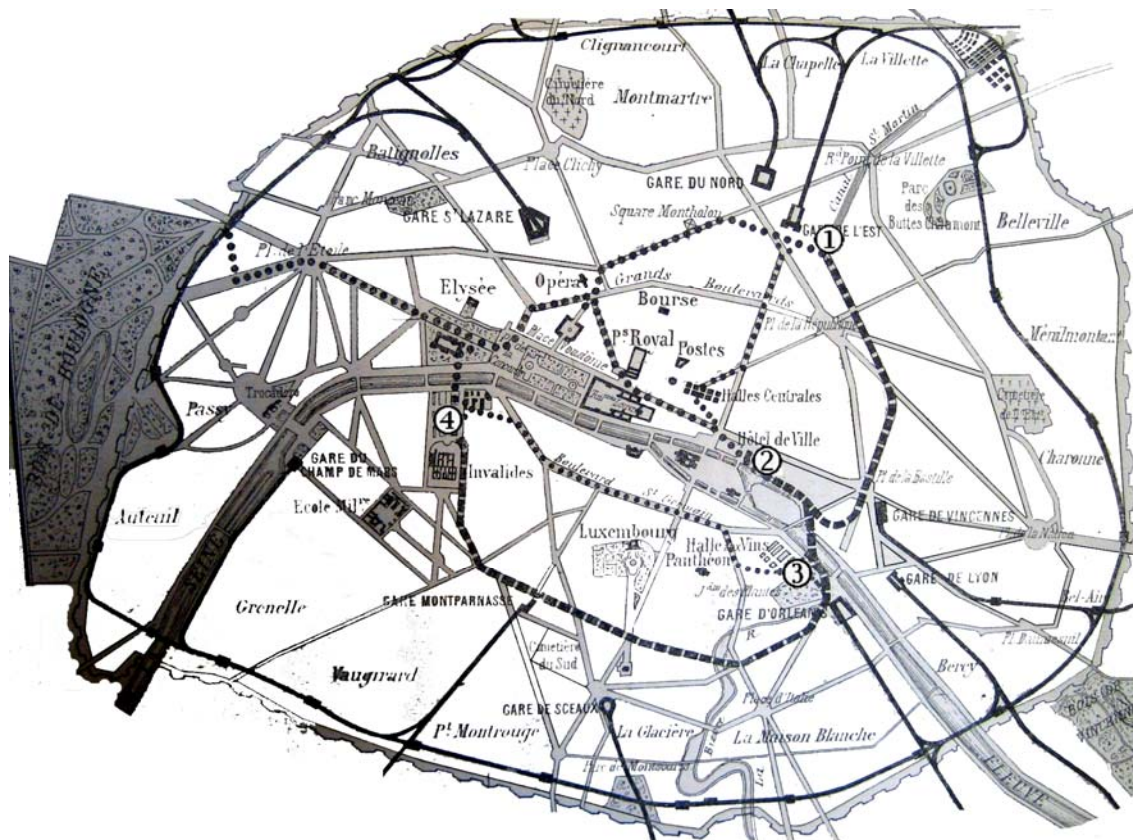


Figure 10: Le Chatelier's 1889 Métro Plan: (1) *Gare de l'Est* (East Train Station); (2) Village of St. Paul; (3) *Gare d'Orléans* (Orléans Train Station); (4) *Esplanade des Invalides* (plaza in front of Napoleon's tomb).

To make the map more legible, I have added four numerals marking the places where the projected railway switches from underground to viaduct. If you connect the numerals in order, two clear lines are produced which divide the city into sections. The

<sup>99</sup> *Projet de Chemin de Fer Métropolitain pour Paris dressé par M. le Chatelier, Ingénieur des Ponts et Chaussées. Notice par A. Flamant, Ingénieur en Chef des Ponts et Chaussées* (Paris, Publications du Journal le Génie Civil, Revue officielle technique des documents relatifs à l'Exposition universelle de 1889, 1889). BA

first line running from point 1 (the *Gare de l'Est*) to point 2 (*Pont Louis Phillipe*, just behind the Hôtel de Ville) forms the limit of eastern Paris on the right bank, a sector in which only elevated tracks were projected (shown as rectangular-dotted lines on the map). The little-Haussmannized, working-class north-east sector of Paris would thus have its street life upset by viaducts. The second line repeats the pattern on the Left Bank, running from point 3 (the *Gare d'Orléans*) to point 4 (the *Esplanade des Invalides*). This line divides the interior from the exterior districts on the Left Bank, establishing an analogous line of inequality between center and periphery, here running east-west rather than north-south. Again, elevated tracks were projected only outside this line. On the other side of both lines, throughout the city's center and west, Le Chatelier recommended underground tracks (shown as round-dotted lines on the map) which would bypass the existing city, not to disturb its architecture or topography. In sum, the burdens of infrastructure—its complicated construction, which promised to upset street life quite a bit, its noise, dirt, and rumble, not to mention its sheer bulk—were not evenly distributed by Le Chatelier's plan, nor were its benefits. The map shows that the north and east periphery already had access to the *petite ceinture*; as they were already served by rails, Le Chatelier didn't plan any Métro access from *Batignolles* to *Bercy* (districts 17-20 and 12), the long arc of Paris's working-class north-east.

Le Chatelier's plan is a convenient historical book-end for the 1880s, reflecting a compromise among architects, engineers and administrators slowly emerging out of the broad range of views circulating since the 1870s. Collectively accepted and recognizable designs were starting to emerge out of the boom in diverse projects and plans. Rather than seek a homogeneous system with uniform infrastructure, the discussion leading out

of the 1880s and into the 1890s tended to be more and more centered around mixed systems, which is how the actual Métro ended up. Mixed systems could more gently stitch large constructions like viaducts and tunnels into the existing fabric of the city. They also had the advantage of being more-or-less modular, hence many engineers recommended the Métro be divided into sections which could be built one at a time, and continually adapted to circumstances—which, again, is how the Métro ended up. Le Chatelier's map above shows this modularity: though it does not contain a line of rails on the exterior boulevards of the Right Bank, this had been a popular place to imagine rails since the 1870s, and it would not disturb the logic of his system in the least if it were added.

The 1889 Universal Exposition and revolutionary centennial included a Conference on the Métro.<sup>100</sup> Le Chatelier summed up the current situation in his address:

This diversity in the conception and the considerable differences which result in the proposed modes of realization have in no small way contributed to obscuring the ideas of the great mass of the public about the significance of the word Metropolitan, and in so doing, has slowed its execution. The powers that be, themselves, did not escape hesitation, because there was uncertainty, even conflict over the attribution of legal title.

Whether or not the Metropolitan is of general interest is a formality without importance for the Parisian. What the population wants is that we finish with this question...<sup>101</sup>

Administrative stalemate, slowed development, an anxious public clamoring for more

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100 This was the only Universal Exposition in Paris from 1855 to 1900 not preceded by a boom in development of transportation infrastructure. Only three tramway lines went in in the department of the Seine between 1887 and 1889 in preparation for the Exposition, two of which were in the suburbs, one in Paris. Source: Tramway Stats 1894. Archives Nationales, F 14 8588.

101 *La Question du Métropolitain. Conférence à l'École des Hautes Etudes Commerciales* (extrait de la Revue Scientifique). (Paris: Administration des Deux Revues, 1889), p. 9: "Cette diversité dans la conception et les différences considérables qui en résultent dans les modes proposés pour la réalisation n'ont pas peu contribué à obscurir les idées de la grande masse du public sur la signification du mot Métropolitain, et par cela même, à retarder l'exécution. Les pouvoirs publics, eux aussi, n'ont pas échappé à l'hésitation, car il y a eu incertitude, parfois conflit sur l'attribution du titre légal. / Que le Métropolitain soit ou non d'intérêt général, formalité sans importance pour le Parisien. Ce que veut la population, c'est qu'on en finisse avec cette question..." BA 206329(1bis)

means of transport— Le Chatelier trotted out all these fixtures of the Métro debate in the 1870s and '80s in order to move beyond them. This kind of forward motion demanded that Parisians turn from dreaming to planning, which could not happen without at least some weak consensus about the future Métro.

For Le Chatelier, 1889 was the moment. And he was right: discussion of the gross spatial forms of the Métro was more-or-less finished. The Métro, everyone in Paris foresaw, would have to upset street life in some way, whether during construction or during operation, whether rails were underground or elevated, no matter where in the city they went. And Haussmann's basic cross-inscribed-in-a-circle geography remained relatively solid, with underground rails for the center city and elevated rails for the periphery. By only imagining rails that followed existing streets, the expropriation issue was quashed. Haussmann's boulevards and avenues were the only spaces wide enough to accommodate rails, whether underground or elevated, without removing existing buildings. For now, with the architectural and topographical decisions largely made, there were three problems left to solve for the Métro in the 1890s: *traction*, *finance* and *jurisdiction*.

This same spirit of impatience guided the authorities as they worked to pull the tramways out of their now decade-long slump. In spite of the financial restructuring of the mid 1880s, with new companies taking over the tramway networks, there was still a lot of financial strain in 1889, not to mention financial confusion. As the Minister of Public Works put it in 1887, the financial rules laid down by the decree of March 20, 1882, specifying how the state could subsidize local interest railways, were often “lost

from view or poorly interpreted.”<sup>102</sup> This government mismanagement was combined with continuing problems in the tramway companies: missed deadlines, failure to honor contracts, and roadways crumbling from wear and tear. As the struggling tramway companies tried to trim the fat, they cut some of the meat from their operations as well. Numbers of trams a day and agents employed sagged. Passengers waited longer for trams as roadways were slowly rattled to bits. The companies steadily demanded to be bailed out by the authorities.<sup>103</sup>

In 1889 Minister of Public Works Yves Guyot tried to pull the tramways out of their slump by creating more government oversight in the form of a new “Tramway Control Service” (*Service du Contrôle des Tramways*) for the department of the Seine, which would make regular inspections. The service was composed of a team of engineers, two *Ponts et Chaussées* men to monitor general construction and operation of the tramways and one mining engineer from the *École des Mines* tasked specially with inspecting systems of mechanical traction.

The most urgent issue facing the inspectors was the rails themselves—how should they be set in the street, what materials should be used for paving, what damage did trams do to streets? New designs for rails, paving, and the whole street-rail interface continued throughout the 1870s and 1880s.<sup>104</sup> Even the most basic of urban light rail

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102 *La réglementation des chemins de fer tramways ...* (1900), from the text of the *Circulaire* from the Minister of Public Works to all departmental prefects, Sept. 26, 1887, pp. 257-8.

103 *Bulletin Municipal Officiel* (July 2, 1885), p. 1311. In the discussion of “Question de M. Guichard au sujet du retard apporté au pavage des rues de Flandre et d’Allemagne,” Guichard blamed the conflict between the city, the CGO, and the tramway companies over jurisdiction. In many ways, this conflict ran parallel to the State-Department-City conflict over the Métro.

104 *Ibid.* Another way that railways compromised the streets was the constant presence of horse manure. For more on rail design and paving, see: AN F 14 14999 - dossier of materials, 1878-85, relating to the case of M. Charles Delcourt, and his new design for tram tracks in cement. Also included is another rejected design, the “rail universel” de M. Poullain de la Motte. Instead of this shape ( |---\_|, *looking head on at the rail*), Motte's rails were a broad, open V-shape. The wheels would no longer lock into the

infrastructures—the rails—were still not fully stabilized or standardized by 1889. Rails and streets, having previously been wholly incompatible, were slowly worked together. This involved technical changes to both the rails (their shape, the nature of the 'lock' between wheels and tracks) and the street (new paving materials like cement and asphalt). In fact, the problem of integrating rails into the roadway was one of the principle historical forces driving the long, slow transition in Paris from cobblestones (*pavés*) to asphalt and cement paving. Whereas rails laid between cobblestones rattled the stones apart over time, compromising both rails and roads, asphalt and cement hugged the rails. These technical concerns at the new Tramway Control Service drove the search for a physical and technical answer to the question of how railways could be integrated into the fabric of the city.

By the end of the 1880s, the question of transportation had become heavily politicized. As Le Chatelier explained, Parisians were becoming more and more impatient with the authorities, who could not seem to transform the dream of the Métro into reality. The authorities knew this, as the examples of Le Chatelier and Guyot illustrate. For those responsible for planning the Métro that Parisians were so impatiently talking about, it was beginning to feel like the capital had been sleeping on the job. It was time to finish dreaming and wake up.

*The Métro and the Meaning of "Public Works," 1890-95*

As Hétier, Chief Engineer for the department of the Seine, put it in 1890, "We don't have to establish the utility, one could say the necessity, of constructing a

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track, but slide around in the groove, leaving more play. Indeed, the real engineering question in these discussions of rails and paving was: more rigidity or more flexibility? The perfect rail, like the perfect road surface, would balance the two.

metropolitan railway in Paris.” He said the same for the tramways: “For more than eight years now, we have recognized the urgent necessity of completing the network of tramways which serves Paris and its suburbs so insufficiently.”<sup>105</sup> There was a good deal of frustration about the state of slump and stalemate which had stalled the Métro question since the mid 1870s. In the following years, engineer Paul Villain would publish plans called “The Métro we can do” (1891) and “a Metropolitan that won't cost and won't trouble anything” (1892), while Guyot wrote that “the best metropolitan is that which will get done.”<sup>106</sup> Another Parisian noted in 1891 that “the philosophy of the Metropolitan is done.”<sup>107</sup> The perceived urgency of Paris's need for the Métro was stronger than ever.

To get things moving, a second *enquête d'utilité publique* on the Métro was opened from July 15 to August 16, 1890. Again, a map of the proposed network was published in *Le Temps* (figure 11).<sup>108</sup> This time the plan was proposed by two cooperating companies, the North Railway Company and Gustav Eiffel's *Compagnie des Etablissements Eiffel*, fresh off its successes at the 1889 Universal Exposition (namely the Eiffel tower). The plan was for the North Railway Company to shoot its tendrils deeper into the city, connecting the North Station with the St. Lazare Station, the East Station, and Les Halles by underground rail. This network would link up with Eiffel's new network for transfers at two stations: the Opéra and Les Halles. Eiffel's network consisted of a simple Right-Bank loop, following the quays of the Seine on the south and

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105 Conseil Général de la Seine. Session de 1890. Routes Nationales et Départementales. *Chemins de Fer Métropolitains. Tramways. Rapport de l'Ingénieur en Chef du Département* (Paris: Chaix, 1890). Quotes, p. 57 and 78, respectively. AN F 14 15000.

106 (1) Paul Villain, *Le Métro qu'on peut faire* (Paris: Grande Imprimerie, 1891) BA 206329(4); (2) P. Villain and E. Mauger. *Un Métropolitain qui ne coûte rien et ne trouble rien* (Paris: Grande Imprimerie, 1892) AN F 14 9154; (3) Guyot, 1896, p. 84.

107 Quoted in Max de Nansouty, *La question du réseau métropolitain de Paris et le projet de la Cie des Etablissements Eiffel* (Paris: Génie Civil, 1891), p. 4.

108 The announcement of the *enquête* came in *Le Temps*, July 18, 1890, p. 3, in the *fait divers*. The map was published in the illustrated supplement to the July 21, 1890 issue.





popularizer of science Max de Nansouty.<sup>109</sup> Nansouty wrote to keep the public informed about and engaged in the *enquête*, but he knew that the results would turn out more-or-less like in 1882, because “the utility of a metropolitan network in Paris is generally admitted.” For Nansouty, any Métro had to do four things: (1) entail no financial risk for the state, no “guarantee of interest” or “subsidy” for the contracted company, (2) connect all train stations with rails, (3) show a general concern for hygiene throughout construction and operation, and finally (4) use a mixed system, neither fully underground nor fully elevated, which he called *sollutioniste*. The label “sollutionist” awkwardly but memorably conveys the mood of urgency in the air, a will to get down to the technical nitty-gritty and design a realistic Métro likely to be approved by the public. The Métro problem had been poured over enough; now it needed to be *solved*.

Nansouty thought the plan submitted for the 1890 *enquête* met all these conditions. He was already a booster for Eiffel.<sup>110</sup> Nansouty knew the Métro would soon be pushed through to realization, not because of Eiffel's brilliant plan, but because it was *time*. At this moment, Parisians could not afford *not* to realize the Métro; Nansouty wrote, “The question of Paris's metropolitan railway seems called to enter into a period of realization very soon.” Nansouty told the story of the Métro's long debate, abandoned and rediscovered again and again “due to various struggles.” But the public's interest was

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109 Nansouty was associated with Louis Figuier's *Les Merveilles de la Science* series, a popular science library, and was also long-time editor of *Le Génie Civil*, France's premier journal of civil engineering. He was an opinion maker, a science booster, and a national liberal who confidently assumed the pose of a public educator in grand journalistic style. Nansouty was a regular contributor to *La Nature*, often writing about railways and other means of transport. He also published many books, including: *Actualités scientifiques* (1911), *Les trucs du théâtre, du cirque et de la foire* (1909), *L'année industrielle: découvertes scientifiques et inventions nouvelles en 1898* (1899).

110 Nansouty gave Eiffel's tower good reviews in 1889 and praised him again in 1891 with another essay on his Métro plan. See: *La Tour Eiffel de 300 mètres à l'Exposition universelle de 1889* (Paris: Tignol, 1889) and *Question du Réseau Métropolitain de Paris et le Projet de la Cie des Etablissements Eiffel* (Paris: Génie Civil, 1891).

unfailing, and the Métro was “assured of public favor.” As public demand for mobility increased, the tramways and omnibuses grew less and less sufficient to meet the public's “...aspirations to progress and the need, ever more pressing, of movement and activity....”

Nansouty offered a new reason why Paris needed a comprehensive urban railway:

This mode of mass transit [the omnibus], which has rendered and still renders real services to circulation, regardless of its numerous inconveniences, is destined to become the tributary of a more intense and more active metropolitan circulation. Movement leads to movement; the creation of a metropolitan network will not diminish circulation by omnibus, just as the tramways and the steam-boats didn't diminish activity in the older means of transport. Is it necessary to recall, in the same order of ideas, that circulation on the national roads and the canals has not stopped developing since the creation of the railroad? A new organ must also be created; they are new forces that we foresee putting into play, without any diminution, without even attenuation of those which exist and which cannot be called but to develop themselves further.

This was not a vision of the Métro calculated to relieve existing flows of traffic, so common in the 1870s and 1880s. Nansouty dreamed the Métro would create activity and movement, producing more and faster flows of traffic. He dreamed of harnessing the Métro to the snowballing rhythm of development and progress, to pull France out of the global slump known by economic historians as the first “Great Depression,” roughly 1873-1896.<sup>111</sup>

It is no coincidence that this global economic slump lines up roughly with the 18-year Métro stalemate from 1877 to 1895.<sup>112</sup> As Louis Biette put it, “For eighteen years (1877-1895), the efforts of official action and private initiative remained sterile: an absolute contradiction divided the [national] government and the city concerning the

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111 Eric Hobsbawm, Ch. 2, “An Economy Changes Gear,” of *The Age of Empire: 1875-1914* (New York: Vintage, 1989), pp. 34-55.

112 This periodization also lines up fairly well with the slump in Paris tramway development during these years.

legal character to attribute to this network.”<sup>113</sup> These were also hard times for big finance. Given the newness, risk, and uncertainty of the urban railway industry, it might have been difficult to find investors to provide the needed start-up capital even without the legal stalemate. Who can say whether the financial or the legal obstacle did more to slow Métro planning? As Biette's quote suggests, they must be taken together.

Nansouty's voice was quite different from the voices we have previously heard from *Le Temps*. In 1890 *Le Temps* was no longer doing much left-republican posturing or emphatically speaking truth to power about public works. The paper was no longer an underdog in a political culture characterized by the lasting hold of clergy and aristocracy, as it had been in the 1860s and 70s. By 1890, *Le Temps*'s political outlook was shared by the ruling class, under President Sadi Carnot, a left-leaning republican. Furthermore, there was no critique of Haussmannization here; Nansouty wholeheartedly embraced it. In 1872 *Le Temps* criticized Haussmannization for creating heavier traffic in the city, and imagined the Métro as a solution to the problem. Now Nansouty, writing for *Le Temps* in 1890, imagined that the Métro would do the opposite: creating more traffic, more healthy circulation of capital, goods, people, information, etc.

Nansouty's views were echoed by the Minister of Public Works, Yves Guyot. Guyot was an outspoken politician and well-published intellectual known for his hard-line liberal views of society and economy. His is among the shriller voices in France's liberal political mainstream in the 1880s and 1890s, constantly free-marketeering and denouncing socialism. Like Nansouty he was an opinion maker and a science booster, but he was also an administrator in the Haussmannian mold, an obsessive bureaucrat. He served as Minister of Public Works from 1889 to 1892, later publishing a memoir-cum-

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<sup>113</sup> Biette (1906), cited above, p. 4.

manifesto of his term entitled *Three Years in the Ministry of Public Works*.<sup>114</sup> Far from a simple memoir, the book “...became a book of combat,” as he put it, because he could not keep the personal and the political out of it. It became a critique of French public works administration, which he thought wasted time and money in development. The enormous cost and scale of public works, for Guyot, made the private sector a more appropriate agent of development. Only in the world of big business could Paris find enough capital to realize projects like the Métro. Only the private sector could maintain and operate such a large system efficiently, leanly, with one eye always on the bottom line. If his professional habits were Hausmannian, Guyot believed that Haussmann's debt-making administrative bloat was inappropriate in this era of financial strain.

It is curious, then, that Guyot opened the book with a definition of public works as “all works undertaken for the end of common utility, which private owners could not do with their own resources or without being authorized to occupy certain parts of the public domain, to expropriate private property, and to collect taxes.” Public works, by this definition, meant: (1) works for the public's benefit, which (2) were undertaken by actors from the private sector, who were (3) authorized by the state to use public resources in construction, operation, and maintenance of the works, because (4) these actors from the private sector didn't have enough capital themselves. The necessary resources could be taken from the public because the works were ultimately destined to benefit the public. A circuit would thereby be created between the public, the state and the private sector, combining their different strengths: the public's taxpaying power, the state's tax-collecting and regulatory power, and the private sector's ability to temporarily mobilize large amounts of capital and labor to get things done.

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114 Yves Guyot, *Trois ans aux Ministre des travaux publics* (Paris: Léon Chailly, 1896).

But this general definition of public works was contradicted by all Guyot's specifics. His book discussed a number of public works projects from his term—a new water source for Lyon, the infamous canal from Paris to the sea, and finally the Métro—under the heading “public works and private initiative.”<sup>115</sup> Here, there was no sign of the limited private sector from his general definition, yoked to the state and the public for the resources it lacked. Turning to the Métro, he cut the public out of the deal altogether, arguing that any company demanding a Métro concession should fund the entire project using its own capital. Like Nansouty, he wanted “no subsidies or guarantees of interest” from the state. Ideally, Guyot believed, the financial promise of collecting fares from such a massive transit network would be enough to justify the weight of the original investment.

There is thus a significant tension in Guyot's work: on the one hand he envisioned a private sector which would remain tied to the state in good, Haussmannian fashion; on the other, he supported keeping financial burdens and incentives in the private sector, seeing this as a motor for economic growth and social progress. He affirmed the basic liberal principle that the state should keep its hands off the market. But he also affirmed the basic statist principles that only the public or the state could determine what was in the general interest, and that only the state could authorize public works projects. This conflict between liberal and statist views of economy, society and politics, was one of the central political debates in France throughout the 19<sup>th</sup> century.<sup>116</sup> At the moment he

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115 For more on the canal from Paris to the sea, see Chapter 5 and Anthony Sutcliffe, *Rêves parisiens: L'échec de projets de transport public en France au XIXe siècle* (Paris: Presses des Ponts, 2005).

116 Aisenberg's book *Contagion* is perfect example of a number of books in the history of French public health which foreground this debate or dialectic. Ann LaBerge's work would be another example. This is only one interesting corner of French social and political history, fields in which the liberalism-statism dialectic is commonly discussed.

wrote, the tensions in Guyot's book mirrored the broader contradictions of society, economy and politics in the Third Republic. Not only one the largest (failed) public works projects of his term, the Métro also gave Guyot an opportunity to reflect on the meaning of “public works,” and the ins and outs of public works administration. The Métro debate became a vehicle for disputing broader questions—about the role of the public and private sectors in the Third Republic, about the meaning of the “public” in “republic.”

Like Nansouty, Guyot dreamed that the Métro would encourage the flows that animated society and economy: “[H]aving placed my ideal in scientific and productive civilization, I considered that the whole economic life of a country depends on the facility and the rapidity of the circulation of people and things...”<sup>117</sup> Existing omnibus and tramways, for Guyot, were not fast enough, moving only 9-12 kilometers an hour—nothing compared to the 18 kilometers an hour enjoyed by London's “City and South London Railway” (1890), the world's first electric-powered underground railway.<sup>118</sup> For Guyot, the Métro could accelerate the flows of traffic that would keep Paris's economy healthy, just as railroads could for the nation as a whole. It was not only local, but also national development that Guyot expected from the Métro. He haughtily dismissed the municipal council's local-centered Métro plans as anti-patriotic: “I've always considered that the first responsibility of a politician is to put the general interests of the country above the interests of his circumscription.”<sup>119</sup>

Guyot also wanted to keep Métro development in the private sector because the use of public resources entailed a social contract, a duty to use them responsibly—

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117 Ibid., p. 13.

118 Ibid., p. 96.

119 Ibid., p. 88.

precisely the sort of social contract that had been broken by Haussmann. Guyot quoted a founder of the French railways, Lafitte, who said “Any means of transport is always unpopular.” For Guyot, Lafitte's authority helped justify the vision of a bratty, opportunistic, hypocritical public never satisfied with public works. “The public never takes account of the effort” that the state puts into public works, he wrote. Let citizens demand a new road or railway as loudly as they like, “once the work is done, they critique it.”<sup>120</sup> The safer option for government, in Guyot's opinion, was to engage as few public resources as possible, so that the public would not feel entitled to critique the finished project. In this era when transportation infrastructures were increasingly politicized, provoking the public was a bad idea. Guyot was more bureaucrat than democrat; he just didn't trust the public.

Of course, the private sector didn't have a much better record than the public at this moment in French history. Just weeks before Guyot took office in February, 1889 the failing Panama Canal project had provoked financial meltdown and public outcry: a canal half-finished, 1.4 billion francs lost, a workforce decimated by malaria and yellow fever, and the ruin of 85,000 shareholders. It cast a pall over Guyot's entire term in office.<sup>121</sup> He even claimed it hampered the search for start-up capital for Métro projects during his term, in spite of his work assembling an impressive list of partners to fund Eiffel's plan in 1891.<sup>122</sup> He discretely didn't mention Eiffel's involvement in the Panama Affair. Even

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120 Ibid., p. 8.

121 In 1893, his predecessor Charles Baihaut was sentenced to 5 years in prison and a 750,000 franc fine.

122 The investors were lined up: Blount, president of the *Société générale pour favoriser le développement du commerce et de l'industrie en France*; Dehaynin, vice-president of the *Société générale du crédit industriel et commercial*, who also signed on behalf of the *Société lyonnaise de dépôts, de comptes courants et de crédit industriel*; Baron Reinach and Company; Donon, president of the *Société des dépôts et comptes courants*; the Director General of the *Crédit Lyonnais*; Wlasto and Rostand from the *Comptoir national d'escompte de Paris*; Einhorn and Picard from the *Banque internationale de Paris*, and Clerc and Sienkiewicz from the *Banque d'escompte de Paris*. (Guyot, 1896), p. 89-90.



though Eiffel was eventually exonerated of any wrongdoing, his connection with the failing project could not have improved his chances of winning a concession for the Métro.<sup>123</sup>

Guyot also favored the private sector because he thought the administrative stalemate was rooted in deeper tensions built into France's system of public works administration. As he saw it, engineers and politicians were constantly forced to work together, but had radically different professional socialization and quite different concerns. They routinely talked past each other. Engineers did not always understand the delicacy of financing large works, and governors were hungry for sovereignty and resented the continuing political power of the *Ponts et Chaussées*. For Guyot, the stalemate was only a symptom of these deeper problems.

National liberals like Guyot and Nansouty dreamed of harnessing the power of the private sector to solve the administrative and financial difficulties holding back the Métro. They also dreamed of using the Métro as an agent of international competition, unifying the national rail network and increasing the speed and fluidity of circulation, creating healthy, vibrant traffic. Movement would beget movement, development would beget development, and capital would beget capital. Around 1890, the Métro was an artifact of what historians of technology call techno-nationalism, an instrument in the international race for industrial and imperial development in the late nineteenth century.<sup>124</sup> For the national liberals, the Métro was not so different from the Panama and

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123 Eiffel, by paying little attention to finance in a company that had already blown through 1.4 billion francs, helped ensure the downfall of the endeavor. In 1887 Eiffel was called in to rework the project, deeply in debt and only half complete. He insisted that the whole conception was flawed and went back to the drawing board, replacing de Lesseps's original flat plan with a tiered canal regulated by locks. This was geologically, hydrologically and technologically appropriate, but not financially feasible for the company. Jean-Yves Mollier, *Le scandale de Panamá* (Paris: Fayard, 1991).

124 For more on techno-nationalism, see: (1) Thomas Hughes, *Networks of Power: Electrification in*

Suez canals, the trans-Siberian, trans-Saharan and Berlin-Baghdad railroads. It was another agent of imperial globalization in the form of transportation infrastructure.<sup>125</sup>

The left-wing, municipalist response to the 1890 *enquête*, predictably, projected a different vision of the Métro. Joseph Odelin, Municipal Councilor from the *Saint-Germain-l'Auxerrois* neighborhood near the Louvre, published his own pamphlet during the *enquête* to combat the liberal views of Guyot and Nansouty.<sup>126</sup> Odelin liked the North Railway Company's part of the plan, but not Eiffel's. Everyone, he claimed, felt that the Métro ought to “bring a recognizable improvement of the material sort to the working class.” It should issue from “a well-formed socialism, responding, in principle, to the needs of the greatest number.” This was how “to produce a work of general interest.” Odelin spoke openly of socialism, arguing that the Metro should be for the people of Paris. For Odelin, the Métro had to do four things: (1) relieve traffic congestion in the city center; (2) expand the means of communication and locomotion; (3) permit the poorest Parisians to live outside the city center (even outside the city limits), thanks to the speed and affordability of the imagined means of transport; and (4) create work for Parisians.

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*Western Society, 1880-1930* (Johns Hopkins, 1983); (2) Jeffrey Herf. *Reactionary Modernism: Technology, Culture, and Politics in Weimar and the Third Reich* (Cambridge, 1984); (3) David Nye, *American Technological Sublime* (MIT 1994); (4) Gabrielle Hecht, *The Radiance of France* (MIT, 1998); (5) Hård and Jamison, eds. *The Intellectual Appropriation of Technology: Discourses on Modernity, 1900-1939* (MIT, 1998); (6) Mikael Hard and Andreas Knie, “The Grammar of Technology: German and French Diesel Engineering, 1920-1940” *Technology and Culture* 40/1 (1999), 26-46.

125 The clearest statement to date of the Métro's implication in globalization during the 1890s comes from Desabres's 2003 article, cited above. For more background on infrastructural development and its connection with globalization in Paris, see Harvey (2003), cited above. For more on globalization and French imperialism, see Michael Adas, *Machines as the Measure of Men: Science, Technology and Ideologies of European Dominance* (Cornell, 1989) and Alice Conklin, *A Mission to Civilize: The Republican Idea of Empire in France and West Africa, 1895-1930* (Stanford, 1997). Hobsbawm's *Age of Empire* (cited above) remains a classic portrayal of this period. As far as primary sources are concerned, there is no better example of this internationalist and developmentalist perspective than political economist Paul Vibert's book *La concurrence étrangère, les transports par terre et par mer* (Paris: Berger-Levrault, 1896-7).

126 Joseph Odelin, *Métropolitain de pénétration centrale* (Paris: Chaix, 1890).

For Odelin, recent plans would fail because they were out of scale. Municipal Council plans were too big for Paris, both in size and in cost. Eiffel's network, by contrast, was too small. It didn't cover enough of the city, and it didn't cover the right parts. Many Parisians, Odelin reports, felt it was puny. It would have neglected the Left Bank altogether, but for the Orléans Company's train station (today *Gare d'Austerlitz*). It was less a "Paris Metropolitan" than a "Right Bank of Paris Metropolitan," as he put it. Others felt it was shady. It had earned the nickname "the *rabatteur* of the North Company," a slur which cast it as a parasite riding on the North Railway Company's plan.<sup>127</sup> Odelin distanced himself from this view, making clear that "We don't want, therefore, to associate ourselves with the first recrimination formulated by this 'league of the public good' which has placed Deputy Mesureur at its helm to chase Eiffel from the Parisian temple"—a glimpse of another civil association trying to intervene in the Métro's progress.<sup>128</sup>

A more serious critique of Eiffel, Odelin argued, involved the plan's inequalities: it neglected the Left Bank and it didn't open any radial lines connecting the center with the periphery or suburbs, neglecting all the working-class areas of Paris and the

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127 *Rabatteur* also means a man who makes unsavory business deals like a pimp, bookie, or scalper, giving a sense of financial impropriety.

128 Odelin allows us into a glimpse of the witch hunt that followed the Panama Canal Scandal. The religious imagery in his text, and the language of chasing Eiffel from Paris, hints at a language of antisemitism that would crop up again in the pages of *La Libre Parole* in 1892. *La Libre Parole* was an antisemitic newspaper started the same year by catholic journalist Edouard Drumont, who often spoke in a populist language, denouncing the power of big business over the little man as fiercely as he asserted that his right to free speech protected his virulent antisemitism. From its first issues, the paper denounced big finance as a Jewish domain, using the Panama Canal scandal as its proof. Drumont's insistent hate speech has been credited with fanning the flames that would become the Dreyfus Affair in 1894. It was this antisemitic critique in particular that Odelin tried to distance himself from. He was not interested in chasing Eiffel out of Paris because of his implication in the Panama Canal affair. Drumont published a lot of books around 1890: *La France Juive devant l'opinion* (1886), *La Fin d'un monde* (1889), *La Dernière Bataille* (1890), *Le Testament d'un antisémite* (1891). He also started an association, the *Ligue Nationale Antisémite de France*, in 1890. See Jean-Yves Mollier, *Le scandale de Panamá* (Paris: Fayard, 1991).

department. Odelin called for a “Métropolitain de pénétration centrale,” which would encourage the radial movement of the working classes in and out of the city, ultimately helping to improve their standard of living.<sup>129</sup> Borrowing the city planning ideas of the 1880s, Odelin saw the Métro as an agent of progressive or socialist urban transformation. Steering the growth of the city, it could give the working classes access to better housing in cleaner, greener areas, save them time commuting, and even create work. It was an agent of moral and material improvement. For Odelin, unlike Guyot and Nansouty, the Métro better served local, not national or global, development.

Odelin doubted that the Métro alone could solve the hygienic problems and traffic problems caused by Paris's density and congestion. It would need to be complemented by a series of new roads, cut Haussmann-style through the densest parts of the Right Bank: “In addition, we propose...the piercing of already-begun major channels of communication that Parisians have been waiting for and asking for for a long time (boulevard Haussmann, avenue Ledru-Rollin, rue Aumaire, rue aux Ours, rue du Louvre, etc., etc.)” Odelin hoped to complete many major roads projected, but not finished, by Haussmann. His pamphlet demonstrates that continued Haussmannization was pursued alongside new, emerging forms of urbanism throughout late-nineteenth-century Paris. As a general model of urbanism, Haussmannization could be both attacked and embraced by Parisians on both the left and the right. One could freely appropriate elements of

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129 Political economist Paul Vibert expressed the same view in 1896: “And so, acting in this way, we follow the English and American system, which is beneficial; one will no longer live anywhere but in the countryside; the small employee will find his house, his *cottage*, the health and low cost that he cannot find in Paris for his wife and his children; this is the capital point: railways, the Metropolitan should serve *solely* to put Paris into contact with the banlieue, with the provinces, they should be *excentric* and not *concentric*, as they have affirmed by virtue of I don't know what aberation.” For Vibert, the question was, of course, one of the direction of healthy flows; things should not flow around Paris, but in and out of it. See: *La concurrence étrangère, les transports par terre et par mer* (Paris: Berger-Levrault, 1896-7), pp. 235.

Hausmannization, and harness them for other causes, as Odelin did for municipal socialism. In debating the future Métro, Parisians were also stretching the bounds of Hausmannization.

Odelin's pamphlet also helps us to see a surge in interest in working class hygiene coming out of the 1889 Exposition. As engineer Paul Villain would put it in his 1891-2 plans for the Métro:

You know that the whole redoubtable problem is for Paris to renovate, aerate and clean up the enormous agglomeration of the old center neighborhoods, where the infected little streets like the rues de Venise, de la Reynie, and de Brantôme meet each other in such great numbers, which are an affront to hygiene and a shame for our capital. For this reason, we must give serious nourishment and a gauge to real estate speculation, we must bring to the commerce of these neighborhoods the activity which has long been far from them. And this cannot be done except by a railway which will carry all circulation to the center.<sup>130</sup>

For men like Odelin and Villain, the Métro could shape not only the direction and intensity of flows of traffic, but also flows of light and air, commerce and street life, capital and labor. The Métro, they hoped, would have manifold social-spatial effects, helping to revivify, clean up and beautify the parts of the Right Bank core not yet touched by Hausmannization.

Beyond the *enquête*, the early 1890s were characterized by increasing pressure from the public to expand and modify tramway service. In the winter of 1892, the press picked up a thread of discussion that had been circulating in Paris: the tramways ought to be heated. As newspaper *Le Rappel* put it, “The tramways and omnibus are a never-ending subject. What improvements doesn't the public demand, whether in the time-table

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130 Paul Villain and E. Mauger, *Un Métropolitain qui ne coûte rien et ne trouble rien*. (Paris: Grande Imprimerie, 1892), p. 44: Vous savez tous quel redoutable problème c'est pour Paris de renouveler, aérer et assainir l'énorme agglomération des vieux quartiers du centre, où se rencontre en si grand nombres les ruelles infectes de Venise, de la Reynie, de Brantôme, qui sont un défi à l'hygiène et une honte pour notre capitale. Il faut pour cela donner un aliment sérieux et un gage à la spéculation immobilière, il faut rendre au commerce de ces quartiers l'activité qui s'en est depuis longtemps éloignée. Or, cela ne peut être fait que par le chemin de fer qui ramènera toute la circulation au centre.

of trains, or in the renovation of cars?"<sup>131</sup> This was about much more than heating. It was about users beginning to react, as a group, to the chaos creeping into tramway organization, as the tramway companies struggled to keep afloat. As Parisians became more and more accustomed to using the tramways on a regular basis, a list of common complaints began to emerge: agents were rude and/or didn't follow the rules, there were not enough tramway lines, or enough trams running on existing lines, existing lines didn't go to/from the right places, the interior of the cars was uncomfortable, the trams tore up road surfaces, etc. References to cold or wet feet were not uncommon, an extra discomfort added to the already tedious wait for the tram.<sup>132</sup>

In hindsight, it is easy to see that these routine criticisms were well-founded. They had inspired Guyot's reform of the Tramway Control Service in the preceding two to three years, and were now inspiring socialist councilor Caumeau as he lead the charge in the Departmental General Council for heated trams. Within 20 years, the tramways had gone from a cutting edge transportation technology to an essential service that the public expected to be available. The tramways had become politicized, too. In Anatole France's 1901 novel *Monsieur Bergeret à Paris* we meet municipal councilor Raimondin, a radical republican who "lost the confidence of the electors," because he "neglected the interests of the neighborhood. He didn't even get a tramway, demanded for 12 years, and they say he has sympathy for the dreyfusards." It is not likely, the narrator informs us, that he will

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131 *Le Rappel*, Nov. 12, 1892: "Les tramways et omnibus sont un sujet intarissable. Que d'améliorations le public ne réclame-t-il pas, soit dans le service des horaires, soit dans l'aménagement des voitures!" See also: (1) Arsène Lopin "Omnibus et tramways" *Le Radical*, Dec. 7, 1892; (2) "Le chauffage des tramways" *le Parti National*, Dec. 5, 1892.

132 See Guyot (1896), p. 96-7: without the Métro, he explained, the Parisian "continues to wait for the omnibus, feet in the water, the umbrella of each one ruffling against himself and others. He continues to pay dearly and go slowly." See also "Le chauffage des tramways" *Le Parti National*, Dec. 5, 1892: "Et il m'a été donné d'avoir les pied gelés dans les omnibus et les tramways départementaux..."

be re-elected.<sup>133</sup>

The early 1890s also saw continuing tramway development, in the form of two cable-cars (or funiculars), one climbing the hill at Belleville, the other the hill at Montmartre.<sup>134</sup> As new lines of transit and new systems of traction were successively applied in Paris, the distinction between existing means of transport (omnibus, steamboats, and tramways) and imagined means of transport (the Métro) was blurred. It was not always easy to tell, as I mentioned earlier with the example of the *grande ceinture*, whether any one particular leg of an existing railway was considered part of the Métro or not. The Métro was not built out of nothing, but rather was woven through a city already crisscrossed by tramway lines and national rail lines. Hence Métro plans often sought to integrate existing tracks, stations and routes.<sup>135</sup> But engineers also made additions to Paris's existing, rather heterogeneous transportation 'system,' like the 1891 funiculars, which were entirely separate from the Métro. Another instructive case is Jean-Baptiste Berlier's "tubular underground tramway."

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133 See the *Project Gutenberg* edition: <http://www.gutenberg.org/etext/7268>

134 See: (1) G. De Burgraff, "Tramway Funiculaire De Belleville" *Le Magasin Pittoresque* 1890 (Yr 58, ser. 2, vol. 8), pp. 318-322; (2) Louis Figuier, *l'Année scientifique et industrielle* yr. 37 (1893) (Paris: Hachette, 1894), p. 109-10. The Belleville Funicular was the work of engineer Fulgence Bienvenuë, who would later distinguish himself by drafting the initial plans for the Métro. It served the north-east quadrant of the city, so often neglected by new lines of infrastructure, opening for service in 1891 and running from the Place de la République to the park at the *Buttes Chaumont*. The Montmartre Funicular was approved by the municipal council in 1891, but opened for service until 1900. As they were designed to increase mobility up two of Paris's steepest slopes, the main technical problem (as for any funicular) was how to balance the weight of the car with a counter-weight. The problem of balance was intimately tied to the problem of traction. In some funiculars (Montmartre, for example), traction was produced by the counter-weight itself, which sometimes took the form of a large container of water. The mass of water could be adjusted to the same weight as the car, and when both were hooked to the same cable, the downward motion of the counter-weight would pull the car upward. In Bienvenuë's Belleville funicular, by contrast, each car was equipped with a "grip" (he used the English word), which hung from the bottom of the cars, and was hooked onto a cable running in a shallow trench between the rails. The cable was powered by a steam engine in a plant at the end of the line (the top of the hill); the loop was completed by another pulley on the Place de la République. In the water-weight system, tram pulled cable; in the steam-powered system, cable pulled tram—two converse responses to the problem of traction on a steep slope.

135 They also sought to financially integrate existing companies.

J.B. Berlier developed a plan between 1887 and 1892 to connect the *Bois de Vincennes* with the *Bois de Boulogne* with a single, east-west transversal, running in shallow tunnels across the center of the city (figure 12).<sup>136</sup> Cast in wrought-iron, they would run just below the street. Trains would run on light-gauge tracks, both traction and lighting would be electric. No plan had yet come so close to predicting how the first line of the Métro would end up looking in 1898-1900 (after all, Bienvenuë's initial 1895 plan for Line 1 was modeled after Berlier's work). Berlier was already well-known and respected for his work in the 1860s and 70s designing the city's underground network of pneumatic tubes for sending mail. In the 1880s, he tried to sell the city on a system for flushing the sewers pneumatically, and was allowed to set up a trial system in parts of the 8<sup>th</sup> and 17<sup>th</sup> districts.<sup>137</sup> He was a devoted servant of pneumatic technology, and experienced in working with underground tubes.

His Métro plan was well received by the Municipal Council, who saw it as a modest beginning for their vision of a local-oriented Métro. Louis Figuier thought the plan answered the Métro question, and suggested that the broader Parisian public did, too.<sup>138</sup> For anyone who was willing to envision the Métro as a light-rail network, on a smaller gauge than the national railways (say, a municipalist), Berlier's plan fit the mold perfectly. But the word “metropolitan” appears nowhere in Berlier's project title,

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136 This single line plan was Berlier's final version. Earlier versions included three lines, which can be seen as A, B and C in figure 10. Line C corresponds to the route of this single 1892 line.

137 See Samuel Merrit Gray *Proposed plan for a sewerage system, and for the disposal of the sewage of the city of Providence* (Providence Press Company, 1884), pp. 27-30, for nice comparative glances at Paris, including details on Berlier's sewer system. See also: “Compte rendu du Secrétariat: Système Berlier, Pour la réception et l'élimination des matières de vidange” *Journal d'hygiène* Vol. 8 #350 (June 7, 1883), pp. 282-3.

138 On the tubular tramway, see: (1) Louis Figuier, *l'Année scientifique et industrielle* yr. 36 (1892) (Paris: Hachette, 1893), pp. 211-20; (2) Louis Figuier, *l'Année scientifique et industrielle* yr. 38 (1894) (Paris: Hachette, 1895), pp. 171-174; (3) C. Carré, “L'enquête sur le tramway tubulaire souterrain à traction électrique” *La Lumière Electrique* vol. 42, no. 41 (Oct. 10, 1891), pp. 72-80; (4) “Chronique et revue de la presse industrielle” *La Lumière Electrique* vol. 33, no. 32 (Aug. 10, 1889), pp. 276-79.





to a simple electric tramway, very practical, which has nothing to do with the superior interests that a Metropolitan should represent....”<sup>142</sup>

Ironically, Vibert was cheering on the same plan pursued by the municipal council whose approach to the Métro he so vehemently criticized. He hurled any slur he could find at the localist and socialist approach of the Municipal Council: “antipatriotic,” “criminal,” “reactionary,” “hateful.”<sup>143</sup> The council's proposal for an elevated railway running along the exterior boulevards, according to Vibert, was “concentric,” meaning that it would shut traffic in Paris. Like Odelin, he thought the city needed an “eccentric” network, to encourage radial flows in and out of the city, constantly taking in fresh nutrients and sloughing off old labor and goods. Vibert simply overlooked the implication of Berlier's “tramway” plan in the Métro debate.

Regardless of whether Berlier's plan was or was not part of the Métro, by the summer of 1892 both the Municipal and Departmental Councils had approved it.<sup>144</sup> This was the farthest any recent plan had gotten during the tramway slump and Métro stalemate, but Berlier could not recruit the necessary capital, and the enterprise lapsed. Berlier's “tube,” as it came to be known, was one of the last unrealized plans produced during the stalemate. But Berlier was luckier than all the others; his plan got a second life in 1895 when Bienvenuë modeled his plan for the first line of the Métro on it.

As we'll see in the next chapter, 1895 was a major turning point, sparked by electrification, which pulled the Métro out of its stalemate and the tramways (temporarily) out of their slump, making public transportation available to a mass

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142 Ibid., p. 266.

143 Ibid., pp. 255, 261, 265.

144 Conseil générale du département de la Seine, Première Session de 1892. *Mémoires de M. le Préfet de la Seine & de M. le Préfet de Police et procès-verbaux des délibérations* (Paris: Imprimerie Municipale, 1892), pp. 298-9.

audience for the first time in the years before 1900. Until November of 1895, however, the Métro remained an imaginary railway at the center of a bitter administrative struggle and a rich public debate. Between 1872 and 1895, what had dreaming of the Métro done? It had nurtured a prismatic technological optimism, showing the railway to be massively interpretively flexible, and asked to do all sorts of things: to articulate the cultural meanings of the underground, to define safe and unsafe, to guide different visions of city planning, to solve the housing problem, and to show Parisians the meaning of politically and culturally charged words like “public works,” “general interest” and Haussmannization. There was disagreement about where rails should go, what system of traction should be used, who the Métro should serve, how it should be funded, regulated and operated, and what its many meanings might be. The Métro became a way to articulate oppositions like national vs. local, public vs. private, politics vs. engineering, and liberalism vs. socialism.

In contrast to the standard view of the Métro's prehistory, which instrumentalizes the Métro as a tool of political struggle, I see these struggles as essentially technopolitical. They were not only struggles to define or control a railway, but also struggles for national greatness, social equality, urban renewal, or many other causes embraced by Parisians from all walks of life. Accordingly, throughout this chapter, engineers have had no monopoly on our sources; we read plans from architects, civil engineers, state engineers, politicians, journalists, scientists, and contractors. Each one of them answered the Métro question in a biased, interested way and slid effortlessly from technological to political topics, weaving a seamless technopolitical argument for how the Métro should or would impact the city's future.

### Chapter 3: Paris Under Construction, 1895-1914

#### *Introduction: The Coming of the Exposition, 1895-1900*

While the years 1872 to 1895 were spent dreaming where Paris's means of transport are concerned, the years 1895 to 1914 were a sober awakening. In the last chapter, we saw how late 19<sup>th</sup> century engineers, architects, intellectuals and politicians imagined that railways would transform Paris, help answer the social question, and solve long-standing urban problems. In the early 20<sup>th</sup> century, by contrast, they found that industrialized means of transport could also cause new social and urban problems. While 1872 to 1895 was relatively sluggish for transportation development, 1895 to 1914 was booming. Construction of the first Métro network—six lines conceded in 1898 to the *Compagnie Générale de Traction* (General Traction Company)—spanned 1898 to 1910, and the catastrophic Métro accident of August 1903 inspired significant renovations of station architecture, rolling stock and electrical equipment which continued until 1914.

The Métro thus subjected the city to an all-over construction project for nearly two decades. Tramway development followed a similar pattern: a boom of development in 1899-1900 before the 1900 Exposition, the Diatto system accidents of 1900-1901 as a turning point, and department-wide “reorganization” of tramway networks from 1902 to 1914. The two decades before the First World War were difficult years for Paris's transportation networks, dotted by spectacular accidents, an uncertain day-to-day operation of technical networks (which moved “from improvisation to method,” as one

scholar has put it<sup>1</sup>), a slow, ongoing overhaul of infrastructures, significant labor unrest, and behind it all the impact of two innovations: electrification and mass transportation.

The development boom after 1895 was sparked by electrification, and complemented by a major shift in social practice: locomotion became available to a mass public for the first time. Hence we will meet some new characters in this chapter: the workers who built and operated the Métro and tramways, and the mass public who used them for the first time. We will meet shopkeepers, day laborers, neighborhood women and tram drivers, and examine their responses to the transformations of technology and built space going on around them, as we pursue urban history and the history of technology from below. From the history of everyday life, I borrow the project of interpreting large structures, institutions, and processes from the point of view of the ordinary people who experience them. Applied to a large technical system like Paris's Métro or tramways, this points to a study of construction workers, tram drivers and everyday users, reminiscent of David Edgerton's recent "history of technology-in-use."<sup>2</sup> These large technical systems were also social systems, which created new communities of workers and riders, people who often saw the new means of transport in less certain and less positive terms than the systems' designers did. The user experiences of 1895-1914 thus provide an important contrast to the design dreams of 1872-1895.

The pressure of the impending 1900 Universal Exposition finally transformed the Métro from a dream of Paris's future into something "current," as Prefect of the Seine

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1 Jean Tricoire, "L'exploitation du métropolitain: de l'improvisation à la méthode," in *Métro-Cité*, pp. 103-116.

2 This pithy formulation of the history of everyday life comes from David Crew. See *Germans on Welfare from Weimar to Hitler* (Oxford, 1998), pp. 8-10. Technology-in-use comes from David Edgerton's recent polemic *The Shock of the Old: Technology and Global History since 1900* (Oxford, 2007), pp. ix-xviii.

Poubelle put it, in 1895. The Exposition also sparked tramway development, though results here would be mixed.<sup>3</sup> The same year, retired military officer M.M. Petitjean published “The Great Works of Paris” (*Les Grands Travaux de Paris*), an essay outlining public works the city needed in preparing for the Exposition. Chief among them was the Métro.<sup>4</sup> Such works were needed, Petitjean argued, for the city to put its best foot forward for foreign guests and remain a model of Western civilization, but also because expositions were always good excuses for developing Paris (a historical pattern we have already seen). The words *grands travaux* (major works) had already been used to describe Haussmann's renovations, and would have suggested to contemporaries the magnitude and seriousness of the proposed works. He continued:

Paris wants to go in advance, marching from conquest to conquest. After pasteurization, vaccination, it wants light, electric traction, aerial navigation, etc., etc... And for its personal use, it demands to move more freely by means of a Metropolitan; it wants more space, to breath more easily, it demands tearing down these walls of Jericho, these inept fortifications which encircle it, which stifle it, it wants to grow!

Paris wants to breathe the pure air of the atmosphere, to drink the clean water of the Seine.... It regards with fear the bacilli of cholera and typhoid fever, holding their positions at the gates of the city....

And what does France demand? It demands a grandiose Exposition, where it can show, with its palaces, its chief works, its love of work and of science, and its strong desire to live in peace with all nations who would march with it in conquest of great discoveries, and thus collaborate in the improvement of our poor humanity.<sup>5</sup>

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3 “Conseil Municipal” *Le Temps*, January 12, 1895, p. 3: speaking before the Municipal Council, Poubelle explained that the “Metropolitan project..., which was suspended for twenty years, has become current again faced with the perspectives of the 1900 Exposition” (*Le projet de Métropolitain, expliquet-il, qui était pendant depuis vingt ans, redevient une actualité en face des perspectives de l'Exposition de 1900*). A May 21, 1895 letter from the president of the CGPT to the Prefect of the Seine mentions the expo as a reason for moving along on tramway development. See Georges Drumont, *Automobiles sur rails* (Paris: Gauthier-Villars, 1898), p. 167.

4 These were: (1) the Métro, (2) another belt railway around the city, (3) direct-to-sewer drainage for all domestic, commercial and industrial waste water, and (4) demolition of its outdated wall of military fortifications.

5 Petitjean, 1895, pp. 9-10.

In short, for Paris to uphold its civilizing mission, it would have to further civilize itself. To preserve its reputation as the “City of Light” (*Ville Lumière*), it would have to be lavishly illuminated in 1900, a beacon of the electric century to come.

Petitjean highlighted infrastructures which had been sensitive for Parisians even before Haussmann: transportation and sanitation. Nineteenth-century Parisians, especially bourgeois ones, often worried their city was 'behind the times' in these areas. Yves Guyot called it “shameful” that Paris didn't have a metropolitan railway in 1896. Transportation was sensitive for several reasons. We saw in the last chapter that discussions of transportation from the 1870s to 1890s were always framed by the presumption of Paris's basic inadequacy in this area. Then there was 1889, the only exposition between 1855 and 1900 not preceded by a boom in transportation development. Many in Paris remembered the event as an embarrassing international showcase of infrastructural inadequacy. American social scientist Edmund James confirmed these fears in 1900, with his review of “The Inadequate Street Car System of Paris.” Finally, Paris coach, omnibus and tramway drivers rarely missed the opportunity to strike during a Universal Exposition between 1855 and 1900.<sup>6</sup>

The build-up to 1900 was no exception. There was a flurry of development (and strikes) between 1895 and 1900. The departmental government passed out new tramway concessions to encourage competition and challenge the CGO's controversial “monopoly,” hoping to raise standards for service and equipment, jump-starting the move to electric traction. They also hoped to increase the capacity of Paris's transport networks

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6 (1) Guyot, *Trois ans aux Ministre des travaux publics*, p. 85; (2) Biette (1906), p. 5; (3) Edmund James, “The Inadequate Street Car System of Paris,” *Chicago Daily*, Apr. 22, 1900, p. 51; (4) Nicholas Papayanis, “Prolétarianisation des cochers de fiacres à Paris (1878-1889).” *Le Mouvement social*, No. 132. (Jul. - Sep., 1985), pp. 59-82.

and reduce costs for both operators and consumers. But they were not always sure how to balance technology, politics, and economics to make industrialized means of transit available to the greatest number of people. The result was contracts with unreliable companies, experimenting with cutting edge equipment, who put workers, passengers and the city's investments into jeopardy—as the accidents of 1901 and 1903 would later reveal. For the tramways, progress was slow and crisis was never far. Tramway companies were consistently unable to keep up with Parisian's growing need (real or perceived) for more means of transportation, just as in the 19<sup>th</sup> century. In the early 20<sup>th</sup> century, while zealous savants hyped electric traction as the predestined future of urban locomotion, and the new, smaller tramway companies experimented with it, sometimes to disastrous effect, the CGO held the reins of horse traction tightly, experimenting with steam and compressed air, but resisting electricity.<sup>7</sup> It was hard to keep up with such rapid technological change. Parisians had not yet come to terms with mechanized transport when electricity's “Second Industrial Revolution” emerged.

There is no better emblem of the Second Industrial Revolution in Paris than the Métro. In 1895, the Prefecture of the Seine, Municipal Council and Ministry of Public Works still vied for control of the network. But the Municipal Council finally broke the administrative stalemate with a clever ultimatum: either the Métro would be declared a local interest railway, or the Municipal Council would withhold the 20 million francs it promised for the 1900 Exposition.<sup>8</sup> The national government folded and Minister of

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7 See the AMTUIR (Paris Museum of Urban Transportation) website, especially the page on the “General History of Urban Transports,” [http://www.amtuir.org/03\\_index\\_hu\\_gale.htm](http://www.amtuir.org/03_index_hu_gale.htm). Here, AMTUIR outlines several systems (Rowan, Serpollet, and Purrey) of steam-powered tramways used by the CGO between 1889 and 1914. See also Jean Robert, *Les Tramways Parisiens*, pp. 31-63, 115-160.

8 Guyot (1896), pp. 96-7.



Public Works Louis Barthou pronounced the Métro a “work of local interest” on November 22<sup>nd</sup>, 1895. The Municipal Council quickly set up a Métro planning commission under socialist councilman André Berthelot. 1896 was full of decisions—about the gauge of tracks, the combination of elevated and underground installations, and network routing. A municipal mission to Budapest in 1896 studied its new Siemens and Halske electric-powered subway, also the showpiece of an international exposition. The commission decided most of the Métro's architectural and technological details—a mix of tunnels, trenches and viaducts, third-rail electric traction—by the end of 1896, and network routing was finalized in 1897. By 1898 the Métro was no longer dream, but reality. Construction started in October of 1898, and the “first network” was completed only weeks before the catastrophic flood of 1910.<sup>9</sup>

This chapter has five sections. In the first section I deal with the social-historical shift toward a mass ridership; in the second, I deal with electrification. These socio-economic changes were closely connected with electrification. Like electrification, they were jump-started in the mid-1890s by the impending 1900 exposition. Like

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9 Michel Margairaz, “Le réseau métropolitain et les pouvoirs publics: du compromis républicain à l'emprise technocratique.” *Métro-Cité*, pp. 165-168. In 1898, one author described the conditions that woke the Métro from its slumber: “After having necessitated laborious studies and given rise to various evaluations, which generally showed a certain skepticism, the metropolitan railway has finally left the domain of legend. The law of March 30, 1898, in consecrating its existence, has made it a reality.” Victorien Maubry, “Le Métropolitain,” *Le Magasin Pittoresque* 1898 (Series 2, vol. 6, year 66), p. 373. The story of the Métro's final planning by municipal engineers Huet and Bienvenuë, as well as the technical aspects of the Métro's construction have already been documented by Michael Ossadzow and other engineering historians at the École des Ponts et Chaussées, so I will not treat it in much detail, here. Most of this historical work on the Métro is fairly recent, coming out of the 100-year anniversary of the Métro celebrated in 1999-2000, and bearing the stamp of Paris's municipal government, archives and museums. See: (1) Hallsted-Baumert et al., eds. *Métro-Cité: Le chemin de fer métropolitain à la conquête de Paris 1871-1945* (Paris musées, 1997); (2) Jean Tricoire, ed. *Le Métro de Paris: 1899-1911 Images de la construction* (Paris musées/RATP, 1999); (3) Claude Berton and Alexandre Ossadzow, *Fulgence Bienvenuë et la construction du Métropolitain de Paris* (Paris: Presses Ponts et Chaussées, 2007), (4) Jean Trioire, ed. *Métropolitain: l'autre dimension de la ville* (Paris: Hotel de Lamoignon, 1988).

electrification, they were worked out by trial and error on the tramway networks, and pursued by Parisian engineers and politicians anxious to modernize the capital. Both transformations were intended to solve ongoing conditions of crisis—financial, technological and administrative—which had plagued the tramways since the late 1870s. The inadequacy of Paris's transportation infrastructures and the burdens of horse traction had been common complaints since at least 1889, and after the CGO's attempt to block new tramway development in 1891, the long-awaited project of expanding Paris's tramway networks stalled. For the tramway and omnibus networks—indeed the whole 19<sup>th</sup> Century system based around the CGO and its satellite tramway companies—the crisis of the late 1870s continued into 1895, even into 1914.

Section three deals with the problem of accidents from 1900 to 1903. For the new mass public experiencing urban railways for the first time, accidents provided evidence of the darker side of modern technology, showing up contradictions and gaps in the ideology of technological optimism and progress. Users began to bridge what Bernhard Rieger called the “knowledge gap,” the distance between expert and popular understandings of technology during the Second Industrial Revolution.<sup>10</sup> But there was also a gap between the confidence of engineering rhetoric and the difficulties of engineering practice, here. We should not forget that these technologies were also new and difficult for the experts, the railway engineers who, as Jean Tricoire so eloquently put it, moved “from improvisation to method” between 1900 and 1903. New social and cultural scripts had to be written for these new technologies, but this work was not always

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10 Bernhard Rieger, *Technology and the Culture of Modernity in Britain and Germany, 1890-1945* (Cambridge, 2005).

easy.<sup>11</sup> Paris's peculiar path through electrification led to application of the Diatto system for tramway traction between 1895 and 1900, a system which failed spectacularly in the accidents of fall, 1900 to winter, 1901. Then came the Métro's fiery accident of August, 1903, killing 84.

Around these accidents, a language of critique developed in the press and in public, which questioned technological optimism by juxtaposing it with the dangers and failures of modern technology. Due to the complexities of public works administration (which relied on close ties between local government and business), journalists and other purveyors of opinion often didn't know whether to blame the sorry state of Paris transportation networks on the transit companies that violated their contracts, or the government that was unable to enforce contracts in a meaningful way. A revolving door between public and private sectors was itself part of the problem; charges of corruption and neglect flew far and wide. In a similar vein, Parisians were not always sure whether technology or human agency was more responsible for problems with transportation networks. The era of accidents taught users to talk back to the authorities, and also forced designers to recognize the user's perspective. The knowledge gap was closed slowly and unevenly through negotiation and struggle.

Section four deals with labor history, especially the wave of *terrassier* strikes between 1905 and 1908. The era of first Métro network construction was also the era in which a militant labor movement confronted French business and government with a

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11 The term “scripts” comes from Madeleine Akrich, who defines “scripts” as visions of the world inscribed in technological artifacts, scripts which suggest how artifacts should be used and interpreted, which predict what kinds of people will use them, and in what ways. See “The De-Scripture of Technical Objects,” in *Shaping Technology/Building Society: Studies in Sociotechnical Change*. ed. Wiebe Bijker and John Law (MIT, 2000), pp. 208-209.

rolling threat of general strike, in pursuit of demands like the eight hour work day. More than a decade of construction required a lot of labor, and Paris transportation and construction workers played an active role in the syndicalist movement. Métro contractors often failed to uphold the labor regulations imposed on them by the government, a fact of which the budding syndicalist movement in Paris never tired of reminding journalists and the *Hôtel de Ville*. This should remind us that transportation (like public works more generally) had become a more contentious political issue in the late 19<sup>th</sup> century, and more publicly visible. As urban railways were woven through the city, the subject of public works became interwoven with broader discussions of the public and the Republic. Thus, between 1872 and 1895, transportation was linked with discussions about privatization and nationalization in the ongoing battle between liberals and socialists in Paris. Between 1895 and 1914, transportation also became linked with the topics of the syndicalist era: work, unions, strikes, sabotage, class conflict and revolution.

The fifth and final section deals with construction, especially the social and spatial problems of the construction-site. The decade of Métro construction after 1898 effectively re-Haussmannized the avenues and boulevards, the Métro ironically encumbering the very flows of street traffic it was designed to lubricate. This upset life on the surface of the city a great deal, troubling everyday routines and itineraries, slowing traffic, and jeopardizing the capital's reputation. The city of *chantiers* (construction sites) became strange and unfamiliar to locals. This was a cultural and aesthetic issue, as many well-to-do Parisians found their torn up capital ugly and improper. It was also a national issue, because important monuments, historical sites and tourist attractions were

inaccessible. The city could no longer function as an effective national capital. But more than anything else, it was a practical issue, a question of the city's smooth functioning. In this section, the accent is on 1908-1914, and the ongoing dissent practiced by journalists and the public, evoking the social contract implied in the idea of “public works.”

In this chapter, I want to show that the process of adjusting social, political, and cultural scripts to fit new electrical technology rarely worked out as Parisians dreamed it would in the late 19<sup>th</sup> century. What's more, technology had to change as much as practice. It was a moment of transition. Parisians did the practical work of getting used to mass transit as part of their everyday lives, while they did the political work of deciding how infrastructures would be administered (publicly or privately, for example), and the technological work of how to design safe, smoothly-running technical systems.

*Mass Transit Arrives: the “Ten-Cent Tramways”*

The period from 1895 to 1914 brought a fundamental social shift to Paris: mobility for the average Parisian increased.<sup>12</sup> The transformation of the transportation market into an economy of scale made purchasing transportation into a mass activity, available to everyone in Paris, regardless of social class. Since the 1870s, Paris's population had increased steadily from about 2 to 2.5 million people, horse traction had proven less and less feasible in the face of ballooning demand, a discourse of citizen demand had solidified, technological options had proliferated, and the dreams of administrators and engineers had significantly grown in scope and scale—more lines, more cars, more riders, more riders per car, more money saved, more money earned.

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<sup>12</sup> Mass sales of bicycles also began in this era, another important index of mobility for everyday people in Paris.

Technologically speaking, electric traction greatly increased the feasible scale of transport networks. Economically speaking, transforming public transportation into a mass market, an economy of scale, had the same effect. Contemporaries knew this. Savants from railway engineer Léon Francq to political economist Paul Vibert argued in the 1890s that Paris could only have means of transport appropriate to its needs, and cash in on the long anticipated cost savings of mechanical and/or electrical traction, if a mass ridership was cultivated. The financial problem and the traction problem had the same solution: *a change in scale*.<sup>13</sup>

A mass market for industrialized transportation began to emerge in the late 19<sup>th</sup> century.<sup>14</sup> Take for example the growth of annual omnibus ridership from 1879 to 1883: older, 28-seat omnibuses saw barely 1% growth, while newer, 40-seat omnibuses saw closer to 50% growth. Ridership grew faster with larger vehicles; each place cost less, each vehicle was more profitable. Newer modes of transportation also grew faster than older; so tramway ridership grew faster than omnibus ridership. Between 1879 and 1895, annual tramway ridership grew almost 300%; from 1895 to 1928, it grew around 400%. Nothing grew more spectacularly than the Métro, which was designed as a mass transit network. From 1901 to 1910, first class ticket sales grew from just over 6.5 million to almost 27 million (over 400%); second class, from 34.5 million to 164 million (closer to

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13 John McKay argued very cogently in his classic *Traways and Trolleys* that electrification and economies of scale worked hand-in-hand to bring mass transit to Europe in this era. Vibert, *La concurrence étrangère* vol. 2; Francq, *Chemin de fer métropolitain: recueil des articles publiés dans le journal le Métropolitain à propos de la traction du métropolitain parisien* (Paris: E. Bernard et Cie., 1892).

14 The emergence of the mass market for transportation followed not far behind the emergence of other emblematic modern mass markets, for example the mass circulation daily newspaper. See Vanessa Schwartz, *Spectacular Realities* (University of California, 1998) and Gregory Shaya "The Flâneur, the Badaud, and the Making of a Mass Public in France, circa 1860-1910," *American Historical Review* 109:1 (February 2004).

500%).<sup>15</sup>

Such growth would have been difficult for politicians and engineers to keep up with even under the best of historical circumstances. Not only a result of population growth, it was also a result of changing expectations and growing availability. More and more Parisians *wanted* to use mass transport, as it became a more accepted, affordable and accessible part of everyday life. More and more seats were available to a broader public, even if there were never enough to satisfy the needs or desires of the entire population. Politicians and engineers helped create demand for mechanized mass transit before they could satisfy this demand, as they did with fresh water piping in this same period.<sup>16</sup> Thus, what started in the early-mid 1890s as a project of adding several new tramway lines onto the existing system became by 1900 a project for the complete overhaul of the departmental tramway system. As Inspector of Public Works Lefebvre put it in his 1898 report, “It is not merely necessary...to complete the current organization of mass transit in Paris and its suburbs, but more to completely transform it.”<sup>17</sup>

Unlike the municipal Métro, these new tramways were largely the charge of the departmental and national governments. According to an 1896 report, discussions about

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15 The annual number of omnibus riders between 1879 and 1883 went from 45,762,451 riders a year to 48,326,597 on the older omnibuses, and from 45,485,981 to 67,047,395 on the newer. The annual number tramway passengers grew from 58,370,878 (1879) to 75,419,772 (1883), and from 136,785,000 (1890) to 166,236,000 (1895). Either this happened in spite of the simultaneous crisis in the tramways, or it was one cause of the crisis. 1928 was the peak year for tramway ridership, at about 700 million rides that year. The 1930s would see the tramways in steep decline, replaced by the autobus. For figures, see Jean Robert, *Les Tramways Parisiens*, appendixes “Évolution du trafic,” which compares omnibus, tramway and Metro traffic in the long durée. Tramway and Omnibus figures for 1879-1883 come from: *Variations dans le nombre des voyageurs et la recette brute*. AN F 14 9154: statistics in the dossier called “Chemin de fer Métropolitain: Notes Diverses relatives à l'évaluation de la dépense, mid-late 1880s.” Figures for 1890-95 come from: Jean Robert, *Les Tramways Parisiens*, p. 36. For Métro statistics, see statistics and accounting records in AP V108 13.

16 We will see this pattern again in Chapter 5 when we discuss the water supply.

17 Ministère des Travaux Publics. *Réseau Complémentaire de Tramways du Département de la Seine. Rapport de l'Inspecteur Général*. Dec. 8, 1898. AN F 14 15024.

the new “penetration network” (*réseau de pénétration*) or “complementary network” (*réseau complémentaire*) began in 1894. This was a department-wide plan, designed to connect Paris and its transit networks with the suburbs and other towns across the department. Planners envisioned thirty-three new lines, half of them radial lines connecting the suburbs with Paris, the other half constituting a purely departmental network, an “exterior beltway” (*ceinture extérieure*) linking the suburban communes to each other.<sup>18</sup>

The complementary network was put to an *enquête* from June 4<sup>th</sup> to July 4<sup>th</sup> of 1896. Plans submitted for review included three important details. First, fares would be 5 centimes for trips outside of Paris and 10 centimes for trips in-and-out of Paris. This was the cheapest fares had ever been. In 1878, for example, seats were between 15 and 50 centimes, depending on how far one traveled and whether one rode on the bottom level of the tram (inside) or on the top (outside, known as the *impériale*).<sup>19</sup> Second, the long-standing omnibus-based practice of flagging down moving vehicles to board freely along the line would be replaced with “fixed stops.” Third, the new lines would be powered by non-animal sources, with the strong suggestion of electricity, and all existing tramway lines would be transformed from horse traction to mechanical traction.<sup>20</sup>

The *enquête* produced very positive reviews. Citizens across the department

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18 The Prefecture of the Seine had a lot of help from the Ministry of Public Works and the Municipal Council, channeled through the specially convened “Commission mixte des omnibus et tramways,” which mixed general councilors of the Seine and Paris municipal councilors. See: Conseil Général de la Seine, *Rapport* No. 13 (Dec. 9, 1896), presented by Gibert, councilor from Saint Mandé (AP 25W 100), and Conseil Général de la Seine, *Rapport* No. 5 (Apr. 2, 1897), presented by Gibert, councilor from Saint Mandé (AP 25W 100).

19 *Paris and its Environs* (Karl Baedeker, 1878), p. 28. Although the interior/downstairs seating was technically first-class seating and always more expensive, fashion, even in the middle class, dictated that the *impériale* was the preferable place to ride.

20 Gauthier, *Rapport de l'Ingénieur ordinaire*. Paris, Nov. 18, 1896. AN F 14 14999



generally approved of mechanical/electrical traction and fixed stops, but made various additional suggestions: that the *impériales* of cars should be covered, that each tram should be manned by two agents, that the trams should be electrically lit, that fares should be lowered, that the system of transfers (*correspondances*) should be discontinued or reformed, and finally, that special routes for the morning and evening rush hours should be created for workers, or special discounted fares or fare-card subscriptions for everyday commuters. Participants in the *enquête* were invested enough in the idea of a new tramway network to tinker with the details of the authorities' plans.

Several comments motivated by health and safety singled out the practice of using the rails themselves for the return of current as a possible source of electrocution. The Water Company (*Compagnie générale des eaux*) agreed, warning that their pipes might conflict with electric tramway equipment laid underground. Interestingly, this system had already been accepted for the Métro. The *Compagnie générale Parisienne de tramways*, meanwhile, was hoping to electrify some of their lines by underground conduit (*canniveau*), though the company's real ambitions were more based on the trolley: “the use...of the electric system with overhead wires wherever it can be admitted, or with underground conduit in those parts of the interior of Paris where overhead wires will not be accepted.”<sup>21</sup>

Parisians agreed with their fellows across the department. Each district of the capital produced 5-20 observations, no more than one of them negative. The themes of fare reduction, reform of the transfer system, and passenger safety were recurrent. The

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21 Ibid.: "...préconisant en particulier l'emploi, pour les lignes exploitées par la dite Compagnie, du système électrique avec fil aérien partout où cela sera admis, ou avec caniveau souterrain dans les parties à l'intérieur de Paris où le fil aérien ne sera pas accepté."

familiar center-periphery geography was apparent here as well. For example, one observer in the 18<sup>th</sup> district “recommends the use of electric traction by underground conductor for the center of Paris, and by overhead wires for the exterior boulevards.”<sup>22</sup> Participation was heavier on the Right Bank than on the Left, and heavier on the west side of the city than in the east. Responses from the working-class east (the 10<sup>th</sup>, 11<sup>th</sup>, 19<sup>th</sup> and 20<sup>th</sup> districts) were unanimously in favor of the new tramways, registering no comments or suggestions at all.<sup>23</sup> Parisian journalism and slang of the era called them “ten-cent tramways,” suggesting the popular importance of their price, their accessibility to everyone.

After decades of reiterating that Parisians constantly clamored for more and better means of transport, there is irony and droll formality in the fact that the authorities still held *enquêtes* at all. The few hundred citizens who participated in the *enquête* of 1896 were a meager slice of Paris's population of nearly 3,000,000, not to mention the suburbs, a fact which doesn't suggest great public interest in the process—nor does it suggest that the authorities tried to make the process accessible to the majority of citizens.<sup>24</sup> *Enquêtes* were legally required, of course, but their ever-positive results only confirmed what everyone already knew: as newspaper *L'Éclair* put it, the public had “so impatiently anticipated” the new tramway network for some time. As Gauthier wrote in an 1897

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22 "préconise l'emploi de la traction électrique par conducteur souterrain pour le centre de Paris, et par fil aérien pour les boulevards extérieurs."

23 The absence of comments from the east side might also mean that working class Parisians did not know how to comment, or didn't feel empowered to comment. I thank Gabrielle Hecht for bringing this to my attention. This does not, however, contradict the fact that all comments which were made by residents of the east side were positive, votes in favor of the new tramway lines.

24 The *enquête* which finally approved the Métro, May 16 – June 16, 1896, turned up similar results in terms of participation. 689 depositions were made, and 473 of these were an organized response *en bloc*, repeating the text of a handbill printed by the Association of Paris Landowners. See “Le métropolitain” *Le Temps*, Nov. 21, 1896, p. 3.

report, “From all sides, they demand the expansion and improvement of our ways and means of transport, as well as a reduction of fares.” The General Council, Gauthier suggested, should work “in order to give prompt and legitimate satisfaction to the voices of the populations in the department.”<sup>25</sup>

Contrary to Gauthier's hopes, deliberation on the ten-cent tramways dragged into the first decades of the 20<sup>th</sup> century and was not finished in time for the 1900 Exposition. A set of documents from the Ministry of Public Works shows that, of the 20 new tramway lines conceded between June, 1899 and June, 1902, 17 were conceded in 1899 or 1900 in a last minute attempt to serve the exposition, but half were still not operational in March of 1903.<sup>26</sup> After the 1896 enquête, it was three years before new tramway lines were conceded, and many lines were still not built after seven years. Construction quickly fell behind schedule. In November of 1902, Deputy of the Seine Coutant brought the “scandal” of what he called the “non-execution” of contracts by the tramway companies before the Senate. If this wasn't proof that private sector couldn't be trusted with such contracts, he asked, what was?—a question which prompted a heated discussion of municipalizing Paris's transport services.<sup>27</sup> Coutant is an example of a small but growing number of leftists around the turn of the 20<sup>th</sup> century who pushed for public ownership of utilities (the gas company was another popular target for reform).<sup>28</sup> The deeper question—of whether private companies could be trusted with public services—was widely discussed at the time, and even many left liberals, who generally preferred private

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25 “Les Tramways à Dix Centimes” *l'Eclair* (Oct. 24, 1897); Conseil Général de la Seine, *Rapport* No. 5 (Apr. 2, 1897), presented by Gibert, councilor from Saint Mandé (AP 25W 100).

26 *Tramways concédés dans la département de la Seine de juin 1899 à juin 1902* (AN F 14 15024).

27 *Journal Officiel de la République Française*. Yr. 34, no. 317. Vendredi 21 Nov. 1902. (Séance du 20 Nov. 1902), pp. 2679-2893.

28 See Lenard Berlanstein, *Big Business and Industrial Conflict in Nineteenth-Century France: A Social History of the Parisian Gas Company* (University of California, 1991).

ownership to public ownership, began to doubt whether any private company could be trusted with transportation in Paris.<sup>29</sup>

Departmental councilors, radical-socialists and journalists had feared this sort of contractual delinquency from the tramway companies leading up to 1900. The CGO had set a bad example. In this age of rapid development, the CGO stood out for its sluggishness. As the largest transit company in Paris and operator of many horse-drawn trams and omnibuses, the CGO was always cautious in experimenting with new equipment, still deeply tied to the 19<sup>th</sup> century's animal-powered urban ecology. The CGO also clung stodgily to its 1860 charter and the 50 year “monopoly” that it granted.

Political economist Paul Vibert campaigned against the CGO before the senatorial elections of 1896. Article 7 of the CGO's contract specified that “if the adoption of a new system would have as a result a notable increase in the net profits of operation, the company will be obliged to include the public and the city of Paris in this advantage by means of a lowering of fares....” But the CGO held back for decades, avoiding the switch to mechanical traction, continually complaining to the authorities about the rising costs of horse traction, the high cost of switching to mechanical traction, and clinging to its high fares. If the CGO *had* tried to update operations in any way, Vibert charged, it had been “fragmentary, I would say almost infinitesimal, absolutely insufficient and under conditions of bad faith.” Vibert harped on the line from Saint-Augustin to the Cours de Vincennes, “where it [the CGO] placed only enormous vehicles that have the air of war

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29 See the following: (1) "Les Tramways à 0.10 centimes" *l'Eclair* (June 19, 1896); (2) Conseil Général de la Seine, *Rapport* No. 5 (Apr. 2, 1897), presented by Gibert, councilor from Saint Mandé; (3) "Les Tramways à Dix Centimes" *l'Eclair* (Oct. 24, 1897); (4) L. de Laere, “La question des tramways,” *Le Courrier Bleu de Neuilly-Boulogne* (Oct. 17, 1897); (5) Stanislas Ferrand, “Les tramways de la Seine” *Le Bâtiment* (July 10, 1898); (6) Conseil Général de la Seine, *Rapport* No. 9 (July 2, 1898), presented by Gibert (AP 25W 100).

machines, even though it knows perfectly well that it was easy enough to establish tramways with covered impériales, light, simple, graceful and able to pass down all streets.” Such design was as “disastrous” as it was “defective.” Vibert was right. The CGO relied on expensive, clumsy and increasingly out-of-date steam and compressed-air vehicles, the kind tested in the Prefect's special commission of 1876.<sup>30</sup>

In 1897, suburban journalist L. de Laere sarcastically pretended to be unable to distinguish Inspector of Public Works Lorieux from Senator and President of the CGO, Cuvinot, in order to make a point about the revolving door between the public and private sectors. De Laere also evoked Armand Grébauval, another prominent suburban journalist and a revisionist socialist, who served on both the municipal and departmental councils in the 1890s. In order to prevent under-the-table deals between government and the CGO, Grébauval proposed formally in session that the Prefect of the Seine (then Justin de Selves) should not be allowed to fraternize with Cuvinot “even to drink a bock at the café of the national guard,” until he declared the public utility of the complementary tramway network.<sup>31</sup> Suburban bigwigs passed the torch of critique from one to the next, putting constant pressure on Paris to connect city and suburbs. In the following year, Stanislas Ferrand, architect and engineer, deputy of the Seine and editor-in-chief of the publication *Le Bâtiment* (“Building”) would take up the torch.

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30 Vibert, *La concurrence étrangère*, vol. 2, p. 83-84. See the AMTUIR (Paris Museum of Urban Transportation) website, especially the page on the “General History of Urban Transports,” [http://www.amtuir.org/03\\_index\\_hu\\_gale.htm](http://www.amtuir.org/03_index_hu_gale.htm). Here, AMTUIR outlines several systems (Rowan, Serpollet, and Purrey) of steam-powered tramways used by the CGO between 1889 and 1914. See also Jean Robert, *Les Tramways Parisiens*, pp. 31-63, 115-160.

31 For more about Grébauval, see *Dictionnaire national des contemporains : contenant les notices des membres de l'Institut de France, du gouvernement et du parlement français, de l'Académie de médecine...* sous la dir. de C.-E. Curinier (Paris: Office général d'édition de librairie et d'imprimerie, 1899-1919), vol. 5, p. 75-6. For this particular anecdote, see L. de Laere, “La question des tramways,” *Le Courrier Bleu de Neuilly-Boulogne* (Oct. 17, 1897).

Paris's first, longest-lasting and most powerful transit company was also its most corrupt. Popular, left-wing and suburban complaints about the CGO inspired critiques of public works aimed at various sources—the municipal, departmental and national governments, the General Traction Company, the smaller tramway companies—throughout the period from 1895-1914. The CGO continued to be powerful, but was always haunted by charges of corruption. The city had to wait until 1910, when its agreement with the CGO lapsed, to see any movement of the company toward wholesale electrification of its network (even though this switch was “legally required” as of 1896). The CGO effectively waited out Paris's primary period of electrification.

In spite of all the rush and controversy of the late 1890s, and the pressure of the impending 1900 Exposition, tramway “reorganization” continued through the First World War. Documents from the Ministry of Public Works show that the subject of “tramway reorganization” was a constant site of administrative work from 1899 through the 1920s.<sup>32</sup> The CGO didn't disappear until 1921, bought out by the municipal STCRP (Société des transports en commun de la région parisienne). Constant talk of “reorganizing” the tramway networks between the 1880s and 1920s is in itself evidence of the ongoing crisis of transportation in Paris. In the years between 1895 and 1914, this crisis was connected with electrification.

### *The Agonies and Ecstasies of Electrification*

France's first electric tramway opened in Clermont-Ferrand in 1890, the same year the *Société française d'accumulateurs électriques* was authorized to test four trains

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32 See the series F/14 in the Archives Nationales, cartons 15024 to 15030: “Réorganisation des tramways de Paris et du département de la Seine. 1899-1920.”

powered by accumulators (or batteries) on the *Madeleine-Levallois* line in Paris.<sup>33</sup> The failure of mechanical traction (steam and compressed air) to deliver the desired savings, and the broader tramway crisis, made electricity seem a likely solution to the financial and technical problems haunting the tramways and the Métro since the late 1870s. Engineer Léon Francq, already well-known for his system of compressed steam power, published a series of articles between 1886 and 1892 recommending electric traction for the Métro. Francq argued that electric traction would be cheaper to operate, drive down prices, allow more people access to public transportation, and pay off its high start-up costs. At the same time it would be cleaner, solving the problem of ventilating Métro tunnels, and reducing the amount of horse droppings in the street.<sup>34</sup> Francq, like many engineers and intellectuals of the era, saw electricity as something of a cure-all.

There was a palpable boost in the popularity, glamour, and awe surrounding electricity as a sublime or magical force following demonstrations at the Paris expositions of 1881 and 1889. In the 1880s, electricity became an important cultural object, a prismatic signifier associated with cleanliness, speed and shrinking distance, as with modernity, the future, progress and the 20<sup>th</sup> century. As historians Beltran and Carré put it, electricity was a “fairy” (*fée*), in the French sense of an inspiration or *muse*, and a “servant,” an all-purpose source of power, limitless in applications, which would

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33 Louis Figuier, *l'Année scientifique et industrielle* yr. 34 (1890) (Paris: Hachette, 1891), pp. 135-6 and 139-41. Siemens opened his first line in Lichterfelde, Germany in 1881. Across the English-speaking world, from the United States and Canada to England and Ireland, electric-powered tramways were first put into operation in the mid-1880s. The most famous was Frank Sprague's “Richmond Union Passenger Railway,” in Richmond, Virginia, 1888. John Joseph Wright is credited with opening an electric tram in Toronto in 1883. Joseph Barcroft was a well-known supporter of the Bossbrook and Newry tramway line, the first electric tramway in Ireland in 1885. In 1886, the first electric tram powered by hydroelectric generators was opened in Appleton, Wisconsin. For a good overview of this Anglo-saxon lead in global tramway development, see John P. McKay, *Tramways and Trolleys*, pp. 40-51.

34 Léon Francq, *Chemin de fer métropolitain: recueil des articles publiés dans le journal le Métropolitain à propos de la traction du métropolitain parisien* (Paris: E. Bernard et Cie., 1892).

revolutionize human life as steam had before it. Electricity also became a metaphor for energy in general, for excitement, inspiration, drive and life.<sup>35</sup> Electricity inspired fear, fascination and fantasy, as in Albert Robida's science fiction. Hence *Le Figaro* described a meeting of striking omnibus workers as “charged with electricity” and *Le Temps* greeted the news that the Métro would be electrically-powered with a cheerful “hail the fairy electricity!”<sup>36</sup>

By 1895, many credited electricity with having won a decisive victory over other modes of traction. Even the historical emergence of electrical technology seemed somewhat magical. Popular travel magazine *A travers le monde* (Across the World) noted how far it had come since Siemens's trolley demonstration at Paris's 1881 International Electrical Exhibition:

Who could have foreseen, before these modest beginnings, seeming more curious than really practical, the extraordinary development that we are witnessing today? Electric locomotion emerged from Germany and was studied and rendered practical in the United States, and now, thanks to the powerful impulsion it received in America, it is establishing itself definitively in Europe and propagates itself in all parts of the world....

Thus electric locomotion propagates itself with a prodigious rapidity, which seems without equal in industry.

The global diffusion of electric traction was a “universal development,” “the order of the day.”<sup>37</sup> The notion became commonplace. As Petitjean, writing about the Métro that same year, put it:

From the point of view of choosing a motor, it is evident that electricity, with its

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35 See: (1) Beltran and Carré, *La fee et la servante: la société française face à l'électricité* (Paris: Belin, 2000), (2) Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (University of California, 1992), (3) Christophe Prochasson, *Les années électriques, 1880-1910* (Paris: La Découverte, 1991), and (4) Shelley Wood Cordulack, “A Franco-American Battle of Beams: Electricity and the Selling of Modernity” *Journal of Design History* 18/2 (summer, 2005), pp. 147-166.

36 “La grève des omnibus” *Le Figaro*, Apr. 24, 1895, pp. 1-2; “Le métropolitain urbain” *Le Temps*, Apr. 16, 1896, p. 3.

37 Henri Monnory, “La locomotion électrique dans le monde” *A travers le monde* 1 (1895), p. 93.



innumerable resources, and the numerous forces it can put into action, will finish by triumphing over steam, and that one day, maybe soon, all forces of locomotion will be produced by electricity...

Paul Vibert returned to the idea in 1896—“a great national movement is taking shape today and which will impose itself imperiously tomorrow, thanks to the truly miraculous progress of electric traction.”—and Georges d'Avenel in 1905: “The future and even already the present belongs to electric traction...”<sup>38</sup> This culture of identifying electricity with the future and progress was well entrenched in Paris, reinforced by periodic expositions, where electricity in its various applications was an important showpiece since 1878. But behind this optimism and sense of historical destiny, electrical technology was still new; there were very real practical questions about making it work.

Technologically speaking, there were three available ways to deliver electric power to trains.<sup>39</sup> Most popular globally, and crucial during the dynamic period of tramway development in Germany and the United States in the 1880s and '90s, was the “trolley” system. In this system made famous by Werner Siemens and Frank Sprague, current was delivered to wires suspended above the rails, and then picked up by the “trolley,” a conductor mounted on a slender arm reaching up from the tram's roof to contact the wire. Eventually the entire system was named “trolley” or “trolley car” after the overhead conductor; the French used this English term, too. The second system, also

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38 Petitjean, p. 19; *La concurrence étrangère, les transports par terre et par mer* vol. 2 (Paris: Berger-Levrault, 1896-7), p. 107; Georges d'Avenel, *Le Mécanisme de la Vie Moderne* v. 5 (Paris: Librairie Armand Colin, 1905), p. 182.

39 Contemporary accounts of these various systems of traction are common in the published record, thanks to the booming interest in electricity of the era. See, for example: Paul Dupuy, *La traction électrique: tramways, locomotives et métropolitains électriques* (Paris: Librairie de Sciences Generales, 1897). Henry Martin, *Production et distribution de l'énergie pour la traction électrique* (Paris: Librairie Polytechnique Charles Beranger, 1902). Louis Barbillion, Louis-Charles Barbillion, G. J. Griffisch, *Traité pratique de traction électrique* (Paris: E. Bernard et Cie, 1903). John Hall Rider, *Electric Traction: A Practical Handbook on the Application of Electricity as a Locomotive Power* (London: Whittaker and Co., 1903). Francis H. Davies, *Electric Power and Traction* (London: Archibald Constable et Co., Ltd., 1907).

fairly common, was to bury conducting cables in the pavement between the rails and to hang a conducting device from the bottoms of cars. This might be a trolley-like apparatus dragging in a charged furrow (*canniveau*), or a dragging “foot” or “ski” (*frotteur*) picking up current from charged plates in the street (*contacts superficiels*) or from a third rail, like the Métro.

In these first two systems, trams regularly received current from a power plant at the end of the line. In the third system, trams were equipped with rechargeable accumulators or batteries. As Paul Vibert explained, a battery the size of a top hat could produce about one horse power. Most horse-trams used at least two horses, but two batteries would not be enough. Railway engineer Mékarski observed in the 1870s that tramways need access to a variable amount of power for stopping and starting frequently and for climbing slopes. Making such headroom would require loading cars with extra batteries. But batteries were heavy; installing more would ironically increase the energy needed to drive the car, and increase wear and tear on the rails. Finally, batteries were fragile and had to be replaced often. Their size, weight, fragility and limited capacity made them by far the clumsiest available form of electric traction.<sup>40</sup>

Accumulators were the first type of electric traction attempted in Paris, and it was not long before engineers realized their faults. Electricity was still a new, experimental domain; older forms of traction remained in wide use.<sup>41</sup> In 1892-3, three lines terminating at St-Denis north of the city operated by the *Compagnie des tramways de Paris et du*

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40 *La concurrence étrangère, les transports par terre et par mer* vol. 2 (Paris: Berger-Levrault, 1896-7), pp. 134-137. See also McKay, *Tramways and Trolleys*, pp. 96-7.

41 On other forms of traction, see *Tramway Stats 1894*: Between 1891 and 1893, the TPDS and the CGO opened 5 new horse-powered lines apiece. In addition to the Belleville Funicular in 1891, there were also 2 new compressed-air lines opened in 1891 and two new steam-powered lines outside of Paris in 1893. In total, the tramway statistics that Guyot began to collect before he left office show 5 new lines each year for 1891 and 1892, 6 lines in 1893. Of these sixteen new lines, ten were powered by horses.

*département de la Seine* (TPDS), were equipped with accumulator-powered cars.<sup>42</sup>

Already in 1893, the TPDS was in financial trouble. As the administrators of the TPDS put it in an address to their shareholders,

We are therefore in an era of transformations, of uncertainties, of studies, and it is for this reason that, faced with the mediocre results of fiscal year 1893, we request that, at least provisionally, you leave the profits of 1893 in the account of Profits and Losses, and do not augment our deficit in the eyes of our bankers.

In the summer of 1894, the TPDS asked its shareholders for financial relief again:

The increasing charges which weigh on our industry, the competition that we have had with the railroads and other transport companies, the costly improvements imposed on us by the situation, the high cost of [horse] fodder, have entailed for us, for several years, aggravations in expenses which are not yet compensated by a corresponding increase in receipts.<sup>43</sup>

Key here is the phrase “the costly improvements imposed on us by the situation”—a reference to increasing competition from newer tramway lines, some of which were mechanically powered. Expanding a horse-powered system to compete with a mechanically powered one was as expensive and labor intensive as testing innovative new equipment—either way, keeping up with technological development and growing demand for mass transit was not easy. The TPDS's Madeleine-St-Denis line actually showed a profit increase after the application of accumulators. Still, accumulators were no financial cure-all. The key was more capacity, more passengers per tram to make each tram more lucrative. Accumulators could not deliver this without making trams heavier, more fragile and more expensive.

Engineer Emile Vignes had already given up on accumulators altogether:

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42 These were: (1) the line from the Opéra to the porte de la Chapelle and St-Denis (place des Casernes), (2) the line from the Madeleine to place Moncey and St-Denis (place aux Gueldres), and (3) from Neuilly (porte Maillot) to St-Denis (place aux Gueldres).

43 *Compagnie des Tramways de Paris et du Département de la Seine. Assemblées Générales Extraordinaire et Ordinaire du 15 Juin 1894* (Paris: Chaix, 1894), pp. 15 and 5, respectively (AN F/14/8587).

“Traction by electric accumulators is incontestably the most expensive. Inadequate returns, costly upkeep and renovation: to such a point that it is now recognized that this mode of mechanical traction doesn't procure any serious savings over animal traction.”<sup>44</sup>

Although the failing tramway companies had been reorganized in 1887, the problems facing the TPDS differed little from those which faced its predecessor the North Tramway Company in the late 1870s. The trials of accumulator batteries (and other mechanical and electrical systems) merely produced additional expenses on top of the already difficult situation of horse traction. Accumulators solved neither the financial nor the technical problems of the tramways.

It grew frustrating. In theory, engineers, politicians and economists had been arguing since the 1870s, mechanical traction should offer major savings over horse traction. Twenty years later, Paris had still not figured out how to put this theory into practice. While electric traction would prove in the long run to be much cheaper than other forms of mechanical traction, results in this era of ongoing experimentation were mixed. So, for example, the administrators of the TPDS found in 1893-4 trials that steam locomotion was more profitable than accumulators, bringing in five times the revenue. From this experience they drew a more general (and generally incorrect) lesson, that mechanical traction could be more affordable than electric.<sup>45</sup>

There was, of course, the trolley. Its popularity on a global scale ensured that Parisians knew about it, at least after 1881. We do not know who first suggested applying

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44 Emile Vignes. *La traction mécanique des tramways* (Paris: E. Bernard, 1894), p. 8. As George d'Avenel saw it in the early years of the 20<sup>th</sup> century, “Traction by accumulators, - whatever their system may be, - is, or so say the entrepreneurs in transportation who have abandoned them after much experience, the worst of all,” p. 182.

45 Compagnie des Tramways de Paris et du Département de la Seine. *Assemblées Générales Extraordinaire et Ordinaire du 15 Juin 1894* (Paris: Chaix, 1894), pp. 6-11. AN F 14 8587

it in Paris, but the idea was certainly controversial. Soon after the accumulator trials, the Municipal Council raised what historian John McKay called a “fury” against the idea of overhead wires in Paris. This became an issue because the tramway companies knew that trolleys were cheaper to install and operate, and wanted to use them wherever possible throughout the department of the Seine. Several tramway companies envisioned mixed systems, with trams switching from accumulators in the center city to trolleys in the periphery.<sup>46</sup> Some municipal councilors thought trolley-wires on the external boulevards might be alright, but everyone agreed that the center city should remain inviolate. A few councilors thought overhead wires should be prohibited throughout Paris, even in the periphery. The council didn't begin to relax this stance until 1902, in the wake of a series of electrocutions due to tramways powered by surface contacts, as we will see later in this chapter. But when the council decided to allow trolleys on a limited basis, “cries of pain and anti-trolley outrage surged up,” with one municipal councilor shouting in session that “if they ever install trolley wires in my quarter of the city, I will cut them down with my own hands.”<sup>47</sup> A contemporary engineer stated flatly that “the establishment of electric tramways supplied by overhead wires is, so to speak, impossible in major cities, because of various reasons, the principle of which is the ugly aspect of the wires, which destroy the aesthetic of streets....” The claim seems hyperbolic in hindsight, considering the contemporary success of the trolley in the U.S. and Germany, but for Parisians of the era, it could seem like brute fact.<sup>48</sup>

We saw in the last chapter that the cultural, aesthetic and patriotic priority of

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46 Paul Vibert, *La Concurrence Etrangère* vol. 2 pp. 73-75, *Tramways 1896 enquête d'utilité publique*,

47 McKay, *Tramways and Trolleys*, p. 86.

48 Paul Dupuy, *La traction électrique: tramways, locomotives et métropolitains électriques* (Paris: Librairie de sciences générales, 1897), p. 150.

keeping Paris beautiful often challenged integrating railways into the city. This was most evident in Parisians' commitment to keeping industrial transportation infrastructure (whether elevated tracks, overhead trolley wires, or locomotives) out of the center city, inside the grands boulevards. This attachment to Paris's cityscape (her "physiognomy" as contemporaries put it) generated significant opposition to overhead wires, making Paris an exception in France, where many smaller cities and towns developed trolley networks. Paris also fit an international pattern. In spite of similar protest to trolley wires in New York, Washington and Berlin, the United States and Germany were leaders in tramway development in this era, because of the trolley's rapid diffusion in smaller cities. It was in capital cities like Paris, Berlin and Washington that trolley wires were seen as aesthetically crude.<sup>49</sup>

The trolley was exotic in Paris for several reasons. In the 1880s, when the trolley system was first being developed on a global scale, Parisian engineers were still struggling with various forms of mechanical traction. In the 1890s, as networks of electrical and telephone wires were gradually installed in Paris, they tended to be routed underground, bundled with gas pipes and Berlier's pneumatic tubes in the sewers. Hence electrical wires were hidden, not yet integrated into the cityscape. Paris's electrical network remained quite limited until preparations for 1900 began. Electric tramway

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49 A glance at comparative development is instructive. By 1889, there were 1,032km (645 miles) of electric-powered tramways in the United States. Ohio and New York were the two leading states, each accounting for more than 10% of the total length of lines. Boston was soon to follow with an addition 400km of electric trams (See Figuiet (1890), pp. 136-7). In Europe, the boom in development came later. From 1892 to 1902, France went from 37km to 1,995km; from 1893 to 1903, Germany went from 102km to 3,692km (See McKay, *Tramways and Trolleys*, p. 72). It is also useful to note that Paris was not the only city in the Western world which witnessed opposition to tramway electrification: Berlin, Brussels, Budapest, Dresden, Vienna and Toronto also experienced such opposition (see McKay, *Tramways and Trolleys*, pp. 86-87), as did several cities in the United States including New York and Washington (see Eric Schatzberg, "Culture and Technology in the City: Opposition to Mechanized Street Transportation in Late-Nineteenth-Century America," cited above).

development of any sort was therefore a plus for the city, because by laying and wiring new tracks, the tramway companies would help to ready the city for more general electrification. In addition, because electricity was such an important theme of the 1900 Exposition, many exhibits needed to be wired. Preparing the city for the exposition thus jump-started development of Paris's electrical network more generally.<sup>50</sup>

The failure of accumulators, combined with local opposition to overhead wires, left only one way for the Parisian tramways to be electrified: conductors sunk in the street between the rails. Hence the majority of electric tramway development between 1895 and 1900, in the rush to prepare for the 1900 Exposition, was based on replacing horse traction with “surface contacts” (English) or “superficial contacts” (French: *contacts superficiels*) in one of several versions on existing tramway lines.

Most lines in Paris were fit with the Diatto system, patented by Italian engineer Alfredo Diatto in 1894 (figure 13).<sup>51</sup> In this system, a ski- or shoe-like “dragger” (*frotteur*) hung from the bottom of each tram, picking up current from charged “plots,” cement boxes sunk in the pavement between the rails equipped with a “stud” or “pin” (*clou*) device. Inside each box, an electrically-charged metal pin with a magnetized head sat in a mercury bath to prevent it from conducting while at rest. As trams passed over

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<sup>50</sup> Beltrand and Carré, *La Fée et la Servante*, 188-189. Indeed, in this era of electrification, tramway development both intimately depended on, and helped advance, the development of electrical grids more generally. See: (1) Alberte Martinez Lopez, “Belgian investment in tramways and light railways : An international approach, 1892-1935” *Journal of Transport History*, March, 2003, pp. 59-77; (2) Pierre Lanthier, “The Relationship between State and Private Electric Industry, France 1880-1920” in Norbert Horn and Jürgen Kocka, eds. *Law and the Formation of the Big Enterprises in the 19<sup>th</sup> and Early 20<sup>th</sup> Centuries*. (Göttingen: Vandenhoeck and Ruprecht, 1979), pp.590-603. As Eric Schatzberg has shown, electrification diffused much more quickly as a motive power than it did, for example, in lighting. See “Culture and Technology in the City,” cited above.

<sup>51</sup> Most, but not all lines in Paris were equipped with the Diatto system. The Dolter, Claret-Vuilleumier and Védovéli systems were also used. For more on these various surface-contact systems, see: (1) Louis Barbillion and G. J. Griffisch, *Traité pratique de traction électrique* (Paris: E. Bernard, 1903), pp. 451-513, (2) Robert Henry Smith, *Electric Traction* (Harper, 1905), pp. 167-206; (3) Henry Maréchal, *Les tramways électriques* (Paris: Librairie Polytechnique Charles Beranger, 1902), pp. 117-145.

each plot, the pin was magnetically lifted out of its mercury bath by the dragger, transmitting the charge. Diatto had solved the problem of how to de-activate the plots while not in use, but he had not solved the problem of how to keep the plots from being re-activated by other forces like rain, rust or physical damage to the contact apparatus. His system was ingenious but fragile, based on a delicate moving apparatus, which often malfunctioned, and was vulnerable to the weather and to short circuits. The system was a better response to Paris's aesthetic problems than it was to Paris's technological needs (here the trolley would have served fine).

While savants like Francq, Gauthier, Vibert and d'Avenel followed international currents of opinion in seeing the rise of electric traction as a decisive victory over previous forms of traction, a historically predestined development, other Parisians did not share this view. Local knowledge collected by engineers and bureaucrats over the preceding thirty years suggested that all forms of non-animal traction were difficult, and that other technical systems (compressed air, steam and cables) were still available.<sup>52</sup> All Parisians knew that aesthetic priorities were essential to the capital, whose reputation was staked on its legendary beauty. Grooming the city for the Exposition unleashed contradictory impulses in Paris: on the one hand, restless futurism and zeal for infrastructural development, which suggested a need to violate the existing city, and on the other hand, pride and vanity in the city's beauty, which suggested the need to preserve it. In the rush to catch up with the perceived level of development of nations like Germany, Britain and the United States in time for 1900, many different systems of

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52 The *Société Générale d'Eclairage et de Force Motrice* tried to revive compressed air with the Popp-Conti system in the 1890s, but again it proved short-lived. See *Société Générale d'Eclairage et de Force Motrice, Tramways Pneumatiques Popp-Conti* (Paris: Chaix, 1896).



traction were simultaneously applied in Paris, mostly surface contacts *a la* Diatto, but also several other versions of surface contacts, compressed air, steam locomotion, and mixed systems.

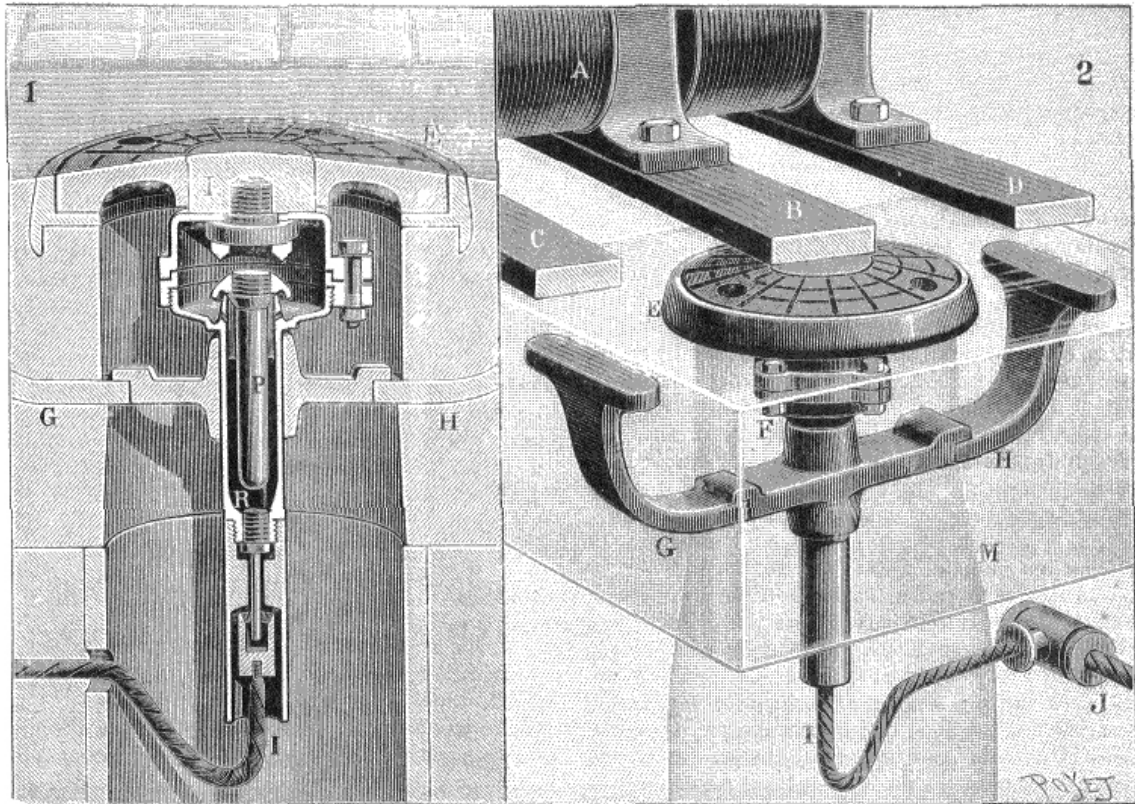


Figure 13: Two views of the Diatto system stud mechanism, from *La Nature*, 1899. The drawing on the left shows a cutaway of the plot situated in the pavement. The drawing on the right shows how a tram's *frotteur* made contact with the plot.

On the one hand, it is easy to see in hindsight that some hasty engineering and hasty business decisions were made in the rush to equip the city for the exposition. On the other hand, the technologies involved were new and “high tech,” still unformed, as were the public and private institutions needed to operate and govern the new mass transit networks, and social-cultural scripts for how to use them. As the administrators of the TPDS saw in the early 1890s, this was an era of experimentation, of restless futurism in development, charting out new territory, taking risks. For investors, there were the

financial risks of putting money on equipment that was, in many cases, still experimental. For the government, there were opportunities for corruption across the public-private divide, and thus the risk of legitimation crisis. Questions of jurisdiction and responsibility abounded. But most remarkable in this era were the physical risks taken by the increasingly diverse Parisians who came into more frequent contact with the new transit networks in this era: construction workers, passengers, drivers. A new public got to experience mass transportation, and in so doing, got their first real taste of electrical equipment, and of the speed, fire, and electrocution that come with it.

*“Electric Misadventures” and “The Wrongdoings of Electricity”: Everyday Operation and the Problem of Accidents, c. 1900-1903*

—“...this type of traction is recent; so we must give it credit for the inseparable difficulties of the debut.”<sup>53</sup>

—“I know well that mechanical traction is destined to replace animal traction: 'the one kills the other'.”<sup>54</sup>

Métro line 1 opened July 19, 1900, three months into the Exposition. One observer described ticket booths “assaulted” by visitors and Parisians alike, trains running at double capacity the first several days. Contemporary newspaper accounts claim everyone enjoyed the ride, noting its speed and affordability. Riders also enjoyed the cool tunnels as a refuge from the above-average summer heat and found underground installations clean and well lit—nothing like the dark and dank images of a *nécropolitain*

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53 “Mésaventures électriques,” *Le Temps*, Oct. 19, 1900, p. 3.

54 Councilor Duval-Arnould, Dec. 15, 1900. See *Bulletin Municipal Officiel*, Dec. 16, 1900, p. 4081. “Je sais bien que la traction mécanique est destinée à remplacer la traction animale: "ceci tuera cela".”

circulating in Paris since 1878. There were many reasons for this enthusiasm. For visitors, it was a fantastic, futuristic ride, the world's fourth electric-powered underground railway after London (1890), Budapest (1896) and Boston (1897). For Parisians, it was a taste of the transit network that would criss-cross their city and transform the way they moved through it in the 20<sup>th</sup> century.<sup>55</sup>

The Métro was also symbolically important, a showpiece in the Exposition. Some connected it with France's civilizing mission, one journalist writing "I salute the Métro as an admirable agent of moral and material progress."<sup>56</sup> The 1900 Universal Exposition, like those before it, was a celebration of industrialization as progress. It was a great open-air museum, designed to teach visitors, among other things, that the development of science and technology was a key to social and economic development, a motor of history, a pillar of modern civilization.<sup>57</sup> The Exposition was a farewell celebration for the "century of steam" and an inauguration of the "century of electricity"—a second industrial revolution on the horizon. Petitjean personified the coming century: "My name is the century of electricity, and I come to the world to continue the work of peace and progress started by steam." Electricity was identified with progress and the future, showcased at the Exposition in its many applications. Petitjean, again: "It is thus in plain social and industrial revolution that the great Exposition of 1900 will open its liberal

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55 Glasgow's 1896 District Subway and Vienna's 1898 Stadtbahn are other contemporary systems, but Vienna's was not fully underground, and neither system was electric powered (Vienna ran on steam and Glasgow ran on cables). See: "Le métropolitain" *Le Petit Parisien*, July 23, 1900, p. 2; *Le Temps*, July 21, 1900; "Smaller Crowd at Paris Fair" *Chicago Daily*, July 21, 1900, p. 6: "The Metropolitan underground railroad commenced regular traffic today and has already proved popular. The coolness of the tunnels is sought by the sweltering Parisians." It should be noted that it was an unusually hot summer, a fact we'll revisit in Chapter 5 when we talk about water shortages.

56 *Le Radical*, July 19, 1900. Quoted in Elisabeth Hausser, *Paris au jour le jour: Les événements vus par la presse, 1900-1919* (Paris, Les Editions de Minuit, 1968), p. 37.

57 See Brigitte Schroeder-Gudehus and Anne Rasmussen, *Les fastes du progrès: le guide des expositions universelles* (Paris: Flammarion, 1992). These authors stress the pedagogical ambitions all the world's fairs, not just those in Paris.

doors to all nations.”<sup>58</sup> As the Métro was born in late-nineteenth-century dreams of a more efficient city, so its inauguration was a spectacular end to the Métro's dream life, a dream come true.

But behind this optimism, the Métro was troubled by technical errors and minor accidents—short circuits leading to fires, lighting failures, delayed trains and panicked passengers—events which show how new and unfamiliar electric technology was for both users and operators of the era.<sup>59</sup> Newspaper *Le Petit Parisien* tried to assuage public fears, calling them “little accidents without any seriousness, whose importance should not be exaggerated.”<sup>60</sup> Electrical technology was still volatile at this early stage of development. Wires were not always well insulated, circuits not always well grounded.<sup>61</sup> As engineering historian Jean Tricoire has argued, day-to-day Métro operation in its first several years (1900-1903) was deeply experimental, moving slowly “from improvisation

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58 Petitjean (1895), p. 7.

59 See *Le Petit Parisien*, July 13, 23, and 26, 1900. There are a number of scholars who have already produced excellent analyses of the difficult process of coming to terms with the powers and dangers of electrical technology, across the Western World, between the 1880s and 1930s. Foundational in this respect is (1) Thomas Hughes, *Networks of Power: Electrification in Western Society, 1880-1930* (Johns Hopkins, 1983). See also: (2) Lisa Cartwright, *Screening the Body: Tracing Medicine's Visual Culture* (University of Minnesota, 1995); (3) Edmund Todd, “Electric Ploughs in Wilhelmine Germany: Failure of an Agricultural System” *Social Studies of Science* 22/2 (1992), pp. 263-281; (4) David Nye, *American Technological Sublime* (MIT, 1996) and *Electrifying America: Social Meanings of a New Technology* (MIT, 1992); (5) Bernhard Rieger, *Technology and the Culture of Modernity in Britain and Germany, 1890-1945* (Cambridge, 2005); (6) Andreas Killen, *Berlin Electropolis: Shock, Nerves and German Modernity* (California, 2006); (7) Eric Schatzberg, “Culture and Technology in the City: Opposition to Mechanized Street Transportation in Late-Nineteenth Century America,” in *Technology and History: Essays in Honor of Thomas Parke Hughes and Agatha Chipley Hughes*, ed. Gabrielle Hecht and Michael Allen (Cambridge: MIT Press, 2001), pp. 57-94; (8) Michael Hård and Andrew Jamison, eds. *The Intellectual Appropriation of Technology: Discourses on Modernity, 1900-1939* (MIT, 1998).

60 “Le métropolitain” *Le Petit Parisien*, July 23, 1900, p. 2. No passengers were injured, but at least two Métro workers were electrocuted. See *Le Petit Parisien*, July 13 and 23, 1900. See also: full record of Métro accident reports, 1899-1905 (AP VONC 129).

61 A point Andreas Killen has made in *Berlin Electropolis: Shock, Nerves and German Modernity* (University of California, 2006); see also Bernhard Rieger, *Technology and the Culture of Modernity in Britain and Germany, 1890-1945* (Cambridge, 2005).

to method.”<sup>62</sup>

The new century was no easier for the tramways. In January, 1900 construction of the new *Bourse-Opéra* line was stopped by angry neighbors protesting the “barbarian tramway” (*tramway des barbares*). *Le Temps*, self-proclaimed ally and “echo” of the protesters, said the tramway would spoil the neighborhood's beauty, encumbering the *rue du Quatre-Septembre* and threatening Haussmann's iconic *place de l'Opéra*.<sup>63</sup> Urban historian Gérard Jacquemet, however, argued that protesters more likely feared the new tramway would enable the “barbaric” working poor of east Paris to invade their upscale bourgeois neighborhood. In fact, more than one line in Paris was called *tramway des barbares*, and this phrase was joined by others like “murderous tramways” (*tramways meurtrières*, 1900) and “criminal tramway” (*le tramway criminel*, 1910).<sup>64</sup> Such everyday epithets are glimpses of the user's perspective in transport history, evidence that Parisians were not always happy with the development of industrialized transport, and recognized the darker side of modern technology. At times the material trappings of

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62 Jean Tricoire, “L'exploitation du métropolitain: de l'improvisation à la méthode,” in *Métro-Cité: le chemin de fer métropolitain à la conquête de Paris 1871-1945* (Paris musées, 1997), pp. 103-116.

63 Hausser, *Paris au jour le jour*, p. 15. See also “Le tramway de Romainville” *Le Temps*, Jan. 11, 1900, p. 2, and “Le tramway de la rue du Quatre-Septembre” *Le Temps*, Jan. 18, 1900, p. 1. The editors of *Le Temps* agreed that this tramway line was barbaric, mostly because it threatened the beauty of the place de l'Opéra, and declared their newspaper the “echo” of this bourgeois neighborhood campaign against the tramway.

64 Gérard Jacquemet, “Equipement Urbain à Belleville de 1860 à 1914” in *Paris et Ile-de-France: Mémoires publiés par la Fédération des Sociétés historiques et archéologiques de Paris et de l'Ile-de-France*, vol. 33 (1982), p. 249. René Martial reported that the epithet was used for the tramway line from Montrouge to the Ecole Militaire. See: “Le mouvement de population dans les villes” *Annales d'hygiène publique, industrielle et sociale*, ser. 11 n. 10, Oct. 1933, p. 562. Albert L. Guérard suggested the same in his *l'Avenir de Paris* (Paris: Payot, 1929), p. 211. These references to the tramway line from Montrouge to the Ecole Militaire contrast with references like those of Elisabeth Hausser and Gérard Jacquemet, who found Parisians using the epithet for an east-west tramway line operated by the Compagnie des Tramways Est, running from Romainville to the Opera. This is the same tramway line singled out by Ernest Levallois in 1910 as a “tramway criminel.” See: *Paris Propre!* (Paris: Edouard Cornély et Cie, 1910), pp. 5-40. Poet Hughes Lapaire used the term “tramway des barbares” to refer to a tramway in the Berry region of central France, which he thought would spoil the beauty of the area. See: *Le Berry vu par un Berrichon* (Paris: Librairie Universitaire J. Gamber, 1928), p. 16.

modernity seemed more like barbarism than civilization.

June of 1900 alone brought 125 injuries and 3 deaths on the tramways. In late July *Le Petit Parisien* observed “it’s decidedly a series,” later reviewing more than a dozen accidents in July and August under the headline “the murderous tramways.”<sup>65</sup> Most of these accidents were collisions involving mechanically-powered trams. *Le Petit Parisien*, again: “They make us talk about them too much—and in such an upsetting manner—these tramways with mechanical traction, whose creation was welcomed with such favor by the Parisian population.” That summer, several pedestrians were run over or hit by trams, one canister of compressed air exploded, and a group of passengers panicked after their tram derailed. Finally, the improperly charged plate of a tramway powered by surface contacts shocked a dozen coachmen and electrocuted one horse to death—a grisly preview of events to come in the winter of 1900-1901.<sup>66</sup> Accidents were so frequent that humorist Pierre Wolff quipped “there is at least one tramway accident per day.”<sup>67</sup>

The accidents continued in the fall of 1900, when *Le Petit Parisien* wrote “it is undeniable that the new mode of mass transit with which we are afflicted constitutes a public danger.” The problem, the editors argued, was that mechanical and horse-powered vehicles shared the same streets and same rails, writing: “Tramways and carriages could never mix well. The one excludes the other.” Such were the difficulties of uneven development. Horse-traction, unsuited for the speed and intensity of modern traffic, was becoming obsolete, while mechanical traction, with its higher capacity and speed, was

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65 *Le Petit Parisien*, Oct. 5, 1900, p. 1; “Rencontre de Tramways” *Le Petit Parisien*, July 24, 1900, p. 3; “Les tramways meurtrières,” *Le Petit Parisien*, Aug. 22, 1900.

66 *Le Petit Parisien*, July 3, 4, 7, 9, 10, 11, 16, 22, 24, and August 1, 5, 8, 13, 16, 22, for 1900.

67 Quoted in Hausser, *Au Jour Le Jour*, p. 39. For August 15, 1900, Hausser wrote: “Collision de tramways place Clichy; 30 blessés légers. Suivant la formule de l’humoriste Pierre Wolff, “il y a à peine un accident de tramway par jour.””

unsafe in crowded spaces—unsuited, *Le Petit Parisien* argued, for major cities at all. Recent accidents had resulted “from the very existence of tramways with mechanical traction in cities where circulation is too intense.”<sup>68</sup>

On October 11th, fifteen young men attacked a horse tram, beat two employees and stole the till—perhaps a protest, perhaps a robbery, perhaps both. The same day a Métro train stopped at the *Tuileries* station and the conductor opened the door to find it on fire.<sup>69</sup> Like the last fire, this was caused by a short circuit. The Métro's first collision was October 19th; two trains crashed near the *Concorde* station. Twenty-nine passengers received minor injuries and one driver was badly injured. Parisians fanned the news into a roaring blaze of rumors, claiming hundreds of passengers had been injured. Prefect Lépine announced again in the press as he had in September that he understood citizens were upset about recent events, quickly revised Métro signaling rules to prevent further collisions, and opened an investigation on the tramway accidents. Investigators concluded that recent tramway collisions had been caused by speeding drivers making up for time lost on busy routes.<sup>70</sup> Naturally, faced with so many accidents, many wanted to discuss responsibility. But police investigators only repeated what journalists for *Le Temps* and *Le Petit Parisien* had already said, resorting to facile finger-pointing, blaming the drivers. Other contemporaries blamed the companies that operated the tramways, especially the

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68 “La marche des tramways” *Le Petit Parisien*, Sept. 8, 1900, p. 3; all quotes from “Les tramways meurtrières” *Le Petit Parisien*, Oct. 5, 1900, p. 1.

69 An unconscious young man was carried from the car and transported to the hospital; the authorities were concerned about his condition, but unable to identify him. See “Un tramway pris d'assaut” and “Le feu au Métropolitain,” *Le Petit Parisien*, Oct. 12, 1900, pp. 1 and 3, respectively. Months later, *Le Temps* reported that some tramway lines were attacked so often at certain points in the periphery that these routes were shut down at night, provoking the ire of passengers, and prompting the Prefect of Police to post officers on trams. See “La police en tramway,” *Le Temps*, Dec. 13, 1900, p. 4.

70 “Le métropolitain et les tramways” *Le Petit Parisien*, Oct. 25, 1900, p. 2.

CGO, for incompetence, corruption, and overburdening employees and equipment.<sup>71</sup>

Hindsight reveals other causes—the newness of electrical technology, the absence of solid social-cultural scripts for its use, and the necessity for engineers and operators to improvise at this stage of uncertainty.<sup>72</sup> Electrical technologies were dangerous for drivers, passengers, pedestrians and horses. Contemporaries saw that electric traction was being applied in social and spatial contexts already strained by Paris's extreme urban density. Drivers had a difficult job not only because they navigated crowded streets, but also because they operated “cutting edge” equipment whose design and use were not yet fully scripted. The climate of ideas is equally significant. Blaming the drivers was a way for those committed to the progressive, civilizing potentials of new technologies to cover up their risks, to avoid cognitive dissonance with the technophilic ideals presented at the expositions (i.e., it was not technology which was to blame, but human agency—how technology was *improperly* used). Indeed, squaring the obvious dangers of the new technology with the nineteenth century's culture of technological optimism was one of the most difficult cultural-intellectual challenges of the second industrial revolution in general, and of the universal expositions in particular.<sup>73</sup>

While engineers and intellectuals defended new technologies, drivers and riders were slowly learning about them individually and collectively, through experience and discussion—and they proved much more wary of the new means of transport.<sup>74</sup> In late October, *Le Temps* noted that the city's electric tramways were starting to “strongly

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71 For example, see Paul Vibert's critique of the CGO in the second volume of *La Concurrence Etrangère*, 1896. A similar critique would be visited on the Métro Company by *l'Assiette au Beurre* and *La Croix* after the accident of 1903.

72 Hence Jean Tricoire's formula “from improvisation to method.”

73 Bernard Reiger, *Technology and the Culture of Modernity*

74 The string of accidents continued in November. See: “Collision de tramways,” *Le Petit Parisien*, Nov. 4, 1900, p. 1. “Accidents sur le Métropolitain,” *Le Petit Parisien*, Nov. 11, 1900, p. 3.



interest the public...and with reason!”, because of a disquieting phenomenon:

In effect, for some time, on the routes of tramways of this type which stretch extensively across Paris, one frequently notices that a horse has been knocked down, that a passerby received an electric concussion; this is happening much too often according to people, extremely numerous, who fear being electrocuted, while not paying attention, by setting foot on one of these “plots” with which we have equipped certain streets and boulevards.<sup>75</sup>

The “plots,” of course, were a technical peculiarity of tramways powered by surface contacts, in this case the Diatto system. The editors of *Le Temps* knew this, arguing that the surface contact system and was regularly malfunctioning. Perhaps “theoretically” plots only delivered current when a tram passed over them, but “in practice” everyone knew that they often remained charged after a tram had passed: “the theory may well be very correct, the designs may well be very convincing, [but] the facts are there: they have received shocks.”<sup>76</sup>

Eight more horses were electrocuted by surface contacts in December (figure 14). Like *Le Temps*, departmental councilor Duval-Arnould blamed the Diatto system. While journalists were critiquing engineers, politicians were becoming engineers. In his statement to the departmental council, Duval-Arnould showed a limited understanding of electrocutions, but engaged in relatively sophisticated discussion of the workings of surface contact plots to justify his claims.<sup>77</sup> His statement pins him to a certain moment

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75 “Mésaventures électriques” *Le Temps*, Oct. 19, 1900, p 2. “La question des tramways électriques commence à intéresser fort le public... et pour cause! En effet, depuis quelque temps, sur les voies de tramways de ce genre qui s’étendent intensivement à travers Paris, on constate fréquemment qu’un cheval a été culbuté, qu’un passant, ou une passante, a reçu une secousse électrique; cela se produit beaucoup trop souvent au gré des gens, extrêmement nombreux, qui craignent d’être électrocutés en posant, pas distraction, le pied sur un des “plots” dont on a garni certaines rues et certains boulevards.”

76 *Ibid.*, p. 3: “la théorie a beau être très juste, les dessins ont beau être très convaincants, les faits sont là: on reçoit des secousses.”

77 He marveled at the fact that horses were killed by walking on plots, while humans were not. He did not recognize, as we would today, that horses were more vulnerable to shock because they wore iron horseshoes, which make good conductors.

in the cultural-intellectual history of electricity, an era in which Europeans from all walks of life worked to close Rieger's "the knowledge gap" through experience and experiment. But Duval-Arnauld's statement also complicates Rieger's concept, showing that there are shades of meaning between lay and expert understanding. Was this professional politician a technical expert, or was he speaking on behalf of himself or his constituents as lay tramway users?<sup>78</sup>

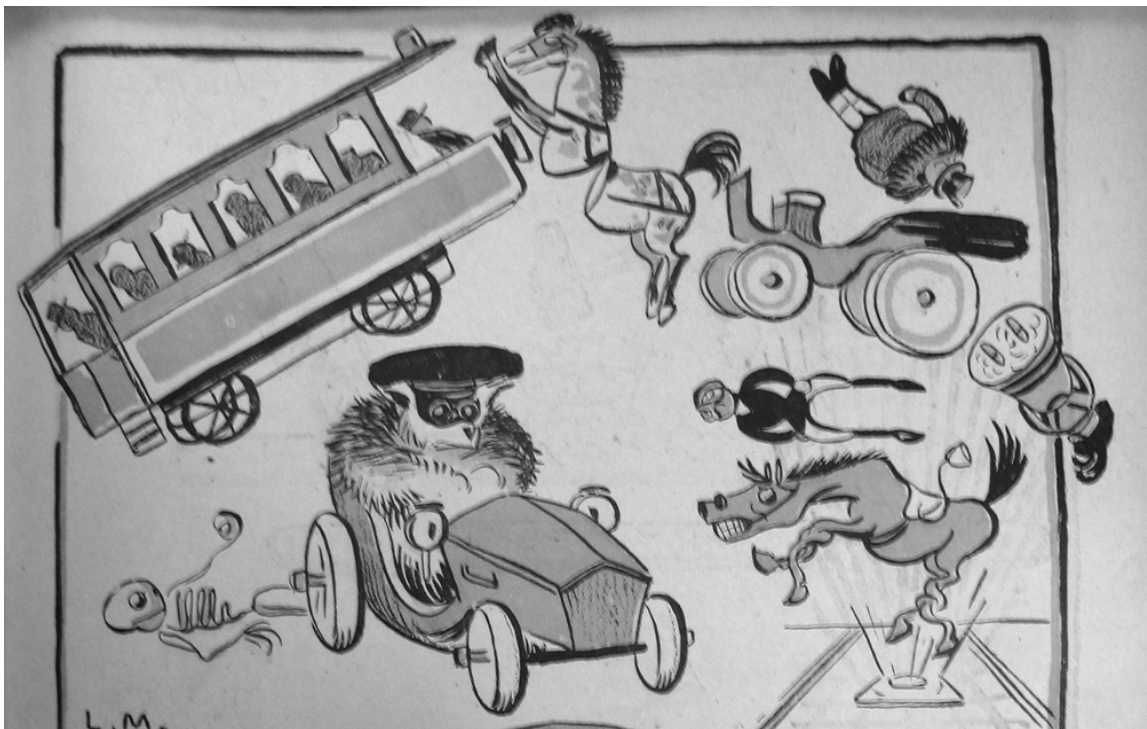


Figure 14: *L'Assiette au Beurre's* November, 1901 cartoon "dangerous toys" (*joujoux dangereux*) depicted the danger of contemporary transportation technology from the user's point of view. The cartoon depicts a tramway colliding with a private carriage, an automobilist running over a pedestrian, and a horse being electrocuted by a tramway plot (from *L'Assiette au Beurre* 35, Nov. 30, 1901).

Duval-Arnauld apologized for his digression into "considerations of a technical order," promising to keep it simple and brief so that neither he nor his audience would be "drowned." He uncovered three technical issues. First, as *Le Temps* suggested, the conducting "pin" or "nail" (*clou*) which ideally rose from its mercury bath to contact the

<sup>78</sup> Bernhard Rieger, *Technology and the Culture of Modernity in Britain and Germany, 1890–1945* (Cambridge, 2005).

conductor (*frotteur*) on the bottom of trams often remained engaged after trams passed, leaving plots improperly charged. Second, as tramway companies began to notice the electrocutions over the course of the summer and fall, they spent weeks equipping trams with a second dragging “foot” (*frotteur*), designed to ensure that plots were no longer live after trams passed. Ironically, these safety devices started short circuits of their own, setting off small electrical fires which damaged plots, only making electrocution more likely. Third and finally was the problem of moisture; the small cement box which held each surface contact device was buried in the pavement and could fill with rain water, another invitation to short circuits.<sup>79</sup>

Duval-Arnauld knew that the Seine Council's job was understood to be politics, not engineering. This was not just a matter of rhetoric, custom or manners. Unlike the recent string of tramway collisions, these electrocutions could not be blamed on the drivers (i.e. human agency). Rather, they were obviously the fault of engineers, or of flaws in the technology itself. But because the administration had ordered the tramway companies to move to mechanical, especially electric, traction after 1896, it accepted the responsibility of regulating these technologies. This was an important moment in state-formation; electrical engineering became entangled with governance. The safety of electrical traction was no longer a subject of public concern at which the Prefect of Police could throw legislation—it had become an urgent task of governance, drawing in the municipal and departmental councils, who engaged in increasingly detailed discussions not only of society, economy and politics, but also of electrical technology itself, in an

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<sup>79</sup> For the December 15<sup>th</sup> session, see *Bulletin Municipal Officiel*, Dec. 16, 1900, pp. 4081-4096. See also *Rapport de l'Ingénieur ordinaire*, Paris le 25 Décembre 1900. Both sources can be found in AN F 14 14999.

attempt to keep everyday passengers safe.

Behind the question of whether human agency or technology caused accidents, another factor lurked: *the weather*. As socialist councilman Armand Grébauval put it, “no one knows how the surface contact system will behave with snow and rain.” January, 1901 proved to be a snowy month, with disastrous consequences. Thirty-four more horses were electrocuted, and the Prefecture of Police was plunged deeper into its study of the problem. The Diatto system was not a good match for Paris's humid climate, its intense circulation, or its continuing reliance on horse power (especially CGO tramways and omnibuses). The system was popular in Paris for two reasons—its relatively cheap and simple construction, and its modest profile, flush with the pavement and thus not harmful to Paris's legendary aesthetic.<sup>80</sup> These were important qualities for a system rushed into application to prepare for the Exposition. But the system that looked good on paper was disastrous in practice. The Diatto system accidents served as a breaking point, throwing the companies that used it—mostly the East Tramway Company and the Left Bank Tramway Company—into a crisis not unlike that of the late 1870s. Eventually the entire department of the Seine was thrown into a dozen years of systematic tramway “reorganization,” from 1902-1914.

According to a Municipal Council study of 1903, the Métro alone was the scene of several hundred accidents in which Parisians were injured between 1900 and 1903. The same study showed tramways in the department of the Seine to be slightly less

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<sup>80</sup> As McKay argued in his classic comparative study of tramways, it was economic and aesthetic concerns above all which shaped the patterns of tramway adoption across Europe in this era. See *Tramways and Trolleys*.

dangerous in these years, killing 112 and wounding 937.<sup>81</sup> The Métro accounted for more injuries, the tramways for more deaths. While the Diatto accidents of fall 1900 to winter 1901 were a turning point for the tramways, the Métro had its turning point, and was thrown into a full decade of architectural and technological overhaul between 1903 and 1914, in the accident of August 10, 1903.

That evening, the worst accident to date occurred on the Paris Métro. As it rolled east along the elevated tracks of Line 2, following the arc of the external boulevards, Train 43's engine short circuited and caught fire near the *Barbès* station. All passengers were evacuated, and after repeated attempts Métro employees were unable to put out the fire (in part because they repeatedly tried to put out an electrical fire with water). So the employees scrambled to move the burning train safely to the end of the line at *Place de la Nation* with a push from the next train, number 52. In the commotion, the employees neglected to lift Train 43's ski-like “dragger” (*frotteur*), which collected current from the third rail, thus feeding more current into a motor already mangled by electrical fire. As the train rolled on, fire soon overtook the body of Train 43, which was, in the typical style of the era, made of heavily varnished and painted wood, making it a convenient incendiary device.

Minutes later fire spread to Train 52 and the two burning trains stalled at the *Ménilmontant* station, where Line 2 was now underground. The crew fled the train. The twelve burning cars quickly filled the tunnel between *Belleville* and *Père Lachaise* with smoke and melted the wires carrying electricity to the tunnel lights. This coincidentally

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81 Municipal Council report on the Accident of 1903 (city printers no. 61), pp. 32 and 37. For the Métro, there were 379 accidents in 1900-1901, 464 accidents in 1901-2, and 496 in 1902-3, for a total of 1,339. These are yearly totals, including both employee and passenger injuries.

set a terrible trap for Train 48, loaded with extra passengers left behind by Trains 43 and 52, which was just arriving at the *Couronnes* station to find it pitch black and full of smoke. In the panic that ensued in the station, which only had one exit, more than 70 passengers asphyxiated—some because they were waiting in line at the ticket window to demand their money back, and refused to evacuate when urged by employees, others because they tried to escape the fire at the dead end of the platform opposite the exit, and found themselves trapped. Satirical magazine *L'Assiette au Beurre* depicted them, eyes wide with fear, trampling one another and clawing at the back wall of the station. The next day's body count was 84.

For the authorities, engineers and the Métro company, the accident taught many things.<sup>82</sup> First were *architectural lessons*: that railings should be light, easy to get around or under, that entrance and exit gates should swing both ways, to avoid restraining crowds of pushing people, that furniture in stations should be kept to a minimum, and important pieces like benches should be fixed to the floor and stand clear of major paths of foot traffic, that exits should be clearly marked with lighted signs, that wires for lighting should not run along the roof of tunnels, that tunnels should be more generously ventilated, and that stations should have more than one entrance/exit. Second were *electrical lessons*: that circuit-breakers should be more numerous and more accessible, that the third rail should be covered, that an emergency lighting system should be set up on its own, separate circuit, but most of all that all current to a section should be shut off in case of emergency. They also learned the *material lesson* that everything involved in

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82 Tricoire's article provides a convenient summary of all these lessons. The original lessons can also be found in the Municipal Council's accident report of 1904: *Rapport au nom de la Commission du Métropolitain sur l'accident du chemin de fer Métropolitain du 10 août 1903 et sur les améliorations à apporter à l'exploitation*, présenté par Félix Roussel, Conseiller Municipal (1904).

the Métro's operation, as much as possible, should be made from non-flammable materials, especially metal. This applied equally to stations, other underground installations, and trains themselves. Finally were a series of *lessons about communication*: that panicked passengers might need guidance, hence the decision to post emergency instructions in all stations, to equip stations with emergency alarms, and to make emergency exit signs more visible; and that employees dealing with a crisis situation would need expanded real-time communication between stations, hence stations were more generously wired for telephones. Rules governing the system were overhauled as well; new standards were set for how many trains could circulate on a given line per hour and how close trains could get to one another, emergency procedures for employees were rewritten.

Most of all, for the authorities, the accident taught the importance of keeping the user's point of view in mind. The Municipal Métro was indeed *public works*—in providing means of transport to the public, the Municipal Council also accepted the responsibility to keeping the public safe. Hence the Métro would have to be redesigned—and *redesigned for the user*. The accident allowed engineers and bureaucrats to see the network through the eyes of passengers, not only providing a powerful counterexample for how the Métro should operate, but also illuminating how passengers experienced Métro stations and cars, and how they behaved in them. The accident, in all of its spectacular horror, forced engineers to rethink their designs based on the exigencies of practice. It brought infrastructure and practice into new relations, as the authorities reworked the Métro to manage the risks faced by passengers in the decade after 1903.

Métro ticket sales declined by half the day after the accident, and when news of

the Paris accident reached London, a similar panic broke out on the subway there. The event sent shockwaves of fear and panic through a broad Western public dealing with the newness of electrical technology. Catholic newspaper *La Croix* saw the accident as an indictment of electrified modernity, suggesting that the hellish fire was heavenly retribution for the *hubris* embodied in the Métro. *La Croix* also criticized the company responsible for operating the Métro as “notoriously beneath its task” (*notoirement au-dessous de sa tâche*). Centrist *Le Temps* made sober suggestions about how Métro operation could be modified to make such accidents less likely: getting rid of third rail traction, making train cars from fire-resistant materials, and increasing ventilation of tunnels. *Le Temps* also reflected at some length on the similarities between the 1903 accident and the notorious *Bazar de la Charité* fire of 1897, a reference which shows how some Parisians framed this accident in terms of other emblematic large-scale, modern catastrophes.<sup>83</sup>

The most strident response came from sharp-tongued magazine of left-wing political cartoons *L'Assiette au Beurre*, which ran a whole issue called *Le Métro-Nécro*, resurrecting Heuzé's term *nécropolitain*. With their typically wicked wit, the cartoonists of *L'Assiette au Beurre* demonstrated the wider cultural resonance of the event, its feeding back into broader popular fears of modern technology, including automobiles (one of the magazine's favorite targets) and hot-air balloons. They also mocked the easy equation of electrical technologies with progress: in another cartoon, the story of a man running up out of the flaming Métro asking for light, which appeared in several

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83 “La Catastrophe du Métropolitain,” *Le Temps*, Aug. 12, 1903, p. 2; “La Catastrophe du Métropolitain,” *Le Temps*, Aug. 13, 1903, pp. 1-2. “La Catastrophe” *Le Temps*, Aug. 14, 1903, pp. 1-2; “Cri de douleur” and “Le Métro en feu” *La Croix*, Aug. 12, 1903, p. 1; “Lendemain de catastrophe” *La Croix*, Aug. 13, 1903, p. 3.



newspaper accounts, was spun into a parable about the failures of modern electrical technology and the triumph of ancient ones like candles and lanterns. Like *La Croix*, with which it had very little in common, *L'Assiette au Beurre* took the General Traction Company to task for cutting costs and endangering the public. But while *La Croix* blamed modern technology for the dangers of contemporary urban life, *L'Assiette au Beurre* blamed modern capitalism. The accident was a vehicle for fears about the dangers of modernity and a prop for critiques of capital and the State.<sup>84</sup>

The accident broke through the solidified crust of the dominant technophilic idea of the Métro. It added fuel to the fire of popular fears, reservations and doubts about electrical technology, and, by extension, about the dangers of modernity. The *London Times* thought the accident unusual, because Parisians were already so loyal to the network. “The Metropolitan now forms part of the daily life of many thousands of Parisians.” Its lines had “completely changed the mode of living of the working population.” The public “got accustomed to this new means of locomotion in an amazingly short time.” Thus, it was Parisians' love for and devotion to the Métro which made the accident so traumatic. The accident challenged the otherwise hegemonic notion that the Métro was a technological advance and a practical convenience, causing friction between attitudes about, and the realities of, the network. It was not easy for Parisians to accept the accident's indictment of the system they had grown so quickly to love.<sup>85</sup>

#### *Labor, Politics, and Paris Transit in the Syndicalist Era*

Just as expanding access to public transportation put a mass public in regular

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<sup>84</sup> *L'Assiette au Beurre* 125, Aug. 22, 1903.

<sup>85</sup> “The Fire on the Paris Underground” *The Times*, Aug. 13, 1900, p. 3.

contact with electrical technology for the first time, so it created new communities of transit workers as well, who were confronted with the difficulties of new electric light-rail technologies on the job. The era from 1895 to 1914 is often identified by historians as a foundational period for the development of the French labor movement. In these years, the Paris transportation sector was an important point of genesis for this budding movement. In the last section, we saw how users responded to the difficult conditions of public transportation in this era; in this section, I consider the perspective of workers.

Paris omnibus workers went on strike in April and May of 1895, and it became a cause around which radical republicans and socialists rallied together, critiquing the CGO monopoly and calling for change in the Paris transit networks.<sup>86</sup> This synergy between radicals and socialists would eventually lead to the creation of the *Parti Radical* in 1901. The omnibus strike also inspired politics of more radical varieties, both left and right. Marxist-Guesdist leader Paul Lafargue compared the CGO's labor practices to slavery, charging that the company's horses had it better than its workers. Anarcho-syndicalist Fernand Pelloutier used the strikers as strawmen in a series of 1895 articles, knocking over these reformist socialists negotiating with the local government as he laid out his vision of a truly revolutionary general strike.<sup>87</sup> At the time, Pelloutier was secretary of the *Fédération des Bourses du Travail* (Federation of Labor Councils), which joined that

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86 Liberal *Le Temps* complained that left-wing papers *La Justice* and *La Petite République* were fanning the flames of this radical-socialist campaign. See: "Socialistes et Monopoles" *Le Temps* Apr. 28, 1895, p. 1.

87 Paul Lafargue, "L'idéalisme et le matérialisme dans la conception de l'histoire" (1895), online: <http://www.marxists.org/francais/lafargue/works/1895/00/idealisme.htm>. Thanks to the zeal of contemporary anarchists for preserving their tradition, and making this knowledge publicly available via the internet, one can read Fernand Pelloutier's piece "L'anarchisme et les syndicats ouvriers" (1895) on line at the *Bibliothèque Libertaire* (<http://kropot.free.fr/Pelloutier-anarsynd.htm>) and his piece "La situation actuelle du socialisme" (1895) on *Pelloutier.net*, "histoire du syndicalisme révolutionnaire et de l'anarcho-syndicalisme" ([http://www.pelloutier.net/dossiers/dossiers.php?id\\_dossier=189](http://www.pelloutier.net/dossiers/dossiers.php?id_dossier=189)). These articles originally appeared in *Les Temps Nouveaux*.

same year with the *Fédération nationale des syndicats* (National Federation of Labor Unions) to form the *Confédération générale du travail*, or CGT, France's most prominent labor union. In the Belle Époque, the CGT became the institutional core of France's dynamic anarcho-syndicalist movement, and Pelloutier one of its most recognized voices.<sup>88</sup> On the right, proto-fascist Gustav le Bon saw the striking omnibus workers as victims of their own herd mentality, a perfect example of the power of “rabble-rousers” (*meneurs*) for his antidemocratic theory of crowd behavior.<sup>89</sup> The strike became a pin-hole through which debates over labor and the social question could be focused.

Striking workers did not only pursue collective action to win more pay, shorter hours, or more humane conditions from their employers. When omnibus drivers who wanted to work during the strike approached the depot at *Place de Clichy* one morning they were blocked by striking workers who informed them that there was no work, because the strike was *general*. In their meetings the drivers' union called for a general strike in which other sympathetic workers of all professions would join. In these meetings, *Le Figaro* reported, “the atmosphere was terribly charged with electricity, even before any orator had spoken”—another glimmer of electricity's darker side. *Le Figaro* claimed that Parisians were too stricken by the lack of omnibus service to have enough sympathy to join the picket lines (—but then, this right-wing paper was not particularly sympathetic, either). Other transit workers, however, got the message: tramway drivers, cab drivers and railroad workers from the *grandes lignes* joined the strike. The Paris

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88 Kenneth Tucker. *French Revolutionary Syndicalism and the Public Sphere* (Cambridge, 1996).

89 Gustav le Bon, *La Psychologie des foules* (originally 1895, this edition, Paris: Felix Alcan, 1905), p. 74: “Pendant une grève des employés d'omnibus à Paris, il a suffi d'arrêter les deux meneurs qui la dirigeaient pour la faire aussitôt cesser” (“During a strike of the Paris omnibus employees, it sufficed to arrest the two rabble-rousers who were leading it to make it stop quickly”).

transportation sector was an important contributor to France's syndicalist movement more generally.<sup>90</sup>

Soon violence erupted. On the east side near Pantin, strikers attacked two trams and knocked them over, passengers and all. Strikers hurled rocks at trams running from Aubervilliers to the Place de la République, wounding two passengers. Amidst the fighting, one police officer was wounded and twenty strikers were arrested. *Le Figaro* snidely quipped that ambulance drivers would not be available to carry away all the people wounded in the strike's violence, but bicycle sales would soar.<sup>91</sup> Tension around the CGO was mounting. The following year, 1896, saw political economist Paul Vibert campaigning against the CGO before the senatorial elections, often evoking the radical-socialist alliance in his speeches.<sup>92</sup> This was the same year that the Ministry of Public Works ordered the CGO to transform existing horse-powered lines to mechanical traction, in keeping with Article 7 of its charter.

The Métro construction and renovation of 1898-1914 was also an important theater of syndicalist activity. By 1898, the Municipal Council decided that the city would oversee construction of what they called the Métro's “infrastructure”—tunnels, trenches, viaducts, stations—and then concede operation of the network to the General Traction Company, which was responsible for rails, rolling stock, day-to-day operation and maintenance, paying the city a share of its annual profits. At the end of the contract's term (1933), the entire network would revert to municipal ownership. This arrangement left the municipality a good deal of influence over standards for wages, hours and

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90 Edward Shorter and Charles Tilly, *Strikes in France 1830-1968* (Cambridge, 1974), p. 115 and p. 150.

91 “La grève des omnibus” *Le Figaro*, Apr. 23, 1895, pp. 1-2; “La grève des omnibus” *Le Figaro*, Apr. 24, 1895, pp. 1-2; “Nouvelles à la main” *Le Figaro*, Apr. 25, 1895, pp. 1.

92 Vibert delivered the speeches collected in *La Concurrence Etrangère*, vols. 1-2, 1896.

benefits. It kept the hands of big finance and the railway companies off of the major works, and held the General Traction Company to the same standards as municipal employees. Like Haussmann's *grands travaux*, the primary works for the Métro required an organ of local government to hire a large number of laborers, who were typically overseen by private contractors. But unlike Haussmann, the turn-of-the-century Municipal Council had a more robust conception of the welfare state. In both work for the city and for city contractors, the Municipal Council upheld rather high employment standards.

For General Traction Company employees these standards included: (1.) biweekly paychecks, at a minimum wage of 150 francs/month, or 5 francs/day for temporary employees, (2.) a ten-hour work day and six-day work week, (3.) ten days/year of unpaid vacation days, (4.) full salary during periods of military training or service, full salary during illness for at least one year, full salary up to complete hospitalization in case of a work accident, (5.) accident insurance paid entirely by the company, (6.) full compliance with government health and safety standards, and (7.) job security or tenure for any adult worker, male or female, having completed two years of service.<sup>93</sup> For its time, this work contract was extremely generous. The gesture toward gender equality, the creation of a job-tenure system, vacation and paid leave particularly stand out. American social scientist Edmund James thought the contract important enough to publish a research note about it in the *American Journal of Sociology*, writing, “The conditions which the city imposed upon the company in regard to the treatment of its laborers and employees are extremely interesting, and indicate the high-water mark attained by modern cities in this

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<sup>93</sup> Biette (1906), p. 9.

respect.” The work contract followed the spirit of the national law on accident insurance of April 8, 1898, which made employers responsible for any accidents resulting from working conditions themselves.<sup>94</sup>

The Métro, then, was more than just a political trophy won by radical republicans and socialists in the Municipal Council. It was also a vehicle for municipal socialism, an institution which could be governed according to socialist principles, an instrument for building a local welfare state. This local welfare state flourished in part because the radical-socialist projects of the municipality met with approval from radical and socialist segments of the national government. This was the energy which would lead to the formation of the *Parti Radical* in 1901. This moment is significant for two reasons. First, because it challenges the common argument that France 'lagged behind' other nations like Britain and Germany in developing a welfare state.<sup>95</sup> The work contract that governed the Métro was a leader in its time. Second, because it changes the scale of discussion, showing that the growth of the welfare state can be measured not only at the national level, but also at the provincial and local levels.

Expanding the local welfare state was one way the left-leaning municipal government responded to the pressure of syndicalism. But it also granted the workers' movement a foothold which would allow it to challenge the authorities and demand further benefits. A feedback loop was created between state and civil society which created both conflict over working conditions and a growing welfare state designed to

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94 Edmund James, “Conditions Relating to the Treatment of Employees and Laborers Imposed by the City of Paris Upon the Company to Which the Metropolitan Road Was Leased” *The American Journal of Sociology* 5/6 (May, 1900), pp. 826-828.

95 Philip Nord, “The Welfare State in France, 1870-1914.” *French Historical Studies*, Vol. 18, No. 3. (Spring, 1994), pp. 821-838.

calm this conflict. This supports the idea that large technological systems can become important political organs for national and local governments, powerful means of organizing basic strands of the social fabric like work. In the half-century before 1914, public works put technology into intimate contact with the social question, as large technical systems were applied as Hausmannesque solutions to the special problems of large populations.

But even the Municipal Council's generous labor contract had to be enforced, a problem which led *terrassiers*, pick and shovel workers who moved earth for the city works, to go on strike during 1898, within the first three months of Métro construction. While the city was legally responsible for Métro construction, it hired private contractors to build sections of the network. Like the struggling tramway companies, the CGO and the General Traction Company, these private contractors came under increasing public fire in the years before the First World War as corrupt private interests betraying their mission of providing public works. The syndicalist movement was one important carrier of this critique.

In October of 1905, the *terrassiers*' union informed the Prefect of the Seine that their employers, contractors hired by the city to construct sections of Métro tunnels, were violating the terms of their labor contracts. They gave the Prefect six weeks to examine their claims about wages, health, hygiene and safety conditions, but he did nothing, and rudely snubbed them in late November when they showed up at his office. They decided to strike immediately. What good were the Municipal Council's generous work contracts if the Prefect wouldn't enforce them? The strike continued into January of 1906. Along the way, all the usual scenery of the syndicalist era was in place: skirmishes with the

police, tensions between skilled and unskilled workers, as well as between strikers and those who stayed at work, and a healthy helping of sabotage. So *Le Journal* reported in January, 1906 that when skilled workers tried to return to work after several weeks of strike, unskilled terrassiers flooded their worksite with water from the Seine to block them. Fighting then broke out between the two groups of workers. Tensions were running high.<sup>96</sup>

The skilled workers going back to work were called *tubistes*, men who worked inside giant, pressurized wrought-iron tubes called *caissons*, used between 1905 and 1907 to dig tunnels under the Seine so that the Métro's Line 4 could cross the river.<sup>97</sup> The work required terrassiers to move earth and pour cement, and also mechanics to readjust the tubes each time they were moved. In addition, such sealed, underground spaces had to be lit, which demanded electricians. The tubes' seals were not perfect, so worksites were often damp, which, as we saw with the Diatto system, was often a problem for early applications of electricity. Small groups of skilled and unskilled workers were thus packed together in close quarters, damp, dangerous and cold. In 1907 when the compressed air rushed quickly out of a badly-sealed tube, it created a vacuum that collapsed the tunnel behind it, trapping five workers in a flooding section of tunnel and

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96 "La nonchalance de M. de Selves" *La Lanterne*, Nov. 24, 1905. "La grève des terrassiers," *La Petite République*, Nov. 24, 1905. Numbers of workers on strike vary in the news. Sympathetic left-wing paper *l'Humanité* counted 20,000 strikers, while the more mainstream *Le Petit Parisien* counted only 3,373, see article titled "La grève des terrassiers" in both papers from Nov. 25, 1905. See also "La grève des terrassiers" *Le Journal*, Jan. 11, 1906.

97 See: "Le caisson du Métropolitain" *Je Sais Tout* vol. 7 (Aug. 15, 1905), p. 338. In 1909, the Paris-Orléans railway was also extended under the Seine, by a special process of freezing hunks of earth with an air compressor, and removing them as blocks. For more on the technical curiosities of tunnel construction, see *Le Métro de Paris: 1899-1911 Images de la construction* (Paris musées/RATP, 1999), pp. 124-141.



killing them.<sup>98</sup>

Such accidents, fortunately rare, were the unfortunate consequence of risks built into the technique of digging tunnels in pressurized tubes. Tubistes had accepted these risks, and were contractually entitled to extra compensation because they worked under especially taxing conditions. But the strike of 1905-6 brought something altogether different to public attention: health and safety violations resulting not from normal working conditions, but from improper working conditions maintained by contractors cutting corners. Structures were not being built to specifications. Newspaper *Le Matin* told of cement walls *five* centimeters thick, instead of the required *sixty* centimeters, and other walls in which cement had been unlawfully replaced with cheaper rubble stone (*moellons*). This made it more likely that tunnels would flood or collapse, wasting the municipality's investment, and endangering both workers and future passengers. Workers also complained of unclean, unsafe and unhealthy work environments, heated by smoky coal-burning stoves and poorly ventilated.<sup>99</sup>

Under pressure from syndicalists and sympathetic journalists, the Minister of Public Works, Gauthier, agreed to inspect the faulty works in question himself on January 25th, 1906, accompanied by two reporters from *Le Matin* and a terrassier for a guide. What they found were repeated violations of rules for materials and building standards, several flooded worksites, sometimes with water streaming in through cracks in the walls or ceiling, and one hole in a tunnel's roof which led up into a forgotten

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98 See a *Note* from the office of the *Service Technique du Métropolitain*, approved by Bienvenuë, Dec. 24, 1907 (AP VONC 129).

99 “Les malfaçons,” *Le Matin*, Jan. 16, 1906; “Les malfaçons du Métropolitain” *Le Matin*, Jan. 26, 1906. For more on health and safety in worksites, see “Au Métropolitain,” *l'Humanité* Aug. 16, 1907; “Questions Parisiennes: l'Hygiène et le Métropolitain” *La Patrie*, Aug. 16, 1908; “l'Hygiène au Métropolitain” *l'Humanité*, Sept. 3, 1910.

section of sewer, a major hygienic violation. There was so much water that Gauthier evoked Venice. In early February, a section of the road surface on the *rue de Chabrol* collapsed into the poorly constructed tunnel below it. Entire lots of Métro construction would have to be redone and, as a sewer worker man-on-the-street put it in an interview with *Le Matin*, “it is the Parisian taxpayers who pay.”<sup>100</sup>

Here was more flagrant “non-execution” of contracts in the transportation sector. 1905 opened a historical season of strikes. The summer of 1906 saw the famous CGT-led general strike for the eight hour workday; terrassiers struck again in the summers of 1907 and 1908.<sup>101</sup> By the summer of 1908, many sections of Métro construction were stalled, behind schedule, or shut down by the authorities or by contractors. Terrassiers began to face layoffs and lock-outs. Fear of a general strike was never far off. In the summer of 1908, newspaper *L'Intransigéant* argued that with gas company workers already on strike, Parisians should pay close attention, for perhaps “tomorrow it will be electricity, then mass transit.”<sup>102</sup>

We cannot ignore the possibility that worker radicalism (strikes, slowdowns, sabotage) slowed development in this period, though it would only be one among many causes, including contractor corruption, bureaucratic excess, etc. It is difficult to say whether faulty Métro works were more a result of employer negligence and corruption, or a result of worker sabotage. But we must also consider the power of perceptions.

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100 Gauthier's evocation of Venice was an eerie foreshadowing of an idiom which would later be used to describe Paris during the 1910 Flood. See: “Les malfaçons du Métropolitain” *Le Matin*, Feb. 6, 1906. 101 *Bulletin Municipal Officiel*, July 9, 1907, p. 2918 (AP VONC 110).

102 Quote from “La désorganisation des services publics” *L'Intransigéant*, Aug. 18, 1908. For more on 1908, see: “Entrepreneurs et Terrassiers,” *Le Siècle*, Aug. 19, 1908; “La crise du bâtiment,” *l'Action*, Aug. 21, 1908; “Entrepreneurs et terrassiers” *l'Aurore*, Aug. 22, 1908; “Pas de Lock-Out!” *Le Radical*, Aug. 22, 1908; “Chez les terrassiers” *l'Aurore*, Aug. 23, 1908 (all articles collected as a press review in AP VONC 131).

Development was actually proceeding faster than ever before, while growing public demand and the ideology of progress made it seem too slow. Contemporaries complained of slow or unacceptable development because they had high expectations, because there was such enthusiasm for modernization (and/or fear of falling “behind the times”). The widespread idea that demand for transportation was ever-growing continued to shape perceptions through 1914.

It is no surprise that the season of strikes from 1895 to 1914, along with growing worker organization and radicalism, was also an era in which a broad left opposition, including radical liberals, bourgeois socialists and syndicalists, managed to co-opt the mainstream republican language of progress, hygiene, civilization—“moral and material improvement”—and turn it to their own ends, be they reform or revolution. They sought to keep the “public” in “public works,” critiquing companies like the CGO and the General Traction Company for violating their contracts, critiquing the authorities for not better enforcing contracts, even critiquing the practice of handing out state contracts to private companies in the first place and calling for public ownership. Some, like the Marxist Paul Lafargue, had long since dismissed public ownership as state capitalism. But the Second Empire habit, still practiced by many companies (and none more than the CGO), of greasing the revolving door between the public and private sectors, continued to provoke radical-socialists and those farther left into sniffing out Haussmannesque corruption.<sup>103</sup>

Against this shared backdrop, of course, were conflicts within the left, as workers mobilized to use the generosity of the radical-socialist government against itself (not

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<sup>103</sup>Paul Lafargue, “La communisme et les services publics,” *L'Égalité*, in two parts: June 25 and July 2, 1882.

unlike the republicans who used Napoleon III's generosity under the "liberal empire" to bring down his regime in the 1860s).<sup>104</sup> Hence *L'Humanité's* ongoing critique, c. 1905-1910, of terrassier working conditions as unsafe and unhygienic, conditions which would have contractually entitled the terrassiers to extra pay like tubistes received. *L'Humanité* pushed at the distinctions between skilled and unskilled, normal and dangerous work, disputing the very definition of work on behalf of workers. There was also conflict between those on the left who considered development of transportation infrastructures to be progressive, and demanded that progress be made more accessible to everyone, and those further left who began to question the value of transportation development on a deeper level. *L'Assiette au Beurre's* ongoing critique of automobiles, tramways and the Métro, 1901-1911, for example, suggests that a segment of the far left saw many modern means of transportation as just more of the same social and political system they resented. In the form of public works, technology could be critiqued as just another appendage of an already questionable body like capitalism or the state. The fact that the government had accepted the responsibility, at least in principle, of providing transportation for everyone in this era meant that transportation was pulled forcefully into conflicts between classes, between state and civil society, and between different political groups in Paris: liberals, socialists, syndicalists, etc.

### *Construction Sites, Circulation and the Embarrassment of Paris*

In spite of growing worker radicalism, contractor negligence and public contention, a lot of work was done in the period between 1898 and 1914. A majority of

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<sup>104</sup> Philip Nord, *The Republican Moment: Struggles for Democracy in Nineteenth-Century France* (Harvard, 1998).

the Métro's first network—about 24 of 41 kilometers—was constructed underground.<sup>105</sup>

To keep land costs down, the *Travaux de Paris* routed tunnels under boulevards and avenues, where the city already owned the property, thanks to Haussmann. Major streets were also the only open spaces in the city large enough to accommodate such large installations. Underground installations took two forms: tunnels, excavated and then lined with cement, and covered trenches, dug out and then reinforced with walls and vaulted roofs of metal, cement, brick and stone (the so-called “cut and cover” method).

Construction thus upset life on the surface of the city a good deal. Covered trenches required removing the entire roadway, and underground works required large pits for worker and equipment access—either way, a major obstruction for surface traffic. The city at street level became an ever-changing landscape of scaffolds, detours, and pits. As novelist Jules Romains wrote, “The scaffoldings of the subway, which rose up all over the place like fortresses of clay and planks...had ended up strangling the streets, blocking all the intersections” (figure 15).<sup>106</sup>

Complaints that Métro works upset street life, especially commerce, were also common in this era. Many shopkeepers wrote to the authorities seeking financial relief for decreased business. In their estimation, Métro construction simply made it difficult for customers to get to their shops.<sup>107</sup> Métro scaffolds and pits often blocked sidewalks, cutting off the common link between walking through the city and stopping into stores to

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105 “Le métropolitain” *Le Temps*, Mar. 26, 1896, p. 3.

106 From *Les Hommes de la bonne volonté*, quoted in David Pike, *Subterranean Cities*, p. 51 and Rosalind Williams, *Notes on the Underground*, p. 79.

107 In 1904, a group of shopkeepers on the Rue de Rennes organized to complain en masse to the Travaux de Paris about the loss of business occasioned by construction of Metro line 4. Several other groups of merchants, for example one on the Rue Réaumur, also organized to demand indemnities between 1900 and 1910. Their complaint letters are conserved in AP V108 15 and VONC 78. Complaining shopkeepers are also mentioned in “Les Embarras de Paris” *Le Radical*, Aug. 29, 1908.

shop. Métro construction upset temporal relations in the city as much as it upset spatial



Figure 15: The rue de Rivoli, June 30, 1899 (looking east toward the Hôtel de Ville). In the foreground, workers are building the vaulted ceiling of the station at Châtelet, the final step before relaying the road surface. One can see how little of the street is left open on either side of the construction site.<sup>108</sup>

relations, challenging routines and itineraries, filling the streets with obstacles and detours. Scripted everyday practices like going to or from work, taking a stroll or window shopping had to be re-scripted.

*Flâneurie* and the *promenade* were among the most compromised of all cultural practices. Key monuments (the Opéra, the Madeleine, the Louvre), streets (the grands boulevards, the avenue d'Italie, the boulevard des Capucines) and squares (Opéra, République) were no longer easily accessible, familiar itineraries were blocked. As

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108 BA Metro Photos, Carton 1. No. 107 (BAVP G/107): No. 142 - Line 1, Lot 5 - 30 June 1899 - Station Chatelet, construction de la voûte.

newspaper *l'Aurore* put it, "It's a perpetual encumbrance. Detours upon detours. It's existence in zig-zag," while *La Libre Parole* wrote "For *promeneurs*, its always an intercepted passage."<sup>109</sup>

Contemporaries often said the same of vehicle traffic. Hence newspaper *Le Radical*: "Currently in Paris it is materially impossible to make a direct trip in a vehicle. One must...take interminable detours." *Le Radical* continued:

Everywhere streets are blocked off, roadways have been gutted, sidewalks are smashed up. Everywhere – and all at once – they have turned Paris upside-down. Circulation is difficult, and the inconvenience caused for those living nearby is considerable. From all sides complaints are rising.

The writers at *Le Radical* had three groups in mind. First, business owners protested because "it is becoming more and more difficult to enter into their shops." Second, coach passengers complained that routes had become more circuitous, which, combined with the new kilometeric counters recently required for all coaches, made rides more expensive. Third, foreign tourists were "furious to encounter nothing but construction sites, and to take *fiacre* rides through a bunch of little streets which were not included in their itineraries."<sup>110</sup> *Le Radical* claimed the discontent was "justified" and "general." The "deplorable situation" boiled down to "losses of money and losses of time."<sup>111</sup>

Besides upsetting traffic and other patterns of everyday life, Métro construction literally shook the city, resulting in physical damage of various kinds. Hence Paris

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109 "Les Embarras de Paris" *l'Aurore*, Aug. 23, 1909; "Les Travaux de Paris: on n'en finira jamais!" *La Libre Parole*, Aug. 22, 1909; "Les Propos du Lanternier" *La Lanterne* Aug. 18, 1909 (VONC 129). See also "Un musée, une bibliothèque et un lycée menacés d'un chantier," *Le Matin*, Aug. 25, 1911 (VONC 131).

110 Accordingly, the office papers of the *Travaux de Paris* contain a number of formal requests from tramway companies and the CGO to modify their itineraries in order to create detours. For example, see letter from the President of the CGO, Cuvinot, to the Minister of Public Works, Jan. 9, 1899 (VONC 78 – *contentieux* concerning the Métro).

111 "Les Embarras de Paris" *Le Radical*, Aug. 29, 1909.



Figure 16: The Arc de Triomphe overlooks a chaotic scene. A Métro tunnel in progress under the *place de l'Étoile* collapsed on December 11, 1899. Here, workers and engineers survey the damage. The two figures standing on the rim at the back of the photograph are members of the photographic crew that took the picture.<sup>112</sup>

archives today contain a modest collection of official complaints made to the Municipal and Departmental Governments concerning damages to property—mostly cracks in walls, ceilings and floors.<sup>113</sup> Occasionally a section of the underground would completely collapse, as it did at the *Place de l'Étoile in December of 1899* (figure 16) or, as we already saw, on the *rue de Chabrol* in 1907.<sup>114</sup>

112 BA Métro Photos No. 182 (BAVP L/182): No. 303 - Line 1, Lot 8, 11 Dec 1899 - accident de l'Étoile  
 113 Metro related complaints (*contentieux*) can be found in AP VONC 78 and V108 15.

114 The *Bibliothèque Administrative de la Ville de Paris* has an extensive collection of photographs documenting the Metro's construction. I am grateful to librarian Agnes Tartie who gave me access to this collection and shared her wisdom on the subject in the spring and summer of 2005. She explained that the credited photographer, Daniel Lieferman, is not a known historical figure. But the *travaux de Paris* obviously thought that the construction of the Métro was important enough to document, because it hired someone to take these photographs. To document similar public works, especially road works and building demolitions for further Haussmannization of the city, the *travaux de Paris* hired the *Union*



Apart from social and spatial problems, Métro construction also inspired complaints about hygiene. On the one hand were local complaints about the hygienic condition of particular spaces, specific worksites, especially Métro tunnels. For example, newspaper *La Patrie* complained in August, 1908 that air in the tunnels was “stinking” and “unbreathable.” While passengers only had to endure brief stints in the bad air, *La Patrie* urged readers to think of workers who spent all day underground. In 1910, left-wing newspaper *L'Humanité* reviewed a decade of Métro construction, claiming “sickness and death have claimed 3,000 victims in 10 years.”<sup>115</sup> Such hygienic complaints were made on behalf of workers and passengers—either way, they were always tied to the Parisian cultural tradition of seeing the underground as suspect, dirty and dangerous. As in the 1870s, ventilation remained a central concern.<sup>116</sup> On the other hand were hygienic complaints of a more global nature, which bemoaned the dirtiness or messiness of the city under construction. In 1911 newspaper *Les Nouvelles* reviewed many construction sites scheduled to open in the near future under the heading “the cleanliness of Paris” (*la toilette de Paris*).<sup>117</sup> Complaints of this sort were particularly common in bourgeois papers like *Le Temps*, and tended to see construction in west-side Haussmannized neighborhoods as particularly offensive.

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*Photographique Française*, a worker-run photographic cooperative. Existing plates and prints of the UPF work commissioned by the city are now housed in the Archives de Paris. See *Paris la rue, un autre 1900* (Paris Musées, 1999). Liferman may well have been a member of this collective. More examples of UPF photos of the Metro can be found in the collection of the *Archives de Paris*, series D10S9, cartons 6-20. The Press of the City Museums of Paris published a selection of these photos in *Le métro de Paris: 1899-1911 Images de la construction* (Paris Musées, 1999).

115 “l’Hygiène et le Métropolitain” *La Patrie*, Aug. 16, 1908; “l’Hygiène au Métropolitain” *l’Humanité*, Sept. 3, 1910.

116 For examples of discussion about ventilation of underground spaces, which as we have already seen, began in the late 19<sup>th</sup> century, see: (1) Dr. Charles Vibert. *La Catastrophe du Métropolitain* (Extrait des Annales d’Hygiène publique et de Médecine légale (Paris: Librairie J.-B. Baillièrre et Fils, 1905), and (2) J.B. Thierry, author of *Étude sur le Métropolitain de Paris: ses installations intérieures, ce qu’elles sont – ce qu’elles devraient être* (Paris: Librairie Polytechnique Charles Beranger, 1907).

117 “Affaires municipales: la toilette de Paris” *Les Nouvelles*, Aug. 9, 1911.

In 1909 newspaper *L'Événement* complained about construction disrupting bourgeois life in the fancy, Haussmannized neighborhoods around the Opéra, specifically on the *Boulevard des Capucines*, which it called a “sacred place,” a place which should have been open for visitors, which was instead “an inaccessible place.” *L'Événement* pleaded on behalf of bourgeois values—the city's important “aesthetic,” the possibility of taking a walk in the neighborhood, and the neighborhood's important national landmarks: “And all this a few paces from the Madeleine!” The article is filled with detailed descriptions of the construction workers' carelessness, the way they left their tools strewn around after work. The author shows a real obsession with cataloging and describing worker's tools as if listing offenses, as if these dirty things of work were not acceptable parts of public life, but rather shameful, inappropriate clutter, something to be hidden.<sup>118</sup> The road surface was not finally laid on the refurbished *Boulevard des Capucines* until more than two years later, in September of 1911.<sup>119</sup> Another news story told of a group of “lumberjack women” (*bûcheronnes*) on the avenue Niel, concerned women who cared for their neighborhood so deeply that they began sneaking into messy construction sites early in the morning to tidy up.<sup>120</sup> They were called “lumberjacks” for picking up wooden tools and wooden paving stones.

No site in Paris was more stigmatized than the place de l'Opéra. Due to the plaza's symbolic importance, and the complex layers of infrastructure underneath it, which centered around the triple-decker underground crossing of Métro lines 3, 7 and 8, the

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118 “Le Paradis de Capucines,” *L'Événement*, June 19, 1909.

119 “Affaires Municipales” *Les Nouvelles*, Aug. 9, 1911; “La Capitale Sabotée” *L'Intransigéant*, Aug. 5, 1911 (VONC 131).

120 “Les bûcheronnes de Paris” *L'Intransigéant*, Sept. 30, 1911 (VONC 131).

Opera worksite was opened and re-opened in 1903, 1905 and 1910.<sup>121</sup> The plaza's repeated unearthing became an obsession. As *Le Matin* put it in 1909, "They are going to gut our dear old place de l'Opéra one more time—we don't count anymore. She must be made for that." A year later, *L'Intransigéant* repeated the joke, pretending to have lost track of how many times the square had been dug up, and then expressing disbelief: "The place de l'Opéra is no longer anything but an immense hole!"<sup>122</sup> Many newspapers called the work-sites a "spectacle," *La Liberté* reporting that a "crowd" gathered at the place de l'Opéra work site "each day" simply to watch the construction.<sup>123</sup>

*Le Temps* spoke of "Paris under demolition," claiming the city had not looked so bad since the Commune: "And while waiting [for construction to finish], we witness the most abracadabra-like incoherence in the organization of works." Why had the road surfaces around the Opéra been repaved three times? Couldn't the layers of underground works (Métro, gas, sewers, etc.) be coordinated so that all works could be completed before the roadway was finally laid? The cause of this "incoherence," *Le Temps* argued, lay solely "in the lack of coordination between administrative services." As *L'Éclair* put it, "The administration paves, unpaves, repaves. It blocks, unblocks, and re-blocks streets. There is no overall program, no unity of direction."<sup>124</sup> It became a common complaint. *L'Intransigéant* called it "disorganization," while *Le Radical* expressed a palpable despair that there was no end in sight, no telling if or when works would be finished. *La Libre*

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121 Max de Nansouty, "Causerie Scientifique: Sciences Appliquées: Le grand trou de la place de l'Opéra," *Le Temps*, July 31, 1903.

122"Petits Paradoxes de Paris" *Le Matin* Aug. 18, 1909 (VONC 129); "La place de l'Opéra n'est plus qu'un trou immense!" *L'Intransigéant*, Aug. 25, 1910 and "Partout des Trous" *L'Intransigéant*, Sept. 2, 1910 (VONC 131).

123"Paris éventré" *La Liberté*, Aug. 26, 1909; "Petits Paradoxes de Paris" *Le Matin* Aug. 18, 1909 (VONC 129).

124"Paris en Demolition" *Le Temps*, Aug. 19, 1909; "Paris-Chantiers," *l'Eclair*, Aug. 6, 1911.

*Parole* added “Travaux de Paris: we'll never finish them!”<sup>125</sup>

Behind this journalistic critique of the Travaux de Paris lay real technical difficulties. As a new network woven through the already dense fabric of Paris's underground infrastructures, the Métro upset sewer, gas, water, and electrical lines. There were also complaints about construction disturbing gardens and green spaces in the city.<sup>126</sup> In 1908-9, President of the Municipal Council Adolphe Cherioux argued that with so many works in progress and with works becoming increasingly complex and intensive, projects needed to be better planned, so that road works wouldn't conflict with sewer works, which wouldn't conflict with Métro works, and so on. He called his plan “the unity of worksites.”<sup>127</sup> Cherioux uncovered one of the key lessons of the era: if public works are not carefully orchestrated, they become a hindrance rather than an improvement.<sup>128</sup>

The Parisian public clearly understood this, especially in the years between 1908 and 1914, where the historical record is unequivocal, filled with popular and populist critiques of any powerful institution or person responsible for or important in public works—the local governments, national government, the Prefect of the Seine or the Director of Paris Works, transit companies, labor unions, groups of investors, contractors, etc. In all of these critiques there is a palpable sense that things were not going right in

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125 “Les Travaux de Paris: on n'en finira jamais!” *La Libre Parole*, Aug. 22, 1909 – it is interesting to note that this could be translated into English as “we'll never finish them,” or “we'll never be finished with them”; “Paris en Demolition” *Le Temps* Aug. 19, 1909 (VONC 129).

126 “Les arbres de l'avenue de Clichy” *La Patrie*, Aug. 16, 1908. The article complains that construction of the underground *Nord-Sud* line threatened the plantations along the avenue.

127 Préfecture de la Seine, Direction Administrative des Travaux de Paris, Service Technique de la Voie Publique et de l'Éclairage, *Rapport de l'Inspecteur General* Nov. 26, 1908. This and other documents concerning Cherioux's plan can be found in AP VONC 129.

128 A brilliant literary rendition of this concept can be found in Alfred Döblin's *Berlin Alexanderplatz: The Story of Franz Biberkopf* (1961). Translated by Eugene Jolas (Continuum, 2002). Much of the story revolves around the torn-up Alexanderplatz, a broken center-point in protagonist Franz Biberkopf's wanderings through Berlin.

the city. From the tone of the newspaper sources discussed above, we can infer the journalists' zeal to stage a confrontation between citizens and government, to steer opinion and mobilize the public. From the fact that the authorities collected these press clippings in the first place, we can infer that the authorities themselves thought powerful currents of opinion were coursing through the city and needed to be watched. The secretaries at the Travaux de Paris collected press reviews to keep an eye on public opinion, so the authorities were aware that the public was not happy with the state of transportation in the city.

All of these various critiques aimed at public works administration—hygienic, spatial, cultural, etc.—were couched in a suggestive language of pain, distress, trauma and shame. In 1909 *Le Matin* wrote, “The capital is flayed, turned upside-down, gutted, broken,” a phrase which employs the familiar anatomical idiom in city planning to grisly effect. A language of crisis emerged around familiar tropes: public works as surgery, and the pain, trauma and disfigurement that result.<sup>129</sup> Two stock phrases recurred as article titles: *Paris-Chantiers*, suggesting a city defined by construction sites, and *Les Embarras de Paris*, suggesting that Parisians had reasons, plural, to be embarrassed by their torn-apart capital. One article called “Les Embarras de Paris” argued that the problem went deeper than the celebrated beauty of the city—it was also a question of the city's proper function, the smooth flow of traffic and the cleanliness of the city. The article often slipped into a medieval imagery, which suggested that the city was regressing instead of progressing, moving back into a more barbaric age. The scaffolds and lifts of the construction sites became “castles,” “towers,” “forts.” No longer urban, the work-sites

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129 “Petits Paradoxes de Paris” *Le Matin* Aug. 18, 1909 (VONC 129).

resembled “villages,” even “ruins.”<sup>130</sup> *L'Intransigéant* used a vocabulary of “craters” and “mountains” to convey an estranged city, no longer architectural but geological.<sup>131</sup> One paper called the capital “Paris gachis” (spoiled or wasted Paris).<sup>132</sup> Like the critique of the tramways, this critique of worksites often challenged the ideology of progress and civilization with a language of barbarism.

These examples show how the city of worksites became Paris's Other between 1905 and 1910, plunging locals into a state of upheaval in which everyday life, that which coalesces around repetitive scripts and routines, was prevented from forming stable patterns.<sup>133</sup> Even before 1910, Parisians were tired of the upheaval, and then, in bitter irony, came the flood of 1910, knocking out Paris's young electric system, and all of the new urban railways that depended on it, for the better part of January and February. The flood did billions of francs in infrastructural damage to the city's roads, sewers, railways, pneumatic system, and electrical system. For the *Travaux de Paris*, the flood heaped more clean-up work on the already difficult pile which had backed up since 1900.

#### *Conclusion: 1910-1914*

The complaints kept coming. In 1910-11, several newspapers began to reverse the language of *sabotage*, which typically targeted syndicalists as vandals, and charged the authorities with sabotaging the capital.<sup>134</sup> This linguistic link between the social-political

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130 “Les Embarras de Paris” *L'Aurore*, Aug. 23, 1909.

131 “La place de l'Opéra n'est plus qu'un trou immense!” *L'Intransigéant*, Aug. 25, 1910.

132 “Sabotage stupide” *L'Eclair*, Aug. 1, 1911.

133 This concept of everyday life as rhythmic can be found in Henri Lefebvre's *Rhythmanalysis: Space, Time and Everyday Life*, trans. Stuart Elden and Gerald Moore (Continuum, 2004).

134 “La capitale sabotée: ce que l'administration a fait du splendide boulevard des Capucines,” *L'Intransigéant*, Aug. 5, 1911; “Partout des Trous” *L'Intransigéant*, Sept. 2, 1910: “où s'arrêtera l'audace des vandales?”

crisis around syndicalism and the political crisis around public works is suggestive. In the early 20<sup>th</sup> century, while syndicalist complaints about Métro construction typically targeted private contractors, journalist complaints about Métro construction more often targeted public authorities. But both were inspired by the maddening, crippling effects of a city turned upside-down by electricity, mass transit, accidents, labor unrest, and constant construction.

A language of infrastructural crisis emerged in Paris already before the catastrophic Flood of 1910, as a result of the ongoing upheavals of 1895-1914. The city battered by floodwaters in 1910 was already stricken. The decade of Métro renovation and tramway reorganization between 1902 and 1914 was sparked by the accidents of 1901 and 1903, before it was spurred by the Flood of 1910. In a similar vein, the left-wing discourse on a crisis in the cost of living, “*la vie chère*,” did not emerge as a result of World War One, as one historian has argued, but had already emerged in the era between 1900 and 1914.<sup>135</sup> We need a structural shift in the timelines we use to make sense of Paris's history in this era, a shift which pulls the crises that emerged before the War out from under the shadow of the crises brought on by the War. The urban problems caused by the automobile are a fine example of this. While the 1920s has long been recognized as the watershed moment for automobiles in European cities, both in terms of private cars and in terms of autobuses, there was already significant experience with automobiles in the city in the era between 1895 and 1914; hence autobuses were first

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135 This chronological disagreement is my only complaint about Tyler Stovall's otherwise brilliant recent article about life on the home front in World War One, “The Consumers' War: Paris, 1914-1918,” *French Historical Studies* 31/2 Special Issue: War, Society, and Culture, ed. David A. Bell and Martha Hanna (2008). Stovall claims that talk of *la vie chère* emerged as a result of wartime hardships – how then, does he account for pre-war artifacts like the article “Le Prix de La Vie” *L'Humanité*, Sept. 3, 1910, or the series in the National Archives labeled “Crises de la vie chère: enquêtes, voeux, statistiques, brochures et journaux, 1900-1913” (F12 7023-7027)?

applied in Paris in 1910. Development of the French automobile industry was significant in the era between 1895 and 1907-8, after which time the French market was overtaken by German and American competitors.<sup>136</sup> Henry Ford's Model T (1908) and assembly line (1913) were also pre-war developments. This pattern could be spun out further. Nationalization of industry and utilities, which is commonly associated with the inter-war era and/or the Popular Front in France (i.e. the STCRP), was also first debated in the *Belle Époque*.<sup>137</sup>

Historians continue to evoke the First World War as a historical rupture which, among other things, finally burst the bubble of 19<sup>th</sup> century technological optimism. Not so in Paris. The technophilic ideas on display in 1900 had already been called into question by the accidents of 1901 and 1903, the upheavals of labor and construction from 1905-1910, and the great flood. In watching how workers, riders, Parisians and foreign visitors experienced Paris's transportation networks and reacted to electricity in this dynamic period, we have seen the process of closing the “knowledge gap” at work. We have tried to see the history of technology from the user's point of view, and to watch as new technologies were learned, evaluated, negotiated, debated, given meaning, etc. Working these new technologies into Paris's everyday life was a bumpy process, full of ambiguities and contradictions. Although the rapid growth of Métro ridership between

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136 Mathieu Flonneau, “City infrastructures and city dwellers: Accommodating the Automobile in Twentieth-Century Paris” *The Journal of Transport History* 27/1 (March, 2006), pp. 93-114.

137 Three other examples can add substance to the shift of timelines I am arguing for. First, the *Îlots Insalubres*, “unclean blocks” in Paris marked for demolition, were first identified in the belle epoch, but didn't receive any attention until the interwar era. We'll hear more about this in Chapter 4. Second, the same goes for plans to demolish Paris's fortifications: planning began before 1900, and demolition didn't begin until after 1918. See Janet Horne, *A Social Laboratory*, p. 260. Finally, architectural styles follow this rhythm as well. As Norma Evenson has shown, the clean lines, blocky forms and lack of ornament that we associate with post-war modernism (especially Deco and the International Style), already emerged in the era before 1914. Architectural modernism did not start with Le Corbusier, but with Paul-Émile Friesé, Hector Guimard, Franz Jourdain, Auguste Perret and Henri Sauvage. See *Paris a Century of Change*, pp. 159-163.



1900 and 1910 confirms the *London Times's* perception that the Métro was well-liked and quickly integrated into Paris's daily life, the traces of popular opinion left in the archives suggest a more cautious, more critical attitude on the part of the average user. Mobility increased for the average Parisian, but so did risk. A “crisis of modernity” was already afoot in Paris before the ravages of the First World War.<sup>138</sup>

Faced with new social arrangements, business-government partnerships and new technologies after 1900, engineers and politicians proved as uncertain as the public. Whether savant or humble rider, electrical technology was new to everyone in Paris. Hence we should go a step further than Bernhard Rieger's idea of the “knowledge gap.” If there was a significant gap between lay and expert knowledge of technology during the second industrial revolution, there were also important ways in which laymen and experts were in the same position. Everyone needed time to experience these innovations for himself or herself and decide how to use them and what meaning to give them. Experiences, not surprisingly for this age of transition, were rather divergent. The masses, for example, experienced both the rush of mobility and the spectacle of grisly accidents. *Le Temps* spoke of a gap between theory and practice on the tramways, but it might equally be called a gap between ideology and social reality. The cognitive dissonance caused by this second gap was one of the central cultural problems of the era, not only in Paris, but across the Western World.<sup>139</sup> How could the second industrial revolution's messy reality of rapid innovation, combined with social and spatial upheaval, ever square

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138 A good brief discussion of Peter Wagner's theories about crises of modernity appears in Michael Hård and Andrew Jamison, eds. *The Intellectual Appropriation of Technology: Discourses on Modernity, 1900-1939* (MIT, 1998), pp. 1-15.

139 (1) Alain Beltran and Patrice A. Carré, *La fée et la servante*, pp. 133-172; (2) Linda Simon, *Dark Light: Electricity and Anxiety from the Telegraph to the X-Ray* (Harcourt Trade, 2005); (3) Lisa Cartwright, *Screening the Body: Tracing Medicine's Visual Culture* (University of Minnesota, 1995).

with the late nineteenth century culture of technological optimism?

In conclusion, we should place Paris in a comparative, trans-national context. Comparative and trans-national studies can bring out the global reach of these sort of struggles to define technology and modernity. For example, there is a growing body of historical research on strikes and riots which erupted across Europe, North America, South America and Asia in response to the development of streetcars between the 1890s and the 1910s, by scholars like Eric Schatzberg, Scott Molloy, James Fujii, and Min Suh Son.<sup>140</sup> These studies can help us put Paris's experiences between 1895 and 1914 into a coherent, global historical context, in which the users of new technological systems were often uneasy about the rapid technological development going on around them, development which they understood to be closely linked with modernity. Forms of user opposition and resistance to technological development, like the user reactions I have pursued here, provide a definite contrast to the technophilic perspectives we are accustomed to hearing from administrators, capitalists and engineers in this period. This difference in perspective, more than anything else, demonstrates the need for the kind of study I have tried to offer here, which combines social and cultural history with the history of technology to compare the different perspectives of designers and users.

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140 James A. Fujii, "Networks of Modernity—Rail Transport and Modern Japanese Literature" *Japan Railway and Transport Review* (Sept. 1997), pp. 12-16; Eric Schatzberg, "Culture and Technology in the City: Opposition to Mechanized Street Transportation in Late-Nineteenth Century America," in *Technology and History: Essays in Honor of Thomas Parke Hughes and Agatha Chipley Hughes*, ed. Gabrielle Hecht and Michael Allen (Cambridge: MIT Press, 2001), 57-94; Scott Molloy, *Trolley Wars: Streetcar Workers on the Line* (University Press of New England/University of New Hampshire, 2007); Min Suh Son, "The "Devil Car" Riots: Science vs. Superstition in Late Nineteenth Century Seoul" (talk given at the University of Michigan, Dec. 5, 2006) and "The Technology of Protest: Streetcar Riots, Race and Public Activism" (paper given at the October, 2007 session of the Society for Social Studies of Science, Montreal).