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ARTICLES

TURNING POINTS IN TELECOMMUNICATIONS HISTORY

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I. INTRODUCTION

Is there one single, critical turning point in American telecommunications history? Put differently, was there one person, event, or institution in the development of the American telecommunications system that stands head and shoulders above the rest in importance? That question is either very easy to answer or quite difficult. The easy answer is (1) Alexander Graham Bell, (2) his invention of the telephone, and (3) either his later creation of the American Bell Company, the forerunner to and one time parent company of the American Telephone & Telegraph Co., or the dissolution of AT&T in 1984 into a long distance company (AT&T) and seven local exchange companies (the Regional Bell Operating Companies (RBOCs) or Baby Bells). That answer is easy because Bell, the telephone, and AT&T clearly serve as the "but for" cause of the current telecom system in this country. It is like selecting (1) Abner Doubleday, (2) bats, balls, and an infield diamond, and (3) nine-person teams as the "but for" cause of baseball.

But if we leave Bell, his phone, and his company to one side, the question becomes far more difficult to answer with a high degree of confidence. Indeed, one could reasonably argue that any attempt to identify a single, critical turning point in the history of American telecommunications is doomed to fail. One need not be a devoté of Chaos Theory to believe that even minor variations in the historical background to—let

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alone the subsequent technological and human influences on—a dynamic system like telecommunications can produce an exponential increase in the variety of pathways that the system would follow. Which event was the most important: The development of long-distance amplification technology? Automatic switching devices? Microwave transmission? Computers? Cellular telephony? Fiber optic cable? A good argument can be made for each one.

Answering the question who was the most important person in telecommunications history is no easier. How about Theodore N. Vail, who twice held senior positions in the Bell Telephone Company and largely is responsible for Bell's pursuit of what became the interconnected nationwide telephone network run by AT&T? Gardiner Greene Hubbard, a Boston lawyer and close friend of Alexander Graham Bell's, who was one of the early promoters of telephone service and who hired Vail? The Bell Labs scientists who invented the transistor, John Bardeen, Walter Brattain, and William Shockley? Federal District Court Judge Harold Greene, who oversaw the lawsuit that broke the Bell Operating Companies (the "Baby Bells") off from AT&T? Perhaps, William Baxter, the Assistant Attorney General for the Antitrust Division of the U.S. Justice Department, who negotiated the settlement of that case with AT&T? What about Craig McCaw or Sam Ginn, two of the pioneers in wireless communications?

And what about the most important institution in telecom history? Was it the Supreme Court, which refused to adopt a general rule requiring interconnection of common carriers, thereby allowing AT&T to stand alone in local and long-distance service? The Supreme Court also required that the costs of operating local and long-distance service be apportioned between each component of the system by state and local regulators, which led to the cross-subsidization problems that bedeviled telecommunications throughout the twentieth century. Was it Congress, which enacted the Communications Act of 1934,[1] creating the Federal Communications Commission (FCC), and then stood on the sidelines as the FCC and state regulators sought to deal with AT&T? Congress also later passed the Telecommunications Act of 1996[2] in order to address the problems created by the break-up of AT&T. Or was it Microwave Communications Inc. (MCI), the upstart company whose entry into long-distance telecommunications helped to start a chain of events that ultimately led to the dissolution of AT&T?

Those inquiries truly have as much in common with asking the question, "Who was America's greatest baseball player?" (Babe Ruth? Ted Williams? Willie Mays? Henry Aaron? Roy Hobbs?) But, just as one

1. The Communications Act of 1934, 42 U.S.C. §§ 151 *et seq.* (1934).
2. The Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996).

baseball player does not make up the entire starting lineup, so, too, no one person or event should be deemed indispensable in American telecom history. The difficulty in selecting any specific event or person as being the single most important factor in American telecommunications today also does not mean that no set of factors can be used to explain how we arrived at where we are today. For example, it would be reasonable to ask what events and persons accelerated the advance of telecommunications, started telecommunications on an entirely new path, such as the growth of wireless service, or possessed not only a clear vision of how today's telecommunications system should be established, but also the wherewithal to lead or propel telecommunications in that direction. And, besides, whoever said that answering an unanswerable question cannot be fun.

So with that in mind (and with apologies to David Letterman) let me offer my "Top 10 Important People, Institutions, or Events in Telecommunications History." These are ten noteworthy persons, inventions, or events that helped create today's American telecommunications system. Most will not be a surprise to anyone, and at the end of the day most probably can be fit into two categories—technological developments and the people who managed all or some part of the Bell System—but each one is worth separate consideration. And Number One is the single most important person, institution, and event in American telecommunications.

NUMBER 10
WESTERN UNION'S DECISION NOT TO PURCHASE BELL'S PATENTS

Ironically, the first item in the list is a mistake: Western Union's decision not to purchase Bell's telephone patents.

The nineteenth century saw a fundamental reshaping of traditional mechanisms for transmitting information due to the development or extension nationwide of four new communications networks: the United States Postal Service, the Railway Mail Service, Western Union's telegraph system, and the Bell telephone system. The Western Union telegraph system was by far the most important of the four.

Samuel F.B. Morse sent the first interstate telegraph message on May 24, 1844, from Washington, D.C., to Baltimore, Maryland: "What hath God wrought." Western Union dominated the telegraph business in the nineteenth century and became the first national communications company. Innovative as well, Western Union introduced the first stock ticker in 1866 and money transfer in 1871. The telegraph system changed American commerce in several fundamental ways. (1) *Trade*: The telegraph changed the nature of speculation about crops and crop

prices. Previously, the delay in transmitting information gave farmers and others close to the source of agricultural information a decided advantage over others. But now the ability to transmit information almost instantaneously nationwide changed the nature of speculation from retrospective to prospective gambling. That is, the telegraph led to the creation of a futures market for prices of crops not yet harvested or even planted. In addition, the birth of futures markets led to the creation of the Chicago Board of Trade to coordinate and regularize those complex futures transactions. (2) *Newspapers*: The telegraph led to the creation of the New York Associated Press, the forerunner to the Associated Press, as New York City newspapers entered into a joint venture to obtain and disseminate news quickly. (3) *Railroads*: The telegraph and the railroad were "the 'Siamese twins of commerce'" because the telegraph ran along the railroad rights-of-way, enabling the railroads to use just one track without innumerable accidents and allowing the telegraph to traverse the country without needing to obtain separate property rights of passage. (4) *Perishable goods*: The telegraph helped to support the perishable goods industry.[3]

Samuel F.B. Morse hoped that the federal government would operate the telegraph as it had with the Postal Service, which Morse saw as the forerunner of the telegraph. Private merchants thought that only the federal government could build and evenhandedly operate the telegraph. Private businesses also feared the monopoly power that could be held if only one firm operated a telegraph system. Ultimately, however, the government decided in 1847 not to run the telegraph system itself, dashing Morse's hopes that the government would control the means of interstate communication in America. Part of the reason why the government decided not to nationalize and operate the new telegraph system was the belief held by Andrew Jackson and his supporters that, given the potential power of the telegraph, the federal government should not be responsible for operating this system and expanding the power of the federal government.[4]

In 1879, however, before the Sherman Antitrust Act of 1890[5] became law, Western Union abandoned the telephone business after losing patent litigation with the Bell System over the telephone. The two companies settled their differences by dividing the interstate communications business between them. Western Union kept the telegraph line of busi-

3. A NATION TRANSFORMED BY INFORMATION: HOW INFORMATION HAS SHAPED THE UNITED STATES FROM COLONIAL TIMES TO THE PRESENT 55, 63, 82-90 (Alfred D. Chandler, Jr. & James W. Cortada, eds., 2003) [hereinafter A NATION TRANSFORMED].

4. RICHARD R. JOHN, SPREADING THE NEWS: THE AMERICAN POSTAL SYSTEM FROM FRANKLIN TO MORSE 255-56 (1995).

5. Sherman Anti-Trust Act, Pub. L. No. 190, 26 Stat. 209 (1890) (codified as amended at 15 U.S.C. §§ 1-7 (2006)).

ness, which Bell walked away from, while Bell did the same for telegraphy. Bell offered to sell the telephone patents to Western Union, but the latter refused the deal. Perhaps, at the time the decision was a reasonable one; telegraphy was then by far the superior power in communications. But history has proved it to be a mistaken judgment. Over the twentieth century, telephony eclipsed telegraphy in the number of customers served, the number of messages sent, the amount of income generated, and in every other relevant feature of communications. The Bell Company, later known as the American Telephone & Telegraph Company, or just AT&T, became the world's preeminent telecommunications firm and America's largest corporation.[6] Over time, money transfers became Western Union's primary line of business. Western Union ended its telegraph communications service on January 27, 2006.[7]

NUMBER 9
THE SUPREME COURT'S DECISIONS IN THE *EXPRESS CASES* AND THE *SEPARATIONS CASE*

Name a contemporary social problem and there's probably a way that it could arise in litigation.[8] As Alexis de Tocqueville wrote, "[t]here is hardly a political question in the United States which does not sooner or later turn into a judicial one."[9] It therefore is not surprising that the Supreme Court would play an important role in the early shaping of telecommunications policy. In fact, two different Supreme Court decisions helped to define the telecom playing field in much the same way that the foul lines lay down the playing field for baseball.

The first United States Supreme Court decision, *Memphis & Little Rock Railroad Company v. Southern Express Company.*[10] (the *Express*

6. "[I]n telecommunications, the Bell System constructed and operated a nationwide telephone network that was the envy of the world. Standardization, centralized control of engineering and operations, and cross-subsidized pricing produced high-quality service that reached nearly all areas of the country. And the earnings were sufficiently generous to support Bell Laboratories, the world's preeminent industrial research center." RICHARD H. K. VIETOR, CONTRIVED COMPETITION: REGULATION AND DEREGULATION IN AMERICA 10 (1994).

7. The Western Union website showed this final message: "Effective 2006-01-27, Western Union will discontinue all Telegram and Commercial Messaging services. We regret any inconvenience this may cause you, and we thank you for your loyal patronage. If you have any questions or concerns, please contact a customer service representative." Ironically, the Western Union legacy has lived on after its demise in the form of "text messaging"—*viz.*, Short Message Service or SMS. TOM STANDAGE, THE VICTORIAN INTERNET: THE REMARKABLE STORY OF THE TELEGRAPH AND THE NINETEENTH CENTURY'S ON-LINE PIONEERS 215-16 (1998).

8. Even global warming. *See* Massachusetts v. Envtl. Prot. Agency, 549 U.S. 497 (2007).

9. ALEXIS DE TOCQUEVILLE, DEMOCRACY IN AMERICA (J.P. Mayer trans., 1966) (1832).

10. Memphis L. R. Co. v. S. Exp. Co., 117 U.S. 1 (1886).

Cases), arose in the context of railroad transportation. Like telecommunications, rail transport has been deemed a "common carrier" that must be available to all parties on nondiscriminatory terms and that is subject to government regulation as to its rates, routes, and service. The issue in the *Express Cases* was whether railroads must serve as common carriers not only for individuals and shippers, but also for each other. That is, must each railroad allow every other one to interconnect with its own facilities (track, switches, roundhouses, etc.) in order to take advantage of so-called natural monopoly "bottleneck facilities" (as an economist might say) and to allow customers the opportunity to select different carriers for transit throughout the nation (as a consumer might say)? By statute, Congress had required telegraph companies to interconnect and transmit another firm's traffic, so the argument was made that the same principle should apply in the case of the iron horse. The Supreme Court, however, expressly rejected that theory. The Court concluded that, for several reasons, the common law underpinnings of the common carrier doctrine did not extend quite that far.[11] The Court therefore refused to order the interconnection of different railroad lines—that is, to make any one or all such companies "a common carrier of common carriers."[12]

The second Supreme Court decision was *Smith v. Illinois Bell Telephone Company* (the *Separations Case*).[13] The American system of government consists of a complex, confusing mix of federal and state jurisdiction over most aspects of public policy, including commerce. States have the authority to regulate commerce by virtue of what is called their inherent "police power," while Article I of the U.S. Constitution empowers Congress to regulate "interstate" commerce. The two grants of authority overlap, and understanding the difference between state and federal regulation of commerce occupies most of a first-year law school course in constitutional law.[14] The *Separations Case* involved

11. The Court explained that railroads had made investment decisions based on exclusivity, railroads had never held themselves out to other railroads as willing to serve them on the same basis that a railroad served the public, requiring interconnection might disrupt a railroad's ability to serve the public, and there was no tradition of railroads serving as common carriers for each other. *See id*. at 20-29.

12. *Id*. at 21.

13. Smith v. Ill. Bell Tel. Co., 282 U.S. 133 (1930).

14. The Supreme Court has read the Commerce Clause, U.S. CONST. art. I, § 8, cl. 3, as a broad grant of authority to Congress to regulate virtually any activity that has any remote relationship to interstate commerce for most of the twentieth century. *See*, *e.g*., Wickard v. Filburn, 317 U.S. 111 (1942) (holding that Congress can regulate a small-scale activity such as home-grown wheat if the nationwide sum of that activity can affect interstate commerce); Gonzales v. Raich, 545 U.S. 1 (2005) (stating the same result for homegrown cannabis). Recently, the Supreme Court has concluded that Congress' Commerce Clause power cannot be expanded indefinitely and has limited Congress' power in this regard. *See*, *e.g*., United States v. Lopez, 514 U.S. 549 (1995) (holding unconstitutional as exceeding Congress's commerce power the Gun-Free School Zones Act of 1990, 18 U.S.C.

the question of how that regulatory authority over telecommunications was divided between the state and federal governments. One theory—the "station-to-station" theory—was that a phone call from New York City to San Francisco should be treated as an indivisible entity that could be regulated only by the federal government. The competing "board-to-board" theory broke down a phone call into three components each of which must be regulated separately: (i) the intrastate New York element regulated by the Empire State; (ii) the interstate element regulated by the federal government; and (iii) the intrastate California element regulated by the Golden State.

The Supreme Court adopted a regulatory theory that distinguished intrastate from interstate commerce. In *Smith*, the Court held that the capital costs of operating the Bell System had to be allocated between the local exchange service and the interstate toll service.[15] The result was the system of "separations"—*viz.*, an accounting process that divided the costs of telecommunications capital into state and interstate components, so that prices could be set accordingly by the regulators involved. The states could regulate telephone service, but were limited to the intrastate facilities and service. Interstate facilities and service must be "separated" from its intrastate aspects, and only the federal government had jurisdiction over those elements of telecommunications.

Together, the decisions of the *Express Cases* and the *Separations Case* defined how the Bell System operated for most of the twentieth century. Gaul may have been divided into three parts, but America's telephone system had but two – local exchange service and long-distance service – and AT&T owned both of them. Historically, the Bell System preferred to allocate all of its costs to local service, which was regulated under the rate-of-return system, in order to recapture common capital costs in the ratemaking process. State and local regulators, however, wanted Bell to allocate some portion of its common capital costs to its

§ 922(q)(1)(A) (1988 ed. & Supp. V), which made it a crime to possess a firearm in the vicinity of a school); United States v. Morrison, 529 U.S. 598 (2000) (holding unconstitutional a statute making rape a federal crime). The Court's latest foray into this issue was Nat'l Fed'n of Indep. Bus. v. Sebelius, 132 S. Ct. 2566 (2012) (which involved the constitutionality of the Patient Protection and Affordable Care Act, Pub. L. No. 111-148, 124 Stat. 119 (2010)). Five justices concluded that there are limits on Congress's Commerce Clause, but there was no majority opinion. Chief Justice Roberts and Justices Scalia, Kennedy, Thomas, and Alito concluded that Congress lacked power under the Commerce Clause to adopt that law, *Sebelius*, 132 S. Ct. at 2577-2609 (opinion of Roberts, C.J.); *Id.* at 2642-76 (Scalia, Kennedy, Thomas, & Alito, JJ., dissenting), but the five Justices were not all on the same side of the judgment. By contrast, Justices Ginsburg, Breyer, Sotomayor, and Kagan concluded that the Act was a lawful exercise of Congress' Commerce Clause power. *Id.* at 2609-42 (opinion of Ginsburg, J.). How the law will play out in this area remains to be seen.

15. *Smith*, 282 U.S. at 146-62.

interstate business, in order to keep local costs low. The result was a series of accounting measures designed not to reflect the economic reality of AT&T's cost of providing local and long-distance service,[16] but to serve the political necessity of keeping local exchange rates low for consumers at the expense of other parties and telecommunications services.[17] That scheme of cross-subsidization lasted only as long as AT&T remained the sole provider of long-distance telephone service. Once the Federal Communications Commission (FCC) and the courts allowed rivals to enter that line of business and engage in "cream skimming" by underpricing AT&T's long-distance service, the cross-subsidization system came undone.

NUMBER 8
THE KINGSBURY COMMITMENT OF 1913

AT&T went through several stages, from competition (against Western Union) to monopoly (due to its settlement with Western Union and its own patents) to competition against rival telephone companies (once the original patents expired) to, ultimately, regulated monopoly status. For a while, the Bell System had several antagonists. Independent telephone companies disliked Bell's monopoly; consumers disliked Bell's monopoly (read: high) prices and imperial-service attitude; the states disliked the high prices charged consumers (read: voters); and the federal government saw Bell's monopoly as socially inefficient.

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16. Marginal-cost pricing is optimal in a competitive industry. By contrast, that pricing approach would not allow a natural monopoly with high fixed costs, such as telecommunications, to recover its fixed costs. Ramsey Pricing is an alternative. Ramsey Pricing achieves its goals by increasing prices where demand is inelastic and decreasing prices where demand is elastic. The result is that, contrary to the historic telephone cross-subsidy pricing scheme, long distance rates would decrease and local exchange rates would increase. STUART MINOR BENJAMIN, ET AL., TELECOMMUNICATIONS LAW AND POLICY 765-67 (2d ed. 2006).

17. The Communications Act of 1934 provided that issues relating to separations should first be presented to a Joint Board of federal and state commissioners before being submitted to the FCC for a final decision. The Joint Board adopted its first formal separations manual in 1947. That manual divided telecom plants and facilities into portions subject to federal or state jurisdiction. GERALD BROCK, TELECOMMUNICATION POLICY FOR THE INFORMATION AGE: FROM MONOPOLY TO COMPETITION 66-68 (1994). Over time, several different subsidies gained hold. Business customers subsidized private customers through higher business telephone rates—*viz.*, different rates for the same service. Urban customers subsidized rural customers because both groups paid the same rate—which meant that they paid the same rate for different services, different because urban service is subject to economies of density, which makes the cost of adding a new consumer less than in rural areas. Interstate customers subsidized local customers through higher long distance phone rates, resulting from an arbitrary allocation of a greater amount of the fixed cost of providing telephone service to long distance than to local exchange traffic. And so-called "vertical services"—e.g., caller identification, call waiting, call forwarding, speed dialing—subsidized basic exchange service. BENJAMIN, ET AL., *supra* note 16, at 763-64.

Over time, however, AT&T ultimately won the contest. AT&T acquired the backing of the J.P. Morgan Company, giving AT&T more financial resources than the independents could bring to bear. AT&T therefore bought off, or defeated, the independent telephone companies who gave up their fight against AT&T's monopoly. Some independents decided to be acquired by AT&T, rather than compete against it. The Kingsbury Commitment of 1913 resolved all of AT&T's other problems. AT&T pacified state regulators and consumers by agreeing to state regulation of rates and service. AT&T appeased the federal government in the Kingsbury Commitment of 1913 by agreeing to divest itself of Western Union, not to acquire additional independent telephone companies, and to interconnect its interstate lines (but not its local exchanges) with the local lines of willing independent phone companies. The result was that AT&T became a regulated monopolist, a status that lasted until 1984, when a federal district court broke up AT&T into one long distance company and the seven Baby Bells.

The Kingsbury Commitment of 1913 proved to be a major success for AT&T. AT&T prevented the federal government from nationalizing the telephone industry, as had occurred in some other nations, and also helped prompt the state and federal governments to adopt favorable regulatory systems. By accepting regulated monopoly status and avoiding both governmental ownership and antitrust litigation, the Kingsbury Commitment helped enable the Bell System to achieve its four business goals: (1) horizontal integration of local exchanges owned by AT&T via (2) AT&T's monopoly over interexchange long-distance communications; (3) backwards vertical integration into equipment manufacturing; and (4) forward, vertical integration into leasing of retail equipment to consumers, rather than sales. State price regulation was a small price to pay for monopoly status.[18]

Ironically, during the Great War the federal government took control of the telecommunications system for national defense purposes and learned that only the Bell Company had the technical know-how to operate a national telephone system. Accordingly, after the War the government decided that it was desirable to have just one company supply telecommunications service nationwide. Congress passed the Willis-Graham Act of 1921[19] in order to lift the restriction in the Kingsbury Commitment on the Bell System's acquisition of other telephone companies. As a result, the Bell System grew dramatically. By the early 1930s, Bell had eighty percent of the local exchange customers, ninety percent

18. Jeffrey E. Cohen, *The Telephone Problem and the Road to Telephone Regulation in the United States, 1876-1917*, 3 J. OF POL'Y HIST. 42, 171-73 (1991).

19. Willis-Graham Act, ch. 20, 42 Stat. 27 (1921) (codified as amended at 47 U.S.C. § 221(a)) *repealed by* the Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56, § 601(b)(2) (codified at 47 U.S.C. § 151 (2006)).

of the local exchange traffic, ninety-two percent of all telephone equipment sales (via Western Electric), and almost one hundred percent of the long-distance traffic (via the AT&T Long Lines Division).[20] AT&T truly had become America's telephone company.

NUMBER 7
DEVELOPMENT IN THE LEGAL, ECONOMIC, AND POLITICAL TREATMENT OF THE REGULATION OF BUSINESS

In the nineteenth century, regulation was done several ways, but there were two common denominators: reliance on the common law as the source of rules to be enforced, and use of the courts as enforcers.[21] A common regulatory structure involved application of tort law by the courts. English and American tort law regulated private, particularly business, conduct principally by defining a standard for damages liability in negligence. (Contemporary tort liability theories, such as implied warranty and products liability, were not born until the 1960s.) The general rule was that only "unreasonable" conduct could sustain liability, so the question in each case was whether the defendant acted reasonably. The answer was contingent on what a "reasonable man" would have done under like circumstances, which, in turn, hinged on whether the costs of further precautions exceeded the discounted cost or expected loss of potential damage. The best-known explanation of the legal standard applicable to most instances of nonintentional torts was the famous *Carroll Towing* standard adopted by Judge Learned Hand.[22] Under that standard, the defendant was guilty of negligence if the loss it caused, discounted by the likelihood of the accident occurring, exceeded the burden of the precautions that the defendant could have taken to avert the accident.[23]

Another example of the use of the courts as regulatory agencies can

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20. Cohen, *supra* note 18, at 173-74.

21. As Supreme Court Justice and professor Stephen Breyer has explained: "The common law is emphatically a regulatory system. It depends on the creation and enforcement, by law, of a set of rights, notably those creating private property and freedom of contract." STEPHEN G. BREYER, ET AL., ADMINISTRATIVE LAW AND REGULATORY POLICY 4 (6th ed. 2006).

22. United States v. Carroll Towing Co., 159 F.2d 169 (2d Cir. 1947).

23. The tort law, some have argued, was very favorable to businesses during this period. The *Carroll Towing* standard limited the circumstances in which a plaintiff could recover for injuries caused by his employer to instances of "unreasonable-as-inefficient" conduct. Atop that, companion doctrines such as assumption of the risk and the fellow-servant rule made it even more difficult for an employee to recover against an employer under traditional tort theories. In sum, although tort law was perhaps the principal vehicle for regulating business conduct, it is unclear how well tort law performed that task. For a discussion of those doctrines and the historical and contemporary uses of tort law to regulate business, *see, e.g.*, RICHARD A. EPSTEIN, CASES AND MATERIALS ON TORTS (9th ed. 2008); JOHN G. FLEMING, AN INTRODUCTION TO THE LAW OF TORTS (1968); W. KIP VISCUSI, REGULA-

be seen in the Sherman Act of 1891.[24] Once described as the "Magna Carta" of our free enterprise system,[25] the Sherman Act seeks to protect the public against anticompetitive conduct.[26] Federal antitrust law therefore is a form of economic regulation of markets and businesses.[27] The goal of the Sherman Act is to promote consumer welfare and protect the competitive process by outlawing "unreasonable" restraints of trade.[28]

TION THROUGH LITIGATION (2002); G. EDWARD WHITE, TORT LAW IN AMERICA: AN INTELLECTUAL HISTORY (1980).

Another approach during the nineteenth century rested on a combination of contract and corporation law. The contemporary public utility doctrine grew out of the nineteenth century principle that some state-created corporations, deemed "franchises," should be treated different from general state-authorized corporations. The reason was that the former were "affected with a public interest," since they were natural monopolies. Initially, corporations were chartered by the state for specific purposes, e.g., to construct a particular bridge. The state regulated corporations in three ways: by inserting conditions into corporate charters, by repealing such charters, or in litigation through quo warranto actions brought by the state attorney general. Over time, however, public opposition to the privileged status of early corporations led the states to enact general corporation laws allowing any qualifying business to assume corporate form. As the consequence, however, control over a corporation was transferred from the state attorney general to a board of directors and the shareholders. The board could directly supervise corporate officers, and the shareholders could seek relief in court against corporate officers and the board for a violation of their fiduciary duties. HERBERT HOVENKAMP, THE ANTITRUST ENTERPRISE 150 (2005); HERBERT HOVENKAMP, ENTERPRISE AND AMERICAN LAW 1836-1937, at 30-32, 56-64, 125-26 (1991).

24. *See* Sherman Anti-Trust Act §§ 1-7.

25. United States v. Topco Assocs., Inc., 405 U.S. 596, 610 (1972) ("Antitrust laws . . . are the Magna Carta of free enterprise. They are as important to the preservation of economic freedom and our free enterprise system as the Bill of Rights is to the protection of our fundamental freedoms.").

26. Spectrum Sports, Inc. v. McQuillan, 506 U.S. 447, 455-56 (1993); Standard Oil Co. of Ca. v. United States, 337 U.S. 293, 305-06 (1949) ("It is the theory of the antitrust laws that the long-run advantage of the community depends upon the removal of restraints upon competition.").

27. *See*, *e.g.*, BREYER, ET AL., *supra* note 21, at 7 ("[A]ntitrust is a form of regulation – a type of market intervention in an economy whose nucleus is private markets"); Fred S. McChesney, *Be True to Your School: Chicago's Contradictory Views of Antitrust and Regulation*, *in* THE CAUSES AND CONSEQUENCES OF ANTITRUST: THE PUBLIC CHOICE PERSPECTIVE 323, 328 (Fred S. McChesney & William F. Shughart II eds. 1995) ("Antitrust is economic regulation. Its essence is the regulation of certain types of economic relationships: horizontal agreements to fix prices, agreements between competitors to combine (by merger or otherwise), and so forth.") (footnote omitted); *e.g.*, Town of Concord v. Bos. Edison Co., 915 F.2d 17, 21 (1st Cir. 1990).

28. *See*, *e.g.*, Brooke Grp. v. Brown & Williamson Tobacco Corp., 509 U.S. 209, 224 (1993) ("It is axiomatic that the antitrust laws were passed for 'the protection of competition, not competitors."); Grappone, Inc. v. Subaru of New England, 858 F.2d 792, 794 (1st Cir. 1988); Robert H. Bork, *Antitrust and Monopoly: The Goals of Antitrust Policy*, 57 AMER. ECON. REV. 242, 244 (1967); HOVENKAMP, THE ANTITRUST ENTERPRISE, *supra* note 23, at 1; RICHARD A. POSNER, ANTITRUST LAW ix (2d ed. 2001).

The New Deal signaled a change in how regulation would be performed. Regulation now would be conducted by administrative agencies. Why? One reason for this change was the dramatic evolution in the post Civil War economy from a series of local markets to a national market. The result was that the states were incapable of regulating this new market both as a matter of law (due to limitations imposed on states by the Dormant Commerce Clause) and as a matter of practicality (due to a state's inability to enforce state law dictates beyond its borders). Another factor was the belief that standing agencies were better equipped to undertake a regulatory task than courts. Judges are generalists; they ordinarily are not specialists in any particular field. Judges cannot proactively reach out to address social problems; they must await the filing of a lawsuit. And judges cannot issue broad-based regulations to address large-scale social problems; they can only issue a judgment in a particular case involving specific parties.[29]

The debate changed dramatically in the 1970s. Economists, members of Congress, and even some members of regulatory agencies came to believe that economic regulation often was sclerotic and harmed consumers by protecting incumbents against competition. The market was seen as a better forum for advancing economic welfare than the halls of the regulatory agencies. Congress began to experiment with deregulation in several important markets, *e.g.*, air transport, trucking, railroads, and financial services. "Deregulation of those markets produced dramatic, socially beneficial results. In each case, consumers are now saving many billions of dollars per year as a result of deregulation."[30] In the 1980s and 1990s, advocates for regulatory reform turned their attention to the "network industries"—natural gas, electricity, and telecommunications—with the same goal of increasing the role of unregulated competition and decreasing the role of regulated monopoly in providing goods and services.[31]

Telecommunications regulation was originally justified on neoclassical grounds as necessary to prevent price gouging by a natural monopoly.

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29. Broadly speaking, contemporary regulation can broadly be placed into two categories. Economic regulation involves the control of entry, exit, rates, and other business or financial conduct of firms in a given market. Social regulation involves the control of economic externalities or activities that imperil human life, health, or the environment. During the first half of the twentieth century, the public supported economic regulation and opposed social regulation, while the opposite was generally true for the second half of the twentieth century. The difference perhaps was due to a fear of big business, the occurrence of the Great Depression prior to WWII and the tremendous post-WWII economic growth and rise of concern with quality of life factors. Clifford Winston & Robert W. Crandall, *Explaining Regulatory Policy*, *in* BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 8-17 (1994).

30. RICHARD J. PIERCE & ERNEST GELLHORN, REGULATED INDUSTRIES 18 (1999).

31. *Id*. at 14-18.

Neoclassical microeconomics taught that if the demand for a product within a relevant market can be satisfied at the lowest cost by one firm rather than by two or more, the market is a natural monopoly, whatever the actual number of firms in it.[32] But over time the natural monopoly theory became less and less persuasive. The reason was twofold: (1) technological developments, particularly in wireless communication, showed that competition could exist in communications without the unduly expensive build-out necessary for traditional, wireline Plain Old Telephone Service (known as POTS); and (2) as the ability for rivalry in telecommunications came to be a reality, the justification for treating AT&T as an indivisible, monolithic entity melted away.

The telecom industry has not been entirely deregulated although wireless telecommunications has gone a long way in that direction. Indeed, some federal legislation that passed in the 1990s has increased elements of regulation of wireline telecommunications, as discussed below. But insofar as regulation is governed by the laws of politics, rather than the principles of economics, the extent of telecom regulation always will remain a subject for debate and will vary over time.

NUMBER 6
TECHNOLOGICAL DEVELOPMENTS

This subject is one that military pilots would call a "target-rich environment," so only a few need be mentioned. For example, Alexander Graham Bell invented the telephone in 1876, and the telephone switchboard came about two years later. The switchboard allowed for a far more efficient telecommunications network because it permitted use of a hub-and-spokes network, just like the one that the United States Postal Service had implemented beginning in the John Adams Administration.[33]

In 1913, the Bell Company acquired patents for its long-distance amplification technology, the audion. The audion was the first vacuum tube electronic amplifier, which gave Bell a major lead over competing telephone systems in long-distance service, to which every independent local exchange company needed interconnection. The result was that more people could be networked with far fewer lines. Similarly, the laying of the transatlantic cable connecting the United States and Great Britain in 1858, the first of numerous such cables, helped bind people and commerce together internationally.

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32. *See*, *e.g.*, DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 104 (4th ed. 2005); W. KIP VISCUSI, ET AL., ECONOMICS OF REGULATION AND ANTITRUST 535 (4th ed. 2005); CHRISTOPHER STERLING ET AL., SHAPING AMERICAN TELECOMMUNICATIONS: A HISTORY OF TECHNOLOGY, POLICY, AND ECONOMICS 93-95 (2006).

33. The U.S. Postal Service's organization provided the blueprint for the layout of the wireline telecommunications system. For a discussion of the Postal Service, see A NATION TRANSFORMED, *supra* note 3, at 91-99; JOHN, *supra* note 4.

The "French Telephone," available in this country in 1927, combined a transmitter and receiver in one handset. Later, the Hush-a-Phone, a harmless mouthpiece attached to a phone to provide privacy, and the Carterphone, a device connecting a radio to the landline system for use by utilities' field maintenance workers, forced AT&T to allow devices not manufactured by its wholly-owned subsidiary Western Electric to be connected to the phone system. The result proved that manufacturing exclusivity was not essential for the system to function well.

Switches changed from human operators to electromechanical systems to crossbar systems to digital systems and PBXs. Long distance technology went from copper wire to coaxial cable and multiplexing to microwaves to geostationary satellites to optical fiber. Open-wire line system (above-ground, pole-to-pole connections) and coaxial cable (below-ground, larger-capacity wires) were the only transmission vehicles until after World War II, when microwave transmission came on stream. Developed for private commercial use after WWII, microwave transmission allowed a large quantity of information to be transmitted inexpensively over a long distance.[34]

The transistor, invented by AT&T's Bell Labs, allowed the development of the modern-day cell phone. The computer aided telecommunications in various ways.[35] The creation of broadband communication to transmit data has enabled the nearly instantaneous transmission of commercial data, particularly in the financial sector.[36] And the Internet, an offshoot of the ARPANET developed by the federal government for military and scientific purposes, threatens, along with wireless communications, to displace the historic wireline services provided by AT&T and its offspring.

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34. VISCUSI, *supra* note 32, at 535.

35. The computer industry also has seen subdevelopments, as well. There are four components to a computer system: (1) *hardware*, such as processing, storage, and terminals, plus associated peripherals such as printers, scanners, and bulk storage devices (mainframes are manufactured IBM, Hitachi, Unisys, and Fujitsu; workstation are manufactured by Sun-Microsystems, Hewlett-Packard, IBM, Compaq/Digital, and Silicon Graphics; PCs are manufactured by Compaq, Dell, IBM, Hewlett-Packard, and Gateway); (2) *software*, such as operating systems (manufactured by Microsoft, Mac OS, Unix, Linux, and OS/2 warp) and application programs, such as word processing, spreadsheet, and database programs, as well as specialized enterprise resource planning software (manufactured by SAP, Oracle, PeopleSoft, J.D. Edwards, and Baan); (3) *network equipment*, such as switches and routers used to connect individual computers (manufactured by Cisco Systems, 3Com, Northern Telecom/Bay Networks, and Cabletron Systems); and (4) *consulting, systems integration, and data processing services* (performed by EDS, Anderson Consulting, Computer Sciences, GE Capital ITS, and Science Applications). THOMAS J. HOUSEL & ERIC W. SKOPEC, GLOBAL TELECOMMUNICATIONS REVOLUTION 46-47 (2001).

36. Broadband is a connection capable of 200 kilobits a second both upstream and downstream. Robert W. Crandall et al., *The Benefits of Broadband and the Effects of Regulation*, *in* BROADBAND 295 n.2 (Robert W. Crandall & James H. Alleman eds., 2002).

Technological innovations such as wireless communications undercut the economies of scale on which the natural monopoly theory of telecom regulation always had rested, as well as the cross-subsidies that had resulted from the separations regime.[37] Those developments occurred simultaneously with the first of two major restructurings of the domestic telecommunications industry, the next relevant Top 10 item.

NUMBER 5
THE ANTITRUST CASES AGAINST AT&T

No American company is a stranger to litigation (this is America, where everyone believes in a right to sue anyone else for anything), and no large American firm is a stranger to antitrust litigation. AT&T was no exception.

As noted above, early in the twentieth century AT&T's size generated concern among the public, the states, and the federal government. At the time, only the federal government could bring a suit under the Sherman Act against a firm (states and private parties now can do so, too), and the Justice Department filed one, challenging AT&T's refusal to interconnect with other smaller telecommunications companies. AT&T and the government settled that lawsuit in the famous Kingsbury Commitment of 1913 noted above, a settlement that left AT&T in its (near) monopoly position in local exchange and interstate communications.

The federal government tried again late in the 1940s and early in the 1950s with a second antitrust suit. (At the request of the Defense Department, the lawsuit was put on hold for the Korean War.) This time the focus was on AT&T's ownership of Western Electric, the exclusive manufacturer of telecommunications equipment. The government's theory was that, by demanding that only Western Electric's products be used in connection with AT&T's phone service, AT&T had monopolized the business of manufacturing phone equipment. But here, again, the government settled the case rather than take it to trial. The Defense Department came to AT&T's aid, arguing that any breakup of AT&T would create a risk of a disruption of telecommunications service deemed essential to the safety of the nation during the Cold War. The settlement permitted AT&T to keep Western Electric as a wholly owned subsidiary, required AT&T to license its patents to other firms, and prohibited AT&T from entering the computer industry. The first two elements of the settlement were designed to satisfy the Defense and Justice Departments. The third element sought to please state regulators, by preventing AT&T from undercutting competition in the computer industry by cross-subsidizing that business via rate increases in its regulated tele-

37. VIETOR, *supra* note 6, at 188-90.

communications services. Interestingly, this last element of the settlement ultimately induced AT&T later to agree to the dissolution of its monolithic status.[38]

AT&T made that decision in the third antitrust suit relevant here, *United States v. AT&T*.[39] This time, the federal government challenged as violating the Sherman Act not only AT&T's refusal to interconnect with other telecom firms—including new entrants into the long distance field, such as MCI and Sprint—but also the other actions that AT&T took to maintain its monopolies in local exchange and long-distance traffic, such as its attempt to compete with MCI by offering a less expensive long-distance service. For a third time, the case settled in lieu of a trial, but this time the case settled on the government's terms. The reasons were that the trial judge signaled that he would rule in the government's favor, AT&T feared more what remedies the judge would impose than the ones sought by the Justice Department, and AT&T wanted to enter the computer industry, which it could do only if the earlier antitrust settlement were modified. The parties therefore came together in 1982 and entered into an agreement that transformed the American telecom system by breaking up AT&T into separate local exchanges and a long-distance business.[40] The trial court approved the settlement agreement and also modified the 1954 antitrust settlement in what became known as the Modification of Final Judgment, or MFJ.

The divestiture, which went into effect two years later, imposed a sharp dividing line between what were seen as the competitive long-distance and natural monopoly local exchange segments of the industry. According to that theory, local exchange carriers should be confined to offering monopoly local exchange service and barred from participating

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38. *See* BROCK, *supra* note 17, at 240:

> The FCC's decision to allow the integrated provision of enhanced services with local exchange service originated in the difficulties of determining the dividing line between those classes of service and in fears of limiting technological advance. The increasing integration of computer technology into all phases of communication during the 1980s made any distinction between computer and communications service appear artificial. Telephone companies routinely provided information services integrated into their ordinary operations through directory services, credit call validation, and 800 service. There was no clear distinction between that type of information service (classified as basic because they were aspects of providing traditional telephone service) and newer services such as voice storage that were classified as enhanced because they provided nontraditional services to the consumers.

39. United States v. AT&T, 461 F. Supp. 1314 (D.D.C. 1978), 524 F. Supp. 1336 (D.D.C. 1981), 552 F. Supp. 131 (D.D.C. 1982), *aff'd*, Maryland v. United States, 460 U.S. 1001 (1983). There also were a variety of private antitrust suits against AT&T, but none of them had the same effect as the federal government's lawsuit.

40. For a detailed discussion of the lawsuit and settlement that lead to the break-up of AT&T, see PETER TEMIN & LOUIS GALAMBOS, THE FALL OF THE BELL SYSTEM: A STUDY IN PRICES AND POLITICS (1989).

in competitive long-distance, manufacturing, or information services. Participants in the competitive markets should be unregulated, generally unaffiliated with the local exchange carriers, and should purchase needed local services from the local exchange carriers on a nondiscriminatory basis, with prices for those monopolized inputs controlled by regulation.[41]

NUMBER 4
MICROWAVE TRANSMISSION, MOTOROLA, AND MCI

With a novel business plan, a little bit of money, and a boatload of grit and determination, Microwave Communications, Inc. ("MCI") proved to the telecom world that David still could beat Goliath.

Motorola was instrumental in the development and early promotion of microwave point-to-point communication, which it helped to invent while working for the War Department during World War II. Both open-wire line system connections (above-ground, pole-to-pole) and coaxial cable (below-ground, larger-capacity wires) had large fixed costs, so AT&T was a natural monopoly in that regard. But the same was not true with respect to microwave transmission. Developed for private commercial use after the war, microwave transmission allowed a large quantity of information to be transmitted inexpensively over a long distance. After the war, Motorola urged the FCC to permit greater and greater use of microwave transmission, but the FCC then was unwilling to unseat AT&T as the monopoly provider of long-distance telecommunication services. Microwave transmission was used principally by utilities and allied firms, such as oil and gas pipelines.[42]

But in the 1960s, MCI came up with a new idea. MCI proposed offering companies the ability to communicate internally between Chicago, Illinois and St. Louis, Missouri by subscribing to its system, rather than by purchasing a private line from AT&T for the same purpose. AT&T vigorously opposed MCI's proposal. AT&T argued that allowing a rival to operate only an interstate phone service would enable it to "skim the cream" from the telecom business by underpricing the artificially high

41. BROCK, *supra* note 17, at 217. AT&T was still subjected to price regulation after the 1984 breakup, because government officials feared that deregulation would lead to either of two (conflicting) outcomes: Fear (1) – a price increase, because rivals could not offer the same services or quality of services as AT&T, or Fear (2) – a price decrease below predatory levels, as AT&T attempted to drive rivals from the field. Some believe that both fears were proved wrong. Fear (1) was proved wrong because the demand for telecom services was price-sensitive, and the development of fiber optic cables greatly increased the available supply of telecom transmission. Fear (2) was proved wrong because AT&T could not have engaged in the type of self-ruinous price cutting necessary to drive MCI from the market. VISCUSI, *supra* note 32, at 540-43, 548-49.

42. VISCUSI, *supra* note 32, at 535.

prices that the FCC and state regulators had forced AT&T to charge for interstate service in order to subsidize lower-priced local exchange service. Nonetheless, after years of skirmishing in the FCC and the federal appellate courts, MCI ultimately was able to offer its Chicago-St. Louis service—which it immediately sought to expand by linking together other cities, as well as by interconnecting with AT&T's local exchange services. MCI was successful yet again in those efforts, ultimately becoming one of the major challengers to AT&T's dominance of the long-distance telecommunications market.

MCI's importance lies not in its ability to compete away customers from AT&T; the latter remained the dominant long-distance carrier long after MCI entered that line of work. No, MCI's importance in telecom history was in forcing the government, in the form of the FCC and the federal courts, to re-examine the unstated legal underpinnings of the telecom monopoly that the government had bestowed on AT&T via the Kingsbury Commitment, the Communications Act of 1934, the 1954 antitrust settlement, and the years of deeming AT&T the sole provider of American telecommunication services. It was that re-examination which persuaded the political and legal communities that the American telecom system could survive, even prosper, without one firm being in charge of the entire end-to-end process.

NUMBER 3
THE FEDERAL GOVERNMENT'S TWO PRINCIPAL TELECOMMUNICATIONS LAWS: THE COMMUNICATIONS ACT OF 1934 AND THE TELECOMMUNICATIONS ACT OF 1996

The Communications Act of 1934 and the Telecommunications Act of 1996 are the two most important pieces of telecommunications regulation enacted by Congress in the twentieth century. Congress passed the Communications Act of 1934[43] early in FDR's Administration as one of many examples of what was the then prevailing theory of regulation. The Communications Act of 1934 was not controversial. Written by the Administration, the act became law after little debate. The consensus was that the Bell Company should remain a privately owned and operated regulated monopoly.[44] The common carrier provisions of the 1934 Act were based on analogous provisions of the Interstate Commerce Act that had been written for the railroads.[45] The 1934 Act was Congress'

43. Federal Communications Act of 1934, ch. 652, 48 Stat. 1064 (codified as amended at 47 U.S.C. § 151 (2006)).

44. VIETOR, *supra* note 6, at 176.

45. The primary common carrier provisions were the following: (1) Common carriers were obliged to serve all who request service; (2) the FCC had the right to require interconnection when it deemed it necessary; (3) telephone rates had to be just and reasonable; (4) unreasonable discrimination was prohibited; (5) publicly available tariffs for communica-

attempt to regulate AT&T's monopoly POTS service by entrusting its care to the FCC.

By contrast, the Telecommunications Act of 1996[46] was a response to changing technologies and market conditions that rendered obsolete the natural monopoly and cross-subsidy features of the telecom industry. The 1996 Act had several major components. *First*: The Act sought to increase competition in the local exchange market by lifting all state-imposed barriers to entry. *Second*: The Act required the "Baby Bells" split off from AT&T pursuant to the 1984 MFJ, known as Incumbent Local Exchange Carriers (ILECs), to interconnect for local service with the new rivals, known as Competitive Local Exchange Carriers (CLECs). *Third*: The Act allowed CLECs to rent various separate elements of an ILEC's business (*e.g.*, its local exchange trunks, switches, etc.), on a piece-by-piece basis, a practice known as purchasing Unbundled Network Elements, or the entire system altogether, a practice known as purchasing Unbundled Network Elements—Platform or UNE-P. Compensation was to be paid according to a formula to be determined by the FCC. *Fourth*: The Act sought to increase competition in the long distance market by allowing ILECs to compete for long-distance service, thereby lifting the ban on such entry imposed by the 1984 MFJ, once the ILECs could prove to the FCC's satisfaction that there was adequate competition in their regions for local exchange service.[47]

The interconnection and intercarrier compensation features of the Telecommunications Act of 1996 together proved to be quite controversial. A major reason was the formula that the FCC adopted for intercarrier compensation, the Total Element Long-Run Incremental Cost (TELRIC) formula. TELRIC was a forward-looking cost methodology used to price an ILEC's separate, unbundled network elements (UNE). The problem was that Congress prohibited the FCC from using an ILEC's historical costs as its pricing methodology, even though history-based pricing had been the prevailing methodology throughout the twen-

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tions charges had to be filed and applied in a nondiscriminatory manner; (6) the FCC could suspend tariffs for up to five months to investigate and hold a hearing regarding their lawfulness; (7) the FCC had the power to prescribe tariffs after a hearing; (8) the FCC had the authority to investigate complaints and, after a hearing, award damages, instead of bringing an action in court; (9) existing facilities could be extended only after the FCC issued a certificate of "present or future public convenience and necessity" justified the extension; (10) the FCC was given the authority to prescribe the accounting system and depreciation schedule for carriers; (11) the FCC was given extensive authority to compel information from carriers; (12) the act created a seven- member commission (later reduced to five members) who held office for seven years and who could be removed only for cause. BROCK, *supra* note 17, at 51-52.

46. Pub. L. No. 104 § 601(b)(2), 110 Stat. 56 (codified as amended at 47 U.S.C. § 151 (2006)).

47. BENJAMIN, *supra* note 16, at 772.

tieth century.[48] Instead, the elements of the TELRIC pricing formula were (1) the marginal cost of servicing a CLEC; (2) a proportion of depreciation for facilities equipment; (3) a proportionate share of overhead; and (4) some share of the cost of capital invested in the element.[49]

Congress' decision put the FCC in a bind. On the one hand, if the FCC allowed an ILEC to recover its fixed costs, then the FCC would have violated the Telecommunications Act of 1996, which prohibited using historical costs. The network elements would have been underused, because marginal cost-pricing is the most efficient pricing mechanism. And, CLECs would have built their own facilities even if there already was an adequate amount of facilities equipment available. But on the other hand, if the FCC did not allow an ILEC to recover its historical costs, then the ILEC would suffer a loss of fixed cost. The ILEC would be deterred from spending money on research and development, because those expenditures could not be recaptured. Even CLECs might be deterred from spending money on construction or research and development, for fear that they eventually would be treated as ILECs.[50] Accordingly, the FCC's UNE-P and TELRIC rules were vocally criticized by the ILECs on the ground that they created a disincentive to CLECs to create their own facilities and to ILECs to invest in new ones, and, by creating such disincentives, thereby hurt the public.[51]

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48. *Id*. at 779-80. Historical costs would not necessarily yield higher prices than forward-looking costs; it depended on the inputs and the amount of depreciation for existing facilities. For that reason, some BOCs proposed a forward-looking (replacement) methodology, but with more realistic assumptions than TELRIC's. Moreover, components of the TELRIC inquiry did require a calculation of (forward-looking) fixed costs and permitted ILECs to recover a pro rata share of those fixed costs from CLECs to the extent the CLECs used an ILEC's capacity. *See* JONATHAN E. NUECHTERLEIN & PHILIP J. WEISER, DIGITAL CROSSROADS: AMERICAN TELECOMMUNICATIONS POLICY IN THE INTERNET AGE App. A, at 431-53 (2007).

49. *Id*.

50. *Id*.

51. *See, e.g.*, George Bittlingmayer & Thomas W. Hazlet, *The Financial Effects of Broadband Regulation*, *in* BROADBAND, *supra* note 36, at 245, 252-54 (describing UNE-P and TELRIC as "the tragedy of the commons"); Howard A. Shelanski, *Competition and Regulation in Broadband Communications*, *in* BROADBAND, *supra* note 36, at 157, 177-85; Jerry Hausman, *Internet-Related Services: The Results of Asymmetric Regulation*, in BROADBAND, *supra* note 36, at 129, 136-39, 148-49, 151; Charles L. Jackson, Wired High-Speed Access, *in* BROADBAND, *supra* note 36, at 83, 100-01; Robert W. Crandall & Martin W. Hazlett, *Telecommunications Policy Reform in the U.S. and Canada*, *in* TELECOMMUNICATIONS LIBERALIZATION ON TWO SIDES OF THE ATLANTIC 8, 22-23 (Martin Cave & Robert W. Crandall eds., 2001).

For a discussion of how the UNE-P and TELRIC pricing rules undermined the benefits of and the "deal" that was a part of price cap regulation, see DALE E. LEHMAN & DENNIS WEISMAN, THE TELECOMMUNICATIONS ACT OF 1996: THE "COSTS" OF MANAGED COMPETITION 85-99 (2000). For example, the UNE-P and TELRIC rules have a "margin spread" effect on an incumbent due to the "output effect" and "input effect." The output effect occurs when a

That controversy (and some others) died down over the ensuing decade. The Supreme Court upheld use of the TELRIC formula,[52] but that Court and the federal circuit courts struck down other aspects of the FCC's post-1996 Telecom Act rules, such as ones relating to legacy elements of the telephone network (e.g., capacity on circuit switches and the high-frequency portion of the copper loop).[53] Moreover, the post-1996 Act growth in wireless communication, the use of fiber optic lines for voice, data, and video services, the acquisition of AT&T and MCI by ILECs (SBC, immediately renamed as AT&T, and Verizon Communications Inc., respectively) and the explosion in Internet communication – all those factors worked to dampen the effect of the FCC's post-Act rules on the ILECs. It is unclear what, if anything Congress will do to address the current, dramatically-changed telecom landscape.

NUMBER 2
WIRELESS COMMUNICATION AND ITS USE IN CELLULAR TECHNOLOGY

Guglielmo Marconi won the Nobel Prize for Physics in 1909 for his contributions to wireless telegraphy, an invention with even greater potential for long-distance communication than the telegraph or telephone, because wireless devices allow communications between points that are impossible or impracticable to connect physically. At one time principally used by civilian vessels for ship-to-shore or inter-ship voice traffic or by the military for battlefield communications, wireless communication devices – *e.g.*, cell phones, BlackBerries, iPhones, and the like – have reshaped the telecommunications market in ways unrecognizable to Ma Bell. Wireless phones now are an established, mass-market consumer device.[54]

It is difficult to overstate the impact of wireless communications on today's telecom world. Wireless technology has freed individuals from

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CLEC is allowed to price one service, such as long distance service, below what an ILEC is forced to charge as a means of keeping low the cost of other services, such as local service. (That is what occurred to AT&T from the FCC's decision to allow MCI to enter only the long distance market and to price long distance calls below the price that AT&T could charge.) The input effect occurs when an ILEC is forced to sell its services to a CLEC at a rate below its costs by using TELRIC forward-looking pricing, rather than historical rates and costs.

52. Verizon Commc'ns, Inc. v. FCC, 535 U.S. 467 (2002).

53. AT&T Corp. v. Iowa Utils. Bd., 525 U.S. 366 (1999); U.S. Telecom Ass'n v. FCC, 290 F.3d 415 (D.C. Cir. 2002); U.S. Telecom Ass'n v. FCC, 359 F.3d 554 (D.C. Cir. 2004).

54. As the Economist magazine has noted, "When you leave your house, you probably take your keys, your wallet and your phone." *A Spiritual Connection*, ECONOMIST, Mar. 10, 2005. According to one study, two-thirds of all U.S. households have at least one cellphone, with many having more than one. CNET News.com Staff, *More Cell Phones, Less Satisfaction*, CNET NEWS.COM (Apr. 13, 2005, 12:55 PM) (citing a Forrester Research study)) http://news.cnet.com/More-cell-phones%2C-less-satisfaction/21000-1039_3-5669525.html.

landline phones and trunks, has obliterated the once-rigid boundaries between local exchange and long-distance services, and has made data and video services available to nearly everyone everywhere in the United States and the world.[55] Wireless technology also has led to a revolution in communications pricing. The 1997 introduction by AT&T of a per month bundle of minutes billed at one price transformed telecommunications pricing, which historically had been defined in geographic terms (local vs. long distance traffic). Telecommunications companies also offer a discount if a consumer "bundles" his wireless, wireline, Internet, and television services into one package. Moreover, we are witnessing, particularly among young and new cell phone users, a permanent transition away from wireline phones exclusively to wireless devices.[56] Indeed, some economists have estimated that a shift of only ten percent from wireline to wireless communications in America creates a sufficient amount of intermodal competition to justify deregulation of wireline communications altogether.[57] In other nations, wireless communication devices have enable governments – such as the new government of Iraq – to leap-frog over the build-out of extensive (and expensive) wireline communications trunks and give people their first opportunity for intra- and international communications by constructing cell towers, instead.

The growth in wireless communication and the Internet are the two most recent and dramatic telecommunications developments since the enactment of the Telecommunications Act of 1996. Their effect is such that, in 2006, *The Economist* predicted that within five years telecom companies would offer wireline service as a free add-on whenever a customer purchased wireless, broadband, or fiber optic video service. That day has not yet arrived, but the prospect that Ma Bell's old landlines

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55. For a discussion of the development of wireless technology and the growth of the wireless industry, see LOUIS GALAMBOS, ANYTIME, ANYWHERE: ENTREPRENEURSHIP AND THE CREATION OF A WIRELESS WORLD (2002); Jerry Hausman, *in* BROADBAND, *supra* note 36, at 106, 117-18.

56. A 2004 survey done for the Centers for Disease Control found that 5.5% of adults lived in households with only wireless phones in the second half of 2004, up from 4.4% in the first half of 2004 and 2.8% in the first half of 2003. Stephen Blumberg, Household Telephone Service and Usage Patterns in the US in 2004, Presented at U.S. Household Telephone Usage Patterns in 2004: A Focus on Cell Phone Usage, (June 16, 2005). The rate among younger users appears much higher, with roughly 14% of 18-24 year-olds living in wireless-only households. According to one analyst, most wireless-only users do not actually cancel their wireline service; instead, they simply never sign up for wireline when making an initial phone service decision. Jason Armstrong, et al., *Americas: Telecom Wireless*, GOLDMAN SACHS, EQUITY RESEARCH 1 (2005). One researcher has estimated that, by the end of 2004, there were more wireless subscribers (184 million) than wireline subscribers (176 million) in the United States. Timothy Horan, et al., *Transfer of Coverage: We Favor Wireless and Cable Over Wireline*, *CIBC World Markets*, EQUITY RESEARCH 2 (2005).

57. Jerry Hausman, *in* BROADBAND, *supra* note 36, at 106, 125.

would disappear from use as consumers switch to Dick Tracey's two-way "wrist radios" is no longer just a comic book dream.

NUMBER 1
A TIE – THEODORE VAIL AND THE INTERNET

There is a tie for the Number 1 spot between Theodore Vail and the Internet. Vail wins the award for starting telecommunications on the path that it followed for most of the twentieth century, while the Internet takes the baton possibly to newer heights than even Vail could have imagined.

A. Theodore Vail

Alexander Graham Bell invented the telephone, but Theodore Vail created the Bell System and the concept of "universal service" – "One Policy, One System, Universal Service." By "universal service" Vail meant, not what is meant by that term today—namely, the principle that everyone has the right to inexpensive telephone service—but that only one telephone company—the Bell Company—would supply telephone service in the United States.[58]

Richard John discusses the different theories regarding the development of the concept of universal service: *viz*., the belief that telephone use ought to be available to all Americans across one nationwide system.[59] John explains that historians have offered several explanations for the origins of universal service in America: (1) AT&T's universal service was "attributable to a unique combination of technological virtuosity and visionary leadership;" (2) "a key turning point was the acquisition [by AT&T] of Western Electric in 1881 – an event that set the stage for Bell's preeminence in industrial research;" (3) establishment of close relations between the operating companies and the AT&T long-lines division; (4) "skillful entrepreneurship," "an 'almost irrational' commitment to interconnection," and "the active cooperation of state regulatory bodies;" (5) the daring, imaginative work of entrepreneurs who, after the expiration of Bell's patents, established telephone systems in regions not served by Bell Telephone; and (6) the use by ordinary Americans of the telephone as a means of connecting America not just politically and economically, but socially.[60]

John has a different view. In his opinion, the civic rationale for nationwide development of the U.S. Postal Service also underlays the growth of the telephone network. According to John, Gardiner Greene

58. Benjamin, *supra* note 16, at 698.

59. Richard R. John, *Theodore N. Vail and the Civic Origins of Universal Service*, 28 Bus. & Econ. Hist. 71 (1999).

60. *Id*. at 71-74.

Hubbard, a confidant of Alexander Graham Bell and an early promoter of the telephone, saw that the telegraph failed to realize the democratic potential of the Postal Service and sought to put the Bell system on a trajectory to accomplish what the telegraph had failed to do: *viz*., expand beyond its core business purposes and customers to reach all of the American public. Theodore Vail, whom Hubbard hired away from the Postal Service (where he was General Superintendent of the Railway Mail Service) to work at Bell Telephone, modeled the telephone network on the Postal Service network. Vail saw universal service, not as a means of stifling competition, but as a means of creating a national communications system.[61] In John's words:

> [T]he nation's telephone network evolved from the basic information infrastructure of the Industrial Age – from the U.S. Postal System, its U.S. Railway Mail Service, and Western Union. The creative entrepreneur most responsible for this evolution was Theodore Newton Vail. His story vividly illustrates how technologies, people, and organizations – and their collective learning and experiences – evolved consecutively over time, how the technological infrastructures and resulting organizational system (and those involved creating these infrastructures and the resulting systems) became the building blocks of the emerging Information Age. From Vail to today, a clear line of events suggests the nature of continuity at work.[62]

Vail undertook a series of specific actions to implement his "universal service" vision. Vail won every patent case brought by or against the Bell Company, and he midwifed the Bell Telephone–Western Union settlement. He helped to achieve the enhanced capitalization of the Bell Company by securing the backing of J.P. Morgan. Vail oversaw Bell's 1881 acquisition of Western Electric, then a leading manufacturer of electrical equipment, associated with Western Union for a decade, and which ultimately gave birth to Bell Labs, perhaps America's greatest corporate R&D arm. A strong supporter of expanding Bell's interstate network and heavily influenced by the network operation of the Postal System,[63] Vail was in charge when the Bell Company entered into the Kingsbury Commitment with the federal government and thereafter built out its telephone network. In his second tour at the Bell Company, Vail became the first head of AT&T, which began as the long-distance subsidiary of Bell Telephone, but eventually became the parent company. AT&T became the nation's second largest corporation, ahead of the Standard Oil Company of New Jersey and behind only the United States Steel Corporation, which AT&T later overtook.[64]

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61. *Id*. at 74-79.
62. A NATION TRANSFORMED, *supra* note 3, at 283.
63. *Id*. at 91-99.
64. *Id*. at 284-85.

Why and how did Vail adopt this strategy? Vail foresaw the rise of competition once Bell's patents had expired and sought to maintain AT&T's dominant position by strengthening the Bell Company's technological and business positions in the telecommunications industry. Vail's strategy had three components. *First*: Vail sought to enhance the reach and dominance of Bell's local and long distance telephone service by encouraging technological innovation and refusing to interconnect with other phone companies, thereby encouraging them to sell out to Bell. *Second*: Vail sought to establish Western Electric as the dominant telephone equipment manufacturer, thereby effectively forcing every telephone company not snatched up by Bell to purchase its equipment from Western Electric. *Third*: Vail sought to develop and introduce new technologies by the internal development of new equipment in what later became Bell Labs, by stressing the need for standardization of telecommunications equipment, thereby effectively creating a national standard that only Bell equipment could satisfy, and by the introduction of new technology on a carefully phased-in, system-wide basis.[65]

Vail successfully defeated the political attempts to weaken Bell's hold over telecommunications. To pacify state officials, Vail agreed to state regulation of price, profits, and service. To satisfy federal officials, Vail entered into the 1913 Kingsbury Commitment, in which he agreed to divest Bell of Western Union, which it had acquired, to cease acquiring new independent telephone companies, and to offer long-distance service to any other telephone company that wanted to interconnect with the Bell system. That last element of the Kingsbury Commitment, although a change from the prior Bell policy of refusing to allow interconnection, worked to Bell's advantage, Vail surmised, because it let smaller, independent companies develop the less densely populated, less affluent rural areas of America while still connecting with them as part of Vail's notion of "universal service."[66]

In sum, Vail took a successful telephone company, changed it into the world's preeminent telephone company by overcoming or acquiring his rivals, and, through a few wisely adopted and craftily-structured compromises, defeated every legal and political effort by all branches of the federal and state governments to disassemble or limit his creation. In making AT&T into an iconic American company, Vail certainly ranks with Henry Ford as one of the giants of twentieth century American business.

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65. Louis Galambos, *Theodore N. Vail and the Role of Innovation in the Modern Bell System*, 66 BUS. HIST. REV. 95, 101-26 (1992).

66. *Id.*, at 102-04. The vision that Vail had and the steps that he took to implement "universal service" established the framework within later actions fit. A NATION TRANSFORMED, *supra* note 3, at 285-86.

B. The Internet

The Internet is an international network of interconnected computers, "smart phones," and the like that can communicate with each other across the globe. The Internet began as the "ARPANET," a telecommunications program created by the Advanced Research Projects Agency of the U.S. Department of Defense to ensure that the military and its supervising civilians could communicate in the event that a war destroyed ordinarily-used communications facilities and transmission lines. The ARPANET no longer exists, but it served as the model for the Internet, which links millions of people worldwide to communicate with one another, to access vast amounts of stored information, and to purchase goods directly from the manufacturer.[67]

The Internet has been a truly revolutionary development. At a plebian level, the Internet enables consumers to shop for goods nationwide and buy directly from the manufacturer as a means of lowering the cost of purchasing an item. At a more patrician level, the Internet enables everyone to become an online author and publisher of articles, books, photographs, music, movies, or anything else that can be reduced to ones and zeros. And at a realpolitik level, the Internet enables disparate groups to communicate with each other in peacetime, to foment insurrection, or to plan military moves in a rebellion like the one that we witnessed occur in Libya in 2011. Add in the ability to access the Internet through handheld devices like a smart phone and you have the ability to manage (much of) life from anywhere and while on the go. Paying the rent, watching a movie, or playing Sudoku while sitting on the subway may not advance civilization very far, but the other, always-increasing uses of the Internet likely will have just that effect. Think of the telegraph or telephone on steroids, and you have the Internet. Yet, because no one *owns* it, there is no cost for people to use it—except what you pay your carrier to access it.

CONCLUSION

I promised you the top ten persons, inventions, or events in the history of telecommunications, and I delivered eleven. So sue me. Whatever the number, the list is a diverse and, in my opinion, comprehensive set of the most important factors that have led to today's modern, worldwide telecom industry.

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67. *See*, *e.g.*, Reno v. ACLU, 521 U.S. 844, 849-50 (1997). For an excellent discussion of the importance of the Internet, and of the history, policy, and law of telecommunications generally, see Nuechterlein & Weiser, *supra* note 48.