Theodore N. Vail and the Civic Origins of Universal Service

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In 1907, AT&T President Theodore N. Vail proclaimed universal service to be a key corporate goal. The following year, at Vail's prodding, AT&T popularized this goal in a major publicity effort that historian Roland Marchand has termed "the first, the most persistent, and the most celebrated of the large-scale institutional advertising campaigns of the early twentieth century" [Marchand, 1998]. Over the course of the next decade, Vail himself explored its ramifications in a remarkable series of reports and addresses [Vail, 1917]. Though historians quarrel about precisely what Vail meant by universal service, few doubt its importance. For the next three-quarters of a century, it played a major role in the firm's business strategy and was a central element of its corporate culture.

Historical scholarship on universal service has been greatly influenced by the antitrust suit against AT&T that culminated in its breakup in 1984. While this work is often suggestive and revealing, it tends to be far more concerned with the consequences of universal service than with the context out of which it emerged. This paper—which, I should emphasize, is preliminary and exploratory, and an invitation to critique—points the discussion in a different direction. It has three sections. The first section surveys the literature on the origins of universal service. The second proposes an alternative account. The final section makes a few observations about the implications of this alternative for the Galambosian "organizational synthesis"—and, in particular, for its characterization of the main lines of institutional development in the nineteenth-century United States.

Historical scholarship on the origins of universal service typically link the concept with the subject of inquiry. Historians of AT&T, for example, almost invariably trace it back to the beginnings of the firm. Characteristic of this genre are the essays collected in Ithiel de Sola Pool's *Social Impact of the Telephone*, a project that grew out of a conference that AT&T sponsored in the mid-1970s at MIT. Though Pool declared in his introduction that AT&T exerted no influence over the contents of this volume, it would be hard to imagine a scholarly work that was more congenial to the sensibilities of its patron [Pool, 1977, p. x]. With minor variations, all of the essays in the volume share a sim-

[1] I would like to thank Sheldon Hochheiser and Kenneth Lipartito for their suggestions and advice.

BUSINESS AND ECONOMIC HISTORY, Volume Twenty-eight, no. 2, Winter 1999.
 ISSN 0894-6825

ilar point of view, making it possible to treat them collectively as the product of a single mind.

From a Poolian standpoint, the origins of AT&T's commitment to universal service could be found in the intentions of the founders of the firm. From the outset, these men—telephone inventor Alexander Graham Bell, telephone promoter Gardiner Greene Hubbard, and telephone manager Theodore N. Vail—envisioned that the new technology would eventually become incorporated into an integrated network that, under a single management, would bring the promise of telephony to families as well as businesses throughout the country and around the world. Given the prescience of Bell, Hubbard, and Vail, the subsequent rise of the Bell System was a "self-fulfilling prophecy" that sprang, as it were, more-or-less fully clad from the brow of its creators [Pool, 1977, p. 132].

The key to the founders' success was their ability to comprehend the essential nature of the new technology. They saw the future with "such clarity"—or so Pool contended—because of the congruence between their outlook and the "very technology of the telephone" [Pool, 1977, p. 8]. From a Poolian standpoint, it was but a short step from Bell's first telephone patent in 1876 to the establishment of AT&T as a long-distance subsidiary in 1885 to the consolidation of the Bell System as a legally sanctioned national monopoly in the 1910s. In this decidedly whiggish and resolutely triumphalist narrative, the rise of independent telephony was but a footnote, as was the role of law, public policy, and the regulatory state.

When read today, fifteen years after the break-up of the Bell System, these essays can be read as *proof texts* of a kind of technological determinism that seems startlingly hubristic and naïve. The political message was plain. AT&T's greatness—or so explained John R. Pierce, a scientist at Bell Laboratories, and a contributor to the volume—was attributable to a unique combination of technological virtuosity and visionary leadership. Both were imperiled by governmental meddling. Telephone networks, Pierce reminded us, were the "largest and most complex systems in the world." And the foremost of these networks was the Bell System. Yet, if it came to be imperiled by "drastic government actions" aimed at bringing it in line with "current ideology," it might swiftly "degenerate" in a very few years [Pool, 1977, pp. 181, 187]. Though Pierce was a bit vague about the kinds of degeneracy he had in mind, he expressed special concern about the evils of interconnection. Should some government regulator, for example, have the temerity to permit telephone users to attach a non-Bell telephone to the network, serious injury or even electrocution might well be the result [Pool, 1977, p. 192].

Vestiges of the Poolian tradition lived on in George David Smith's *Anatomy of a Business Strategy* and Robert W. Garnet's *Telephone Enterprise,* the first two volumes of the Johns Hopkins/AT&T series in telephone history. Like the Poolians, Smith and Garnet found in the earliest years of the Bell Company the seeds of its later glory. For Smith, a key turning point was the acquisition of Western Electric in 1881—an event that set the stage for Bell's preeminence

in industrial research; for Garnet, it was the firm's establishment, beginning in the late 1870s, of close relations with the operating companies—a precursor to the Bell System. Interestingly enough, one historian who appeared to dissent from this view was Louis Galambos—the editor of the series. Indeed, in a notable essay on Vail, Galambos took care to distinguish his business strategy during his first career at Bell—which ended in his departure from the firm in 1887—from the strategy that he pursued in his second career following his return in 1907 [Galambos, 1992].

Both Smith and Garnet grounded their monographs in the structural-functionalist framework that Alfred D. Chandler, Jr., used so effectively in the *Visible Hand* [John, 1997a]. Far different in approach was the fourth volume in the Hopkins/AT&T series—Kenneth Lipartito's study of telephony in the South. In this monograph, and also in a related series of articles, Lipartito moved from an *internalist* toward a *contextualist* understanding of Bell's strategy. It was not technology and markets, Lipartito contended, but skillful entrepreneurship, in conjunction with an "almost irrational" commitment to interconnection, and—most important of all—the active cooperation of state regulatory bodies, that translated universal service into a reality [Lipartito, 1989a, p. 225; Lipartito, 1989b]. Lipartito did not reject outright the possibility that the origins of universal service antedated Vail's articulation of this ideal in 1907. Yet his primary interest was the conjunction of events that Vail's return helped to inspire. Indeed, to a greater extent than any other historian who focused primarily on AT&T, he was open to the possibility that, had AT&T executives not proved so successful in manipulating the political setting, government regulators could conceivably have made a superior "public choice" [Lipartito, 1989b].

Historians whose main interest lies elsewhere than AT&T have been, perhaps not surprisingly, markedly less inclined to trace the origins of universal service to the founders of the firm. A case in point was Milton L. Mueller, Jr.'s., *Universal Service,* the most extensive analysis of the economic dimensions of universal service in American telephony during the opening years of the twentieth century [Mueller, 1997]. If the Poolians read at times a bit like defendants in the AT&T antitrust suit, Mueller was a star witness for the prosecution. In the Vail era, Mueller explained, the concept of universal service had far more to do with the interconnection of existing telephone service than with the extension of telephone service to under-served regions. Only later would the concept become synonymous with the establishment of a nation-wide, low-cost, cross-subsidized residential phone network that, during the antitrust proceedings, AT&T's champions misleadingly claimed to have been one of its defining features all along.

How, then, did Mueller explain the origins of universal service? Its true creators, he contended, were the swarm of daring, imaginative, and (at least implicitly) socially progressive independent telephone promoters who, following the lapse of the Bell telephone patents in 1894, established telephone service for the many regions that Bell managers had declined to serve. Given Mueller's theme, it is, perhaps, not entirely surprising that his book appeared

in a series that was sponsored by the conservative, free-market-oriented American Enterprise Institute. After all, it can be read—which, indeed, seems to have been Mueller's intention—as a brief for today's telecommunications upstarts, and a forthright critique of any effort to re-regulate the industry following the breakup of AT&T.

Equally critical of Poolian orthodoxy was Claude S. Fischer's *America Calling*, a prize-winning study of telephone users in the period prior to the Second World War [Fischer, 1992]. Framing his inquiry as an exploration of the "consumption junction," Fischer contended, predictably enough, that it was here that the promise of universal service was first realized. For Fischer, the true champions of universal service were neither Bell managers, as the Poolians and Lipartito had claimed, nor independent telephone entrepreneurs, as Mueller had contended. Rather, they were the millions of rural and small town telephone patrons who pioneered in the social (as opposed to the commercial) uses of the telephone. It was these ordinary Americans, Fischer concluded, who finally persuaded Bell managers to stop thinking of the telephone as little more than a telegraph that talked, and to embrace fully its actual potential as a medium for two-way social communication.

Like Lipartito—and, to a certain extent, the Poolians—Fischer conceived of the Bell managers' outlook as a *mindset* with a distinctive cultural cast. Yet Fischer treated this mindset as an obstacle to be overcome rather than an asset to be exploited. Trapped as they were by their blind reliance on inappropriate telegraphic analogies—or so Fischer assumed—Bell managers failed to recognize the actual potential of the new technology. Not until the 1920s, fifty years *after* the initial establishment of the industry, would customers living in rural locales finally show them the way. Or, to put it somewhat differently, for Fischer, no less than for the Poolians, the founders of the telephone industry were technological determinists—only, now, technological determinism was not a functional *given* but, instead, a cultural *norm*.

Existing scholarship on the origins of universal service highlights the salience of technology and markets, and devotes little attention to developments that antedated the commercialization of the telephone. Yet long before the 1870s, there *already existed* an expansive rationale for communications policy that owed little to electrical science or consumer demand, yet which would exert a major influence on the ideal of universal service as it would later come to be understood. Ever since the campaign for "cheap postage" in the 1840s, countless pamphlets, magazine articles, and government reports had hailed the inexpensive, uniform, and geographically extensive distribution of social correspondence as a public good. And ever since the passage of the Post Office Act of 1792, the government had moved vigorously to hasten the rapid transmission of time-specific information on commerce and public affairs throughout the length and breadth of the United States. This civic rationale for communications policy had little influence at Western Union—which was, in the 1870s, the largest telegraph firm in the country. Yet it was taken for granted at the Post Office Department, which remained, throughout the nineteenth century,

the largest and most influential element of the information infrastructure in the United States [John, 1995; John, forthcoming].

The existence of this civic rationale for communications policy best explains the origins of universal service as a business strategy at AT&T. Universal service was, at bottom a cultural heritage with an unmistakably political cast, rather than an intrinsic attribute of the new technology, or a fortuitous byproduct of the impersonal workings of the competitive market.

The civic rationale for communications policy had a particularly lasting influence on Hubbard—the telephone promoter who, in addition to funding Bell's early experiments in telephony and making several key early administrative decisions at the Bell Company, recruited Vail to become Bell's first general manager.

Hubbard's preoccupation with universal service began well before his involvement in telephony. Its impetus was his dissatisfaction with what he took to be the unduly narrow, business-oriented strategy that Western Union officials pursued following the consolidation of the firm in 1866 as a *de facto* national monopoly. Western Union, Hubbard believed, had conspicuously failed to realize the democratic potential of the new technology. From his standpoint, its rates were too high, its service too limited, and its offices too few. "As a telegraph for business, where dispatch is essential and price is of little account"—Hubbard declared in 1883, articulating a position that he had held for fifteen years—"the Western Union system is unrivaled; but as a telegraph for the people it is signal failure" [Hubbard, 1883, p. 522]. To rectify this situation, Hubbard lobbied Congress repeatedly to charter a "postal telegraph" that would underbid the telegraph giant and provide universal service for all.

Hubbard's critique of Western Union calls into question Fischer's assertion that Bell's founders were trapped by telegraphic analogies. How, one wonders, could this be true of Hubbard—Western Union's most insistent critic? Hubbard's pronouncements also raise questions about Mueller's blanket claim that the concept of universal service dated back no further than the competitive flurry of the 1890s and the 1900s. Few students of nineteenth-century communications policy would find such a claim persuasive. After all, universal access to information on commerce and public affairs had been a goal of postal policy for over a century—and, indeed, had furnished Hubbard with much of the rhetorical ammunition that he deployed in his struggle against Western Union [John, 1998].

Hubbard's critique of Western Union's business strategy led him, predictably enough, to establish the telephone industry on a broader and more inclusive foundation. In marked contrast to telegraph officials, Hubbard took it for granted that, eventually, the new technology would be administered as a public utility, and that it would serve a large, and constantly growing, clientele. Later Bell investors would be decidedly more restrained in their assumptions about the industry's future course, particularly in the years immediately preceding the expiration of the key Bell patents. Yet Hubbard's vision was never entirely eclipsed, and, beginning in 1907, would reemerge, in a distinct, yet rec-

ognizable guise, in Vail's commitment to universal service. By the First World War, the Bell System would come to resemble the other network technologies with which Hubbard was familiar—such as the gas and water works that were beginning to proliferate in American cities and towns, and which, in the years prior to his initial involvement in telephony, Hubbard himself had done a good deal to promote [Carlson, 1994].

Hubbard never doubted that the telephone would be quickly adopted by banks, hotels, and retail establishments of all kinds. Yet he was equally confident that it would one day prove useful within the home. Middle-class Americans like himself—as Hubbard knew well, and as he had frequently contended in his essays on telegraphic reform—were one market that Western Union had conspicuously ignored. To encourage homes as well as offices to install telephones, Hubbard offered residential users special low rates. And to promote its widespread use, he offered subscribers unlimited monthly service for a single fee. This rate structure had the advantage of being relatively simple to administer. Yet other, message-unit-based pricing schemes could have been, and were, devised, particularly in Europe.

Alexander Graham Bell echoed Hubbard's conviction that the telephone would play a major role within the home. In particular, he envisioned the telephone replacing the speaking tubes, pull bells, and other devices that well-to-do Americans had come to rely on to maintain contact with their household staff. Once householders became accustomed to the new technology, he reasoned, they would urge its extension to stores, offices, and other similar locations that would then be linked together by a central exchange. In an age when even modest middle-class households employed one or more servants, this was an ingenious strategy, and one well calculated to insure that the arbiters of taste and fashion would come to regard the new technology in a favorable light. To make his point, Bell cited gas and water companies—though, significantly, not district telegraph firms—as prototypes for the new enterprise [Bell, 1878, pp. 89-92].

Theodore N. Vail's approach to telephony was predicated on a similarly expansive conception of its potential. Indeed, like Hubbard's, it owed a good deal more to postal precedent than to the example of Western Union. This was true even though Vail had himself worked for a time as a Western Union telegraph operator, while his cousin, Alfred Vail, had been a key figure in the early years of the telegraph industry.

Prior to Vail's arrival at Bell, the most formative experience in his adult life—and, indeed, the reason Hubbard offered him a position in the Bell Company—had been his successful tenure as the general superintendent of the Railway Mail Service. Hubbard met Vail during a stint that Hubbard served as chairman of a special postal commission that Congress established in 1876 to devise a better method for allocating railway mail pay. Vail worked closely with Hubbard and prepared an elaborate report on postal costs [Vail, 1876, pp. 8-24; Hubbard, 1877]. Hubbard was duly impressed with Vail's energy, imag-

ination, and capacity for abstract thought, and in 1878 persuaded him to bolt the government to become the first general manager at Bell.

The Railway Mail Service had been established in 1869 and, under the capable leadership of a series of gifted administrators—including Vail—quickly became a key element of the information infrastructure of the industrial age. The purpose of the institution was to speed the movement of the mail by shifting its routing from stationary distribution centers (where it had been located since 1800), to moving railroad cars (where it would remain for much of the next century). In its day, the continuous, train-based sorting scheme that the railway mail clerks oversaw was widely hailed as one of the wonders of the age.

Writing in 1925, Bell historian Arthur Pound drew attention to the significance of Vail's years at railway mail [Pound, 1926, pp. 17-18]. So, too, did Robert Sobel in a perceptive biographical sketch [Sobel, 1974]. The connection was also noted by John Brooks in what remains the single best volume on the history of the telephone industry [Brooks, 1976]. Yet most recent studies of telephone history—including all of the works discussed above—say nothing about it at all.

How, then, might Vail's years in the Railway Mail Service have influenced his business strategy at Bell? Several parallels are suggestive. At the Bell Company, as at railway mail, Vail was firmly committed to retaining complete control over the communications circuit. Like most postal officers, Vail believed that it was incumbent to guarantee that the mail remain under the control of individuals who could be assumed to display a proper degree of "fealty" to the Post Office Department. For this reason, he opposed the practice (which dated back to the stagecoach era) of requiring mail contractors to convey the mail between the train and the post office. This custom, Vail warned, exposed the mail to "all kind of irregularities," since it virtually guaranteed that it would be handled in a haphazard manner by men whose minds were on something else [Annual Report, 1877, p. 151]. Later, as a Bell executive, Vail would display an analogous commitment to systems integration. Following the Bell breakup, it has come to seem odd to treat this "network mystique" as a functional response to a technological imperative. Vail's experience at railway mail suggests an alternative explanation.

To better coordinate the routing of the mail once it was under government control, Vail devised a number of novel administrative procedures and sponsored several conferences with his eight divisional superintendents. One such meeting, in September 1877, lasted a full week. The purpose of this conference, Vail explained, was to improve relations between the government and the railroads, standardize the work of the various divisions, minimize routing errors, and devise uniform procedures [*History,* 1885, pp. 114, 184]. Later, at AT&T, Vail would make similar organizational summits a prominent feature of the firm's corporate culture. Interestingly, there is little evidence that, at this time, similar meetings were held at Western Union.

No feature of the Railway Mail Service was more distinctive than its *esprit de corps.* Here, too, was a cultural norm that anticipated, and that may well have

helped to shape, the meritocratic ethos that was such a distinctive feature of the Bell System under Vail. Unlike much of the rest of the Post Office Department—which remained tied to the patronage-based mass parties—the Railway Mail Service was administered on civil service principles. Promotions were based on performance, and all clerks were required to take periodic tests to demonstrate their skills. "Upon the careful performance of their duties," Vail declared in 1876, "are dependent interests of a magnitude that cannot be estimated." After all, a "single error" on the clerks' part, resulting in the "delay or missending of a single letter, no matter how unimportant it may look, may result disastrously to some individual or corporation" [*Annual Report,* 1876, p. 167]. On the fidelity of the railway mail clerks, Vail added two years later, were dependent interests "beyond estimate" that they had "fully met." If, then, the United States was to boast a postal service of which there was "none superior" then to "these employes is due their share of the credit" [*Annual Report,* 1878, p. 242].

Few features of railway mail intrigued Vail more than the Fast Mail, a high-speed mail link between New York and Chicago that cut the transit time to a mere twenty-five hours—a remarkable achievement that was, in its day, as well known as the Pony Express. Though Vail himself did not establish the Fast Mail, he oversaw its expansion and took great interest in its administration. The project was, Vail declared in one of his annual reports, of comparable import to the initial establishment of the railway mail. Every day, he proudly reported, fast mail clerks sorted no fewer than 529,000 pieces of mail [*Annual Report,* 1876, pp. 163, 165].

Vail recognized that the Fast Mail project was experimental, yet he was confident that it would prove its worth by—among other things—speeding up mail delivery throughout the rest of the country, and ratcheting up administrative standards in the remaining distribution centers and feeder lines. Later, as the first president of AT&T—the Bell Company's long-distance subsidiary—Vail would champion long-distance telephony for similar reasons—seeing in it a competitive advantage that would enable Bell to establish a level of service that no competitor could match.

Vail's involvement with the Fast Mail brought him into contact with William Vanderbilt, the president of the New York and Hudson Railroad. Frustrated by a sudden reduction in mail pay, Vanderbilt briefly tossed the mailbags off his railroad cars—a gesture that Vail regarded as deeply offensive to the citizens who lived in the immediate vicinity, and entirely out-of-keeping with the public-service ethos that had shaped postal policy for eighty years. The government, Vail declared at one point, should be invested with an "absolute power" to determine which trains should carry the mail, and how much room should be provided to facilitate its sorting [*Annual Report,* 1877, p. 151]. Vail always opposed government ownership of the telephone industry. Yet he favored its regulation—and, indeed, was convinced that intelligent government oversight was not only inevitable, but desirable. Here, too, was a habit of mind that may well have been shaped by his years at railway mail.

One of the central tenets of the "organizational synthesis" that Louis Galambos has done so much to popularize is the assertion that, at some point after 1880, American society assumed a new and different form [Galambos, 1970, 1983]. Prior to 1880, Galambos contended, institutional development had been primarily *extensive* in the sense that it involved the settlement of the vast North American interior. This process involved a multitude of Americans, virtually all of whom were engaged in ventures no larger than the artisanal shop or the family farm. With the exception of the railroad, large-scale organizations—in business or government—were unknown. Only after 1880, with the rise of the modern corporation, would this trajectory change in a fundamental way. Henceforth, institutional development would become *intensive*. Rapidly, and in ways that no one could possibly have foreseen, the country was transformed with the elaboration of administrative hierarchies, first in business and then in government. America's rendevous with destiny had come—and it was a rendevous not with liberalism, but with bureaucracy.

The Galambosian bifurcation of the American past into pre-bureaucratic and post-bureaucratic phases has a certain intuitive appeal. Indeed, in various ways, it builds fruitfully upon—and, indeed, supplies a Parsonian gloss to—the frontier thesis of Frederick Jackson Turner —one of the most venerable and seemingly indispensable of historiographical constructs. Yet, whatever its strengths, it renders invisible large-scale undertakings such as the Railway Mail Service—and, in this way, obscures the origins of concepts such as universal service. The Railway Mail Service is anomalous on two counts. Not only is it an "intensive" enterprise that antedated the great divide of 1880, but it is also a governmental institution rather than a business firm.

Vail's tenure at the Railway Mail Service—and, more broadly, the civic rationale for universal service to which he had been exposed during his years in the government—suggests that, long before 1880, the government—and, in particular, the federal government—had been a major seedbed of administrative innovation. This conclusion may perplex late-twentieth century Americans—accustomed, as we are, to according causal primacy to economic and technological phenomena. Yet it would have startled neither Vail nor his more thoughtful contemporaries. Only after 1880, as James L. Hutson has recently suggested, would Americans began to regard economic phenomena as more fundamental than political processes as agents of change [Hutson, 1993; John, 1997b]. The influence of Vail's tenure in the Railway Mail Service upon his subsequent career in telephony suggests that it may well be time to reconsider the merits of this older view. Only then, perhaps, will it be possible to understand the civic origins of universal service—and, more broadly, the cultural and political context out of which the modern corporation emerged.

References

Annual Report of the Postmaster General (Washington, 1876, 1877, 1878).

Bell, Alexander Graham, "To the Capitalists of the Electric Telephone Company," 25 March 1878, in J. E. Kingsbury, *The Telephone and Telephone Exchanges: Their Invention and Development* (London, 1915), 89-92.

Brooks, John, *Telephone: The First Hundred Years* (New York, 1976).

Carlson, W. Bernard, "Entrepreneurship in the Early Development of the Telephone: How Did William Orton and Gardiner Hubbard Conceptualize the New Technology?" *Business and Economic History,* 23 (1994), 161-192.

Fischer, Claude S., *America Calling: A Social History of the Telephone to 1940* (Berkeley, 1992).

Galambos, Louis, "Theodore N. Vail and the Role of Innovation in the Modern Bell System," *Business History Review,* 66 (1992), 95-126.

Galambos, Louis, "Technology, Political Economy, and Professionalization: Central Themes of the Organizational Synthesis," *Business History Review,* 57 (1983), 471-493.

Galambos, Louis, "The Emerging Organizational Synthesis in American History," *Business History Review,* 44 (1970), 279-290.

Garnet, Robert W., *The Telephone Enterprise: The Evolution of the Bell System's Horizontal Structure, 1876-1909* (Baltimore, 1985).

History of the Railway Mail Service: A Chapter in the History of Postal Affairs in the United States (Washington, 1885).

Hubbard, Gardiner G., "Government Control of the Telegraph," *North American Review,* 325 (1883), 521-535.

Hubbard. Gardiner G., "Report of the Special Commission on Railway Mail Transportation," *Senate Miscellaneous Document* 14, 45th Cong., 2d. sess., 1877, serial 1785.

Hubbard, Gardiner G., *Memorial of Gardiner G. Hubbard in Relation to the Postal Telegraph,* n. p., 1873.

Hubbard, Gardiner G., *The Proposed Changes in the Telegraphic System* (Boston, 1873).

Hubbard, Gardiner G., *The Postal Telegraph: The Only Means by Which the Telegraph Can be Made the Ordinary Method of Communication...* (Boston, 1869).

Hubbard, Gardiner G., *Union of the Post-Office and Telegraph. Letter to the Postmaster General on the European and American Systems of Telegraph, with Remedy for the Present High Rates* (Boston, 1868).

Hutson, James L., "The American Revolutionaries, the Political Economy of Aristocracy, and the American Concept of the Distribution of Wealth, 1765-1900," *American Historical Review,* 98 (1993), 1079-1105.

John, Richard R., "Recasting the Information Infrastructure for the Information Age," in Alfred D. Chandler, Jr., and James W. Cortada, eds., *A Nation Transformed by Information: How Information Shaped the United States from Colonial Times to the Present* (New York, forthcoming 2000).

John, Richard R., "The Politics of Innovation," *Daedalus,* 127 (1998), 187-214.

John, Richard R., "Elaborations, Revisions, Dissents: Alfred D. Chandler's The Visible Hand after Twenty Years," *Business History Review,* 71 (1997), 151-200.

John, Richard R., "Governmental Institutions as Agents of Change: Rethinking American Political Development in the Early Republic, 1787-1835," *Studies in American Political Development,* 11 (1997), 347-380.

John, Richard R., *Spreading the News: The American Postal System from Franklin to Morse* (Cambridge, 1995; paperback, 1998).

Lipartito, Kenneth, "Culture and the Practice of Business History," *Business and Economic History,* 24, 2 (1995), 1-41.

Lipartito, Kenneth, "When Women Were Switches: Technology, Work, and Gender in the Telephone Industry, 1890-1920," *American Historical Review,* 99 (1994), 1075-1111.

Lipartito, Kenneth, *The Bell System and Regional Business: The Telephone in the South, 1877-1920* (Baltimore, 1989).

Lipartito, Kenneth, "System Building at the Margin: The Problem of Public Choice in the Telephone Industry," *Journal of Economic History,* 49 (1989), 323-336.

Marchand, Roland, *Creating the Corporate Soul: The Rise of Public Relations and Corporate Imagery in American Business* (Berkeley, 1998).

Mueller, Milton L., Jr., *Universal Service: Competition, Interconnection, and Monopoly in the Making of the American Telephone System* (Cambridge, 1997).

Pool, Ithiel de Sola, ed., *The Social Impact of the Telephone* (Cambridge, 1977).

Pound, Arthur, *The Telephone Idea: Fifty Years After* (New York, 1926).

Sicilia, David, "Cochran's Legacy: A Cultural Path Not Taken," *Business and Economic History,* 24, 1 (1995), 27-39

Smith, George David, *The Anatomy of a Business Strategy: Bell, Western Electric, and the Origins of the American Telephone Industry* (Baltimore, 1985).

Sobel, Robert, *The Enterpreneurs: Explorations Within the American Business Tradition* (New York, 1974).

Vail, Theodore N., "Statement..." 13 January 1877, in "Additional Papers Relating to Railway Mail Transportation," *Senate Miscellaneous Document* 20, 44th Cong., 2d sess., serial 1766.

Vail, Theodore N., *Views on Public Questions: A Collection of Papers and Addresses of Theodore Newton Vail,* 1907-1917, n. p., 1917.