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The half-century following the Civil War witnessed an epochal transformation in American telecommunications. In the 1870s, the telegraph network became a spawning ground for a remarkable spate of inventions that included the phonograph and the telephone, and around 1900 the telephone network became the first electrical communications medium that network providers intended to be accessible to the entire population. This transformation was a centerpiece of the still unprecedented burst of inventive activity that economic historians call the Second Industrial Revolution.[1]

This essay builds on recent historical writing, as well as my own research, to sketch some of the ways in which this transformation was shaped not only by market trends and technological imperatives, but also by governmental institutions and civic ideals. It is intended as a study in the centrality of politics to the making of what is today sometimes called the information infrastructure.[2] My thesis can be simply put. To understand the transformation of American telecommunications, one must locate the telegraph and telephone networks in their political as well as their economic setting, or in what contemporaries would have called the political economy.[3]

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1. Gordon, "Great Inventions."
2. For a related discussion, see John, "Information Infrastructure."
3. By political economy, I mean the relationship between the state and the market, or what Douglass North calls the rules of the game that structure economic activity.

Today, it is customary to lump together the telegraph and telephone networks as telecommunications. In the nineteenth century, however, these two networks remained distinct. At their core, both consisted of a small number of network providers that followed separate, and, in some ways, divergent paths. In the case of the telegraph, the dominant network provider was Western Union; in the case of the telephone, the dominant network providers were the operating companies licensed by American Bell (later AT&T). The Western Union network was nationwide, the Bell network was regional and in certain instances city-based. This distinction shaped in various ways the inventive process, which was regulated primarily by the patent office and the courts. In addition, it affected the rates network providers could charge and the rights-of-way they could obtain. For telegraph network providers, rate-and-entry regulations were coordinated by state and federal legislatures; for telephone network providers, by city councils. As it happens, what might appear to be a minor difference had major consequences for the way in which these two networks evolved.

Until quite recently, historical writing on the telegraph and telephone routinely discounted the extent to which the evolution of Western Union and the Bell-associated network providers had been shaped by the political economy. This was true even though it has long been widely known that the telegraph network was jump-started by a federal government grant and that the telephone network coalesced around patent rights.

The relative unimportance of political economy to the creation of the American telegraph network was implicit in Robert Luther Thompson's *Wiring a Continent* (1947), still the standard history of the network's beginnings. By 1860, Thompson contended, telegraph promoters had concluded that the network was best coordinated by a single provider, since it was a "natural monopoly."[4] In so doing, he consigned to the dustbin of history Western Union's many post-1860 challengers and obscured the extent to which the nineteenth-century telegraph network had been shaped by governmental institutions and civic ideals.

Thompson's conclusion has recently been challenged, at least implicitly, by a number of scholars.[5] Even so, for many decades it predisposed historians and economists to discount the influence of politics

4. Thompson, *Wiring a Continent*, 342.

5. For a sampling of recent historical writing on the post-1860 telegraph network that underscores the influence of politics on its evolution, see Blondheim, "Rehearsal for Media Regulation"; Carlson, "Political Instrument"; Hochfelder, "Industrial Divide"; John, "Politics of Innovation;" John, "Télégraphie Publique"; and Starr, *Political Origins*.

on the telegraph. For Alfred D. Chandler, Jr., Western Union was the "first nationwide multiunit modern business enterprise," making it, along with certain railroads, of which the most important was the Pennsylvania, the "most relevant administrative models" for the architects of the modern industrial corporation.[6] For Richard B. Du Boff, Western Union was a technically backward monopoly run by grasping rentiers.[7] Chandler and Du Boff differed widely in their characterization of Western Union's business strategy. Yet they agreed that the firm remained essentially unregulated until the New Deal. For Chandler, Western Union's managers proved so effective in meeting user demand that few called for federal regulation.[8] For Du Boff, Western Union's lobbyists were so devious in manipulating the political process that they forestalled regulation for which there existed great public demand.[9] Tellingly, neither so much as mentioned the National Telegraph Act, the cornerstone of post-Civil War federal telegraph regulation, even though the main provisions of this law were well known.[10] Indeed, Du Boff managed to write an entire essay on post-Civil War federal telegraph regulation without so much as acknowledging its existence.[11]

Historical writing on the early telephone network has followed a similar pattern. Until quite recently, historians and social scientists alike discounted the influence on its evolution of the political economy in which it was embedded.[12] This was true not only for historians who admired the Bell-associated network providers' business strategy, but also for those who did not. The "immediate effects of sociopolitical forces" that would later become so "dominant" in the modern telephone network—Bell admirer George David Smith contended, in summarizing a common view—were "negligible" early on; as a consequence, the telephone network emerged in a "relatively permissive political atmosphere."[13] The popularization of telephone

6. Chandler, *Visible Hand*, 197, 79.
7. Du Boff and Edward S. Herman, "New Business History," 102–5.
8. Chandler, *Visible Hand*, 200.
9. Du Boff, "Communications Regulation."
10. Herring and Gross, *Telecommunications*, 210, 353–54.
11. Du Boff, "Communications Regulation."
12. For a sampling of recent historical writing on the pre-1920 telephone network that underscores the influence of politics on its evolution, see Beauchamp, "Telephone Patents"; Gabel, "Federalism"; John, "Vail"; John, "Recasting"; MacDougall, "People's Telephone" (2005); MacDougall, " People's Telephone" (2004); Maguire, "Local Dynamics"; and Starr, *Political Origins*.
13. Smith, *Business Strategy*, 199. Specialists in twentieth-century government-business relations have reached an analogous conclusion. For example, in a book that focused, in part, on twentieth-century telecommunications regulation, Richard H. K. Vietor observed that, in the period before the New Deal, the only economic sectors in which the federal government played a major regulatory role were banking and transportation. Vietor, *Contrived Competition*, 3.

service through its extension to underserved areas, Bell detractor Milton L. Mueller claimed, "posed no special policy issue" and "required no government action."[14]

Marginalizing the political economy in historical writing on early American telecommunications built on, and helped shape, a long-standing tradition of society-centered historical narratives on the American past. Historians otherwise as diverse as Chandler, Thomas P. Hughes, and William Cronon regarded it is an article of faith that politics, however defined, did little to shape the epochal transformation of the United States from a struggling commercial republic on the margins of Europe into one of the most powerful industrial nations in the world. To be sure, Chandler, Hughes, and Cronon defined this transformation in strikingly different ways. For Chandler, its hallmark was managerial capitalism, for Hughes the large technical system, for Cronon the industrial city.[15] These differences notwithstanding, each traced this transformation to factors unrelated to politics, even if one construed politics broadly to embrace governmental institutions and civic ideals. Authoritative historical writing, Cronon observed, in an unusually candid reflection on the historian's craft, entailed the imposition of a coherent design on a crowded and disordered reality through the foregrounding of certain elements and the omission of others.[16] For Chandler, Hughes, and Cronon, as well as the many historians and social scientists that followed their lead, the political economy was among the elements that could be safely left out.

In the past few years a small yet growing group of historians has begun to reconsider the devaluation of politics in historical writing on the United States. Spurred in part by anomalies in the reigning interpretative paradigm, and in part by the emergence of a distinguished body of social scientific writing on related themes, the new institutionalists have reinvigorated a once-thriving trading zone between

14. Mueller, "Universal Service," 368. Mueller expanded on this position in *Universal Service*, an important revisionist monograph that credited the expansion of the telephone network in the decades that immediately followed the expiration of Alexander Graham Bell's telephone patents in 1894 to what he termed "access competition" between telephone operating companies (Bell and non-Bell) that did not interconnect. In so doing, Mueller downplayed the extent to which access competition was itself the result of deliberate political choice, and provided no real explanation for the rapid expansion of the telephone network within specific localities—such as New York and Chicago—in which access competition was but one, and by no means the most important, of the challenges that network providers confronted.

15. Chandler, *Visible Hand*; Hughes, *American Genesis*; Cronon, *Nature's Metropolis*.

16. Cronon, "Place for Stories," 1349, 1371.

political history and social science.[17] While this body of historical writing does not yet possess the theoretical self-confidence of Chandlerian business history, Hughesian history of technology, or Crononian environmental history, it has enough common features to signal the emergence of a "political economy synthesis." While "political economy synthesis" lacks the pithiness of the "frontier thesis," or even the "organizational synthesis," it has the advantage of juxtaposing two inextricably intertwined yet irreducibly distinct realms of human experience: namely, polity and economy.[18] For the new institutionalists, institutions begat institutions and ideals spawned ideals. While they emphasize the agency of governmental institutions, they characterize the state not as an agent of change, but, rather, as a structuring presence whose effects no group or individual willed.[19] Scholarship that fits under this rubric has been published on many topics, including transportation, banking, manufacturing, military procurement, public works, finance, and communications.[20]

The new institutionalism provides a fresh angle of vision for exploring the political economy of the nineteenth-century telegraph network. One of the more remarkable aspects of this history was the culture of entrepreneurship that flourished among telegraph inventors in the 1870s. In an astonishingly brief interval, a small group of inventors, of whom the best known today are Thomas Edison and Alexander Graham Bell, devised—and obtained patents for—a galaxy of remarkable inventions that included electric lighting, the phonograph, the telephone, and a form of broadband telegraphy known as the quadruplex. How can this sudden burst of creativity be explained? What inspired the "technological enthusiasm" that Hughes considered to be one of the defining features of the age?[21]

17. A parallel shift is occurring in historical writing on economic institutions in Europe. See, for example, Kipping, "Business–Government Relations"; Berg and Bruland, "Culture, Institutions, and Technological Transitions"; and Mokyr, "Political Economy."

18. For a related discussion, see Caporoso and Levine, *Political Economy*, 6, 28, 31.

19. On this point, see Skocpol, "Bringing the State Back In," esp. 20–21.

20. Dunlavy, *Politics and Industrialization;* Usselman, *Regulating Railroad Innovation;* Berk, *Alternative Tracks;* Edling, *Revolution in Favor of Government;* Sylla, "Experimental Federalism"; Lamoreaux, *Merger Movement;* Einhorn, *Property Rules;* Einhorn, *American Taxation, American Slavery;* Misa, *Nation of Steel;* Wilson, *Business of Civil War;* Henkin, *Postal Age;* Howe, *What Hath God Wrought;* John, *Spreading the News;* John, "Private Enterprise, Public Good?"; John, "Vail."

21. Hughes, *American Genesis*, 1–3. While Hughes accorded considerable significance to this entrepreneurial culture, he opposed the parceling out of credit for specific inventions. "It is futile," Hughes observed, "for an inventor, a historian of invention, or even the courts to attempt to prove who invented a machine, a device,

Part of the answer to these questions can be found in the telegraph network's internal dynamics. Historians have long assumed that Western Union in the 1870s was a natural monopoly, more-or-less impervious to competition. In fact, it was relatively easy for an upstart telegraph promoter to underbid Western Union by stringing wire between major commercial centers. In the language of economics, few economies of scale existed to "naturally" discourage competitors; as a consequence, would-be rivals had a major incentive not only to parallel Western Union's lines, but also to purchase telegraphic inventions to improve their competitive position.[22] And so long as competition persisted, a robust sellers' market would exist for new technical contrivances.

Equally significant was a supportive legal environment. Each of these inventions had been hastened by the expansive safeguards lawmakers built into the patent system to give inventors a panoply of time-specific legal rights.[23] Inventors also benefited from a state-based chartering policy that discouraged monopolies among telegraph network providers.[24] Though Western Union had negotiated with railroads hundreds of exclusive right-of-way agreements, nothing prevented a would-be rival from securing a corporate charter. States granted telegraph charters, and throughout the Unites States, state legislatures had emulated the example of New York, which, in 1848, enacted a

or process such as the steam engine, the telephone, or the transformer." Alexander Graham Bell, in Hughes's view, did *not* invent the telephone; rather, Bell combined in a distinctive ensemble a telephone system that embodied a particular application of the principles of variable resistance and induction. Hughes, *Networks of Power*, 94, 95. For a related discussion, see Carlson, "Innovation and the Modern Corporation." In the 1870s, Carlson observed, a "unique market" existed for telegraph inventors who could supply "blockbuster" inventions to Western Union or its rivals (207). Why this market existed at this moment in time is a topic Carlson left for others to explore.

22. The absence of what would today be called economies of scale among telegraph network providers was well known to network insiders. "The telegraphic business is in effect a business of writing a vast number of short letters for the public," explained Western Union president William Orton in a public interview in 1875: "One man can only write a given number of letters in a given time, be they long or short. The cost of writing is not reduced by an increase in the number written, because when the number exceeds the capacity of the present staff additional writing or operating assistants must be employed." Quoted in *Operator* 3 (15 August 1875). Orton registered analogous doubts about the benefits of high-volume throughput in his private business correspondence. Orton to George H. Mumford, 16 May 1870, president's letterbooks, Western Union Records. Similar sentiments found their way into the press. The benefits of doing a "wholesale business" in the telegraph, opined an editorialist in the *Nation* in 1872, were less than in any other business. "Would a Postal Telegraph be Cheap?" *Nation* 15 (19 December 1872): 403.

23. For an introduction to the vast literature on patent policy, see Usselman and John, "Patent Politics."

24. Nonnenmacher, "State Promotion."

general incorporation law for telegraph network providers to prevent promoters allied with telegraph inventor Samuel F. B. Morse from monopolizing the new medium. This antimonopoly legislation had the desired effect, and a host of would-be-telegraph magnates sprang up on the lucrative intercity routes.

In the 1870s, the most important rivalry among telegraph network providers pitted Western Union against the Atlantic & Pacific and American Union, each of which had the backing of Jay Gould, an unusually shrewd and imaginative financier with a genius for exploiting opportunities the political economy spawned. So long as this rivalry persisted, a thriving market would exist for telegraphic inventions. To meet the demand, Edison, Bell, and a gaggle of lesser-known inventors, sold, or threatened to sell, a variety of telegraph-related patents to the highest bidder. Bell turned to the telephone only after he had been hired to patent an acoustic telegraph to sell to either Western Union or Gould. Edison provided his quadruplex to both Western Union and Gould in an audacious bit of legal jugglery that preoccupied some of the country's leading attorneys. With the money he obtained from the sale of this patent, Edison built the celebrated laboratory complex in Menlo Park, New Jersey, at which he invented his phonograph and electric light.[25]

While telegraph network providers relied primarily on state legislatures to obtain rights-of-way, telephone network providers obtained from city councils their legal authority to string wire. Municipal franchises were negotiated one-by-one, and, in contrast to telegraph charters, were often quite detailed. Some specified maximum rates and performance standards; a few even had expiration dates. The 1889 franchise for the Chicago Telephone Company, for example, expired in 1909. For telephone network providers, to a much greater extent than for telegraph network providers, competition was always contrived.[26]

Telephone franchises were of special significance in the nation's major cities, the home to the largest and most lucrative of the Bell-associated network providers. Without a municipal franchise, it was impossible to secure rights-of-way on crowded city streets. And even with a franchise, gaining rights-of-way could be contentious. In the 1880s, for example, hundreds of municipalities forced telephone companies to bury thousands of miles of telephone wire, an expensive undertaking for which they received no immediate financial return. Municipal franchises shaped the business strategy of network providers in various ways. Incumbents relied on them to forestall competition;

25. Israel, *Edison*, chap. 8.
26. Priest, "Utility Regulation."

insurgents to enter the market. To be sure, it was hard for a rival to enter the field, even under the best of circumstances. Yet once a network provider had strung its wires in a particular locality, it could hardly ignore municipal politics. Manufacturers confronted with burdensome municipal ordinances could plausibly threaten to shut up their plants and relocate in a more hospitable locality. The Chicago Telephone Company, however, could not move to Milwaukee.

Franchise politics became particularly contentious following the emergence in the 1890s of a constellation of non-Bell telephone equipment suppliers who were determined to open up the telephone network to non-Bell network providers. To create a market for their wares, these manufacturers lobbied tirelessly, and with considerable success, to create a favorable legal climate for non-Bell or "independent" network providers. To meet the potentially devastating challenge that this new political environment posed, Bell-associated network providers launched an aggressive campaign to popularize telephone service. In New York and Chicago, the cornerstone of this campaign was the introduction of a variety of pay-as-you-go calling plans known as "measured service." In conjunction with a number of technical advances, these new calling plans enormously increased the size of the telephone network. In Chicago, for example, the total number of telephones spiked from 10,000 in 1893 to 300,000 1911, while in the same interval the company's capital investment increased from $3 million to $30 million.[27]

Measured service transformed conventional assumptions about telephone usage in the nation's largest cities. Prior to the 1890s, most network providers offered users unlimited local service in return for the payment of a fixed monthly fee. Flat rates were popular with large users, such as lumber dealers, who grew accustomed to making dozens and sometimes hundreds of local calls every day. Yet so long as the monthly fees remained high, they blocked the extension of telephone service to the vast majority of city dwellers. Although measured service rarely took hold in small cities and towns, by 1900 it had become ubiquitous in the nation's leading cities. Some calling plans combined fixed and variable charges; others did not. By 1906, over half of Chicago's 114,000 telephones had no fixed charges at all, much like public telephones today.[28] These telephones, which were popularly known as nickel-in-the-slots, offered a rudimentary level of telephone service for as little as a nickel a day, or $1.50 a month, which was all the vast majority of city dwellers desired. Bell managers installed thousands in boarding houses and private residences.

27. Hibbard, *Hello Goodbye*, 179.
28. Jackson, *Telephone Situation*, 33, 112.

To make a telephone call, users put a coin in the pay box, just as they would at a public telephone station. There was no telephone bill, and no possibility that a user might be confronted with unexpected long-distance charges. Each month, telephone collectors stopped by to count and collect the nickels; no other accounting procedure was required. Nothing did more, in the opinion of electrical engineer Dugald Jackson, to popularize the new medium.[29]

The advantages of these new calling plans figured prominently in the elaborate advertising campaigns that big-city operating company marketing departments launched around 1900. These campaigns did their best to instill what one Chicago operating company manager called the "telephone habit" in the masses as well as the classes, and among women as well as men.[30] Marketing departments proved particularly adept at publicizing the still somewhat novel idea that the telephone was suitable not only for narrowly instrumental tasks, such as the ordering of groceries, but also for a wider range of cultural practices such as the maintenance of social relationships with neighbors and friends.[31]

Popularizing the telephone in the nation's largest cities owed much to the political economy in which network providers operated. Municipal politics was intrinsically adversarial. City officials possessed the authority not only to regulate maximum rates and performance standards, but also to franchise new entrants and even, in certain localities, to buy out network providers and operate them as a branch of city government. Indeed, the municipal buy-out of privately

29. Jackson, *Telephone Situation*, 22.

30. Hibbard, *Hello Goodbye*, 210. Electric power companies mounted parallel advertising campaigns to popularize an energy-intensive lifestyle. On these campaigns, see Platt, *Electric City* and Sicilia, "Selling Power."

31. The advertising campaigns of the Bell-associated telephone operating companies in New York and Chicago are documented in the advertisements that their marketing departments ran beginning around 1900 in the *New York Times* and the *Chicago Tribune*. Since these advertisements were intended to sell telephone service, rather than to burnish the public image of telephone network providers, they are a more accurate reflection of the business strategy of telephone managers than the better-known public relations campaign orchestrated by AT&T. The primary objective of the AT&T public relations campaign was not to sell telephone service, but to forestall hostile government legislation. Taken together, these operating company advertisements raise questions about the claim of the urban sociologist Claude Fischer that telephone managers did not begin to advertise telephone sociability widely until the 1920s. Fischer, *America Calling*, 75–84. In New York and Chicago, operating company advertisements had been trumpeting the possibilities of telephone sociability since at least 1900. The sophistication of these advertising campaigns is abundantly documented in the scrapbook of advertising circulars circa 1900 compiled by a Milwaukee Bell operating company employee that can be found in the records of the Wisconsin Telephone Company at the AT&T Archives and History Center in San Antonio, Texas.

owned enterprises, beginning with streetcar lines and electrical power plants, was the cherished dream of many US-based municipal ownership advocates, who in the 1890s began to call municipal franchises "public utilities," a new coinage that, at least initially, was a rallying cry for opponents of private ownership and operation.[32]

The distinctiveness of the US political economy is highlighted by a comparison with Canada, the country whose telephone network most closely resembled that in the United States. Canadian municipalities retained far less authority over telephone rates and performance standards.[33] As a consequence, Canadian network providers had less incentive to innovate. In the United States, incentives for innovation were substantial. In many cities, including New York and Chicago, local officials routinely extorted large sums from network providers to forestall hostile legislation, such as a phony franchise grant for a would-be rival network provider. To break the cycle of corruption, even public figures hostile to socialism endorsed municipal ownership in the hope that it might purify city politics. In such a political climate, popularization had the potential to create political constituencies that were wary of municipalization, and, in this way, to parry a potentially devastating political assault. Had telephone managers not popularized the telephone, potential new entrants might have enjoyed a broader measure of popular support, while municipal officials might have faced less opposition in pushing for a municipal buy-out of the company's plant.

Popularizing urban telephony generated the revenue that AT&T relied on to build its much-touted long-distance telephone network. Long-distance telephony was a major technical achievement, yet in its early years its capacity remained limited and its cost high. As late as 1941, 98 percent of all telephone calls connected parties located within the boundaries of an individual state.[34] The limitations of the long-distance network are worth underscoring, since its significance has been long exaggerated by AT&T publicists and the historians who have followed their lead. Bell network providers vanquished their rivals neither because of their superior long-distance grid, nor even because of their superior regional coverage, but, rather, because they popularized local telephone service in response to a political challenge that was most intense in the nation's largest cities.

32. This generalization is based on a keyword search of the *New York Times* and *Chicago Tribune*. Prior to the 1890s, the phrase "works of public utility" was relatively common; as a collective noun, however, "public utility" was virtually unknown.

33. MacDougall, "People's Telephone" (2004), 17–18, 48–51, 188–195.

34. Page, *Bell Telephone System*, 177.

In the half century following the Civil War, the political economy shaped the telegraph and telephone networks in myriad ways. In the case of the telegraph, antimonopoly sentiment fostered a culture of entrepreneurship that generated a remarkable spate of inventions. In case of the telephone, municipal politics hastened the popularization of a medium that had, before this time, been confined to a tiny elite. These outcomes are best explained not as the supposedly inexorable product of technological imperatives and market trends, but, rather, as a result of the peculiar mix of incentives created by the political economy of the American state, a political economy that dated back to the early republic, and that spawned, in the 1870s, an entrepreneurial ferment that marked the beginning of America's progressive age.

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