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UNIVERSAL SERVICE

Competition, Interconnection and
Monopoly in the Making of the
American Telephone System

Milton L. Mueller

First published 1997, MIT/AEI Press. Digital version published 2013 © Milton Mueller

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1

INTRODUCTION

THIS BOOK IS AN ATTEMPT to change the way we think about competition, universal service, and interconnection in telecommunications. It does so by revisiting a critical period in the development of American telecommunications: the period of unbridled competition between the Bell system and independent telephone companies in the early 1900s.

Universal service as a term and a concept originated during that period. Since then, it has been one of the key touchstones of U.S. telecommunications policy. Although the meaning of the term has changed, its essential connotation is not hard to grasp: universal service means a telephone network that covers all of the country, is technologically integrated, and connects as many citizens as possible. The importance of rapid, widespread telecommunications to government, business, and society can scarcely be overstated. Telecommunications makes it possible to administer a national economy and maintain social bonds across great distances. Because communications infrastructure coordinates and unifies a country in countless ways, the universal service concept spans the realms of economic and social policy.

In recent decades policymakers have come to believe that universal telephone service was an historical achievement of regulated monopoly. Superficially, the fit between telephone monopolies and universal service objectives seemed a natural one. Monopoly organization simplified the process of standardization and so provided the basis for uniform nationwide connectivity. The absence of competition also made it easier for regulators to make telephone companies' rates conform to social policy goals. The use of long-distance revenues to subsidize local service, a practice common to telephone monopolies worldwide, found ready justification in the idea of making access to basic telephone service affordable to larger numbers of people.

The alleged historical link between the universality of the telephone and a monopolistic industry structure has set the stage for a momentous policy debate in contemporary telecommunications. The natural monopoly paradigm is eroding everywhere. Competition is spreading throughout the sector on a global basis. If, as the traditionalists claim, universal service was the *raison d'être* of regulated monopoly, what will become of it as competition proceeds to revolutionize the industry? Are competition and universal service compatible?

The importance and pervasiveness of that question has led to worldwide adoption of a peculiarly American phrase. A slogan coined by AT&T President Theodore Vail in 1907, "universal service" is now regularly invoked by telecommunications authorities from China¹ to Japan² to the British Commonwealth countries.³ Here in the United States, the federal government is concerned not only with the financing of universal service in a competitive environment, but also with the extension of universal service ideals from simple voice telephony to the new technologies of a "national information infrastructure."⁴

The reconciliation of universal service goals with the new market paradigm forms one of the central problems of contemporary policy. But the universal service issue is really a subset of a more fundamental problem posed by telecommunications competition, namely that of interconnecting competing networks. Few if any of the new, competing networks are stand-alone entities; they require access to the users of the established telephone network via interconnection arrangements. Those relations of interconnection have the power to virtually predetermine the winners and losers of competition. Overly restrictive interconnection arrangements may cripple new competitors. Overly liberal arrangements may undermine the incumbent and destroy universal service by allowing newcomers to "cream skim" the most profitable markets while leaving the costly services to the incumbent. Thus, without exception the countries that have introduced competition have been forced into long debates over the conditions and prices of interconnection, all the while looking over their shoulders at the universal service implications of their policies.

The essential issue in those debates is the impact of interconnection upon competition and universal service in telecommunications. This book attempts to illuminate that problem by conducting a detailed historical examination of early telephone competition in the United States. The prominence of competition, interconnection and universal service concerns today makes an accurate analysis of the early competitive period of telephone development in the United States of special relevance. From 1894 to about 1912 the telephone industry in the United States was open to practically unlimited entry. The Bell system was forced to compete with independent telephone companies in thousands of cities. More important still was the specific form that the competition took. Unlike today's telecommunications industry, the competing exchanges of the Bell and independent companies were not connected to each other. The companies conducted

¹ Hongmei Wang. Competition and Regulation of China's Telecommunications Industry, 7 World Telecommunications (Chinese language) 7-8 (Nov. 1994). See also He Fei Chang. Lian Tong: A Quantum Leap in the Reform of China's Telecommunications, 18 Telecommunication Policy 206, 208 (Apr. 1994).

² Koichiro Hayashi, Universal Service in Japan (Japanese language) (Chuokoron-Sha 1994).

³ The size and financing of "universal service obligations" (USOs) are being actively debated in Great Britain, Hong Kong, New Zealand, and Australia.

⁴ National Telecommunications and Information Administration, Inquiry on Universal Service and Open Access, Docket. No. 940955-4255 (Sept. 19, 1994).

their rivalry as separate systems. As such, the Bell-independent contest of the early 1900s provides an extended experiment with an essentially unregulated market for interconnection.

A historical analysis of that experiment challenges some of the most cherished tenets of contemporary telecommunications policy. Contrary to the prevailing mythology, it was that period of systems competition, not the ensuing period of regulated monopoly, which gave birth to both universal service as a policy prescription and the physical reality of a geographically ubiquitous telephone infrastructure. Moreover, the refusal of Bell and the independents to interconnect with each other actually promoted the rapid geographical extension of the network. Our understanding of the concept universal service is greatly enriched by reexamining the historical background. The policy first emerged in the thick of the competitive battle between Bell and the independents. The universality of telephone service became an issue at that time because of the fragmentation of telephone users into competing local exchanges. At that time, *universal service* did not mean a telephone in every home or rate subsidies to residential users, but the unification of the telephone system so that all users could call each other. In other words, the original universal service debate was about interconnection. The policy choice faced at that time may seem eerily familiar to modern observers of the telecommunications and computer industries. Like us, our predecessors in the early 1900s were confronted with a difficult choice between compatibility, uniformity, and monopoly on the one hand, and competition, fragmentation, incompatibility, and diversity on the other.

The book attempts to combine theory and history in a way that can make the historical data relevant to current policy problems. Chapter 2 provides a more thorough introduction to the historiographical issues addressed in the book. It shows that numerous misconceptions and myths have grown up around the subjects of universal service and early telephone history. Chapter 3 outlines the economic theories that are applied to the historical data. With the conceptual framework in place, chapters 4 through 11 constitute the historical narrative, which runs from the expiration of the Bell patents in 1894 to the final act of telephone service unification, the passage of the Willis-Graham Act of 1921. Chapter 12 provides a summary of the impact of early competition on telephone network scope and penetration. Chapters 13 and 14 move the discussion into the present. Chapter 13 shows how the politics of rate regulation from the 1930s to the 1970s led to an important and somewhat misleading change in the definition of the term universal service. Chapter 14 explains how the book's reinterpretation of the history of universal service, the economic effects of interconnection, and the origins of monopoly are relevant to current policy debates. The final chapter is a summary of the book's main points.

2

UNIVERSAL SERVICE: A CONCEPT IN SEARCH OF A HISTORY

UNIVERSAL SERVICE entered the vocabulary of American telecommunications in 1907. The slogan “one system, one policy, universal service” was coined by Theodore Vail, the President of AT&T, and propagated in the company’s annual reports from 1907 to 1914.⁵ Its appearance came, as we shall see later, at the peak of a fierce competitive struggle between the Bell system and thousands of independent telephone companies. The idea of universal service served as the linchpin of the Bell system's argument for transforming the telephone industry into a regulated monopoly. The emergence of the concept thus marked an important turning point in the history of American telecommunications.

Most historians and policy makers believe that when Vail invoked *universal service* he meant the same thing we mean by it today: regulatory policies to promote the affordability of telephone service through cross subsidies.⁶ This book disputes that widely-accepted view. There is, it argues, an important difference between Vail's concept of universal service in 1907 and the conception prevailing now. Understanding that difference is what this book is all about. At stake is not simply a question of historical semantics, but a far-reaching reinterpretation of the history of telecommunications with significant implications for current and future telecommunications policies.

In contemporary discourse, *universal service* policy is synonymous with government policies to promote the affordability of telephone service and access to the network. Sometimes this means direct subsidies to telecommunications construction in remote areas, such as the Rural Electrification Administration loan program. More commonly, it refers to attempts to maintain affordable local rates

⁵ American Telephone and Telegraph Company, ANNUAL REPORT 17-18 (1907).

⁶ See, for example, Herbert S. Dordick, Toward a Universal Definition of Universal Service, UNIVERSAL TELEPHONE SERVICE: READY FOR THE 21ST CENTURY? (Annual Review of the Institute for Information Studies, 1991).

by means of rate averaging and cross-subsidies within the nation's telecommunications system. This might mean, for example, imposing higher charges on long-distance users in order to reduce charges for basic local telephone service for households. Or it might mean charging the same rates for a long-distance call between two small, remote towns in Montana as for calls between Philadelphia and New York, when in fact economies of scale make calls between the latter two high-traffic centers far less expensive than the former. Whatever the mechanism, pushing telephone penetration towards 100 percent is seen as a policy goal of sufficient importance to justify various forms of public intervention in the industry. Underlying all these policies is the assumption that without active government intervention, access to telecommunications would be well below the socially optimal level.

Universal service in that respect is an expression of liberal egalitarianism, like universal schooling, literacy, or voting rights. More than just a telephone in every home, it implies that a ubiquitous communications infrastructure can contribute to national unity and equality of opportunity. In debates over the emergence of competition in the telephone industry during the 1970s, 1980s, and 1990s, the concept has become a pillar of the developed world's postal, telephone, and telegraph monopolies.⁷ Telephone companies and regulators warned that universal service could not have been achieved without the regulated monopoly structure, and that competitive market forces had to be thwarted or tempered lest those goals be undermined. More recently, advocates of a new "information superhighway" have also drawn upon the concept to promote broadened access to new technologies.

This is the *modern* construction of universal service policy – the definition that has prevailed from about 1975 to the present time. This construction, and particularly its link with the regulated monopoly regime, draws its legitimacy and support from (questionable) interpretations of history. The all-encompassing network is perceived as an historical achievement of public regulation and a monopoly structure. Indeed, the modern idea of universal service comes with a full-blown version of its own historical origins. According to the conventional wisdom, universal telephone service was a public policy mandated by the 1934 Communications Act, and consciously brought into being by regulators acting in conjunction with telephone monopolies. A typical statement of this view appeared recently in an industry trade journal. "Telecommunications public policy crystallized in America with the Communications Act of 1934. Its goal was clear: the provision of universal service to every citizen in the country... Telephones at the time were viewed as a 'social necessity' that should be provided to all."⁸ The crowning achievement of this system, so the story goes, was the 92 percent household penetration ratio of the telephone just prior to the AT&T divestiture.

The authors of that claim are not historians and offer no evidence for their claim. But that is precisely my point: the viewpoint they express is so common and so widely accepted that it is assumed to need no substantiation. In making such a statement the authors are merely reiterating something that most business people, academics, and regulators involved in the telephone industry take as a truism. There are minor variations on the theme. The telephone companies, particularly those associated with AT&T, emphasize Vail's formulation of the idea and the telephone industry's contribution to its realization. In their view, the Communications Act simply ratified the far-sighted

⁷ Nicholas Garnham, *Universal Service in Western European Telecommunications. European Telecommunications Policy Research* (IOS 1989).

⁸ Barbara J. Farrah and Mike Maxwell, *Building the American Infostructure, Telephony* 45 (Apr. 20, 1992).

vision of a corporate statesman. Academic scholars generally follow in this vein. A recent book on the subject, for example, hails the 1934 Act as the codification of Theodore Vail's vision of universal service⁹ and highlights the role of redistributive rate regulation in promoting broader penetration.¹⁰ In short, the modern definition of universal service is based on a holy Trinity comprised of the Communications Act, regulated monopolies, and rate subsidies.

But it is surprisingly easy to refute those historical claims. The words 'universal service' never appeared in the 1934 Communications Act. In preparing the law, Congress filled thousands of pages of the Congressional Record with research and documents about communications companies, but one will search that record in vain for the words 'universal service,' or for any evidence of a policy corresponding to the one described above. No mechanism for subsidizing telephone service was created or authorized in the legislation. Indeed, federal regulation could not have had much impact on the universality of telephone service in the 1930s or 1940s, or even the 1950s. The Communications Act and the FCC had jurisdiction over interstate telecommunications only, and in 1934 less than 2 percent of all telephone traffic crossed state lines.¹¹ The 1934 Act thus affected only a tiny portion of the overall telephone marketplace. Most of the regulatory action was at the state level and thus was in the hands of state commissions.

If one bothers to examine the text of the 1934 Act, one finds that it is little more than a piece of legislative consolidation. Its stated purpose was to put federal authority over communications into one specialized agency. In order to implement this goal its drafters took parts of the Interstate Commerce Act authorizing the Interstate Commerce Commission to regulate interstate telephone service (passed in 1910) and combined them with the 1926 Radio Act, which created a Federal Radio Commission to regulate broadcasting. The result was a consolidated Communications Act and a single regulatory agency, the Federal Communications Commission. The bill's House sponsor, Speaker Sam Rayburn, explicitly stated that the Act *did not change existing law*.¹²

That brings us back to the point at which this chapter began. If the universal service concept originated not in the Communications Act of 1934 but in the Bell-independent competition of the early 1900s, why did a debate about universality emerge at that time? And if, as I have asserted, Theodore Vail and his contemporaries did not mean by universal service what we mean today, what *did* they mean? As usual, the historical reality is more interesting than the myth. The universality of telephone communications became an issue in the early 1900s because the local telephone exchanges of the Bell system and the independents were not connected to each other. Competition took the form of two separate telephone systems in the same city or town vying with each other for subscribers and for connections to other localities. Subscribers who joined one system could not call the subscribers of the other –unless, as happened about 13 percent of the time, the user subscribed to both systems. Duplicate subscribers (mostly businesses) literally had two separate telephone instruments, Bell and Independent,

⁹ Herbert S. Dordick, *supra* note 6.

¹⁰ "The goal of having a universal telecommunications service has historically been to keep charges low enough that all but the poorest Americans could afford to make and receive telephone calls..." R. Entman, Introduction, *Universal Telephone Service: Ready for the 21st Century?* (Annual Review of the Institute for Information Studies 1991).

¹¹ *Smith et al v. Illinois Bell* 282 U.S. 133 (1930).

¹² "...the bill as a whole does not change existing law, not only with reference to radio but with reference to telegraph, telephone, and cable, except in the transfer of jurisdiction [from the ICC to the new FCC] and such minor amendments as to make that transfer effective." 78 Congressional Record, 73rd Congress, 2nd Session, 10313 (1934).

on their desks or walls. Even when there was only one exchange in a community, dual service divided subscribers. A Bell exchange could not make connections with the subscribers of competing independent exchanges in other cities, and vice-versa. In effect, telephone users confronted the same kind of barriers to communication as IBM compatible and Macintosh computer users of the 1980s and 1990s. The incompatibility, however, was usually due more to the companies' refusal to deal with each other than to technological incompatibility.¹³

“Dual service” was the contemporary name for competing, non-interconnected telephone exchanges in the same community. Dual service diverges so radically from our current experience with a universally interconnected telephone system that it is hard to appreciate just how widespread and long-lived the phenomenon was. It existed in some form for thirty years, from 1894 to 1924. From 1900 to 1915, at least 45 percent of the U.S. cities with populations over 5,000 had competing, unconnected telephone exchanges. During the peak of the independent movement’s strength, between 1902 and 1910, this percentage remained over 55 percent. Some of the nation’s largest cities had dual telephone systems for more than fifteen years: Cleveland, Buffalo, Minneapolis-St. Paul, St. Louis, Los Angeles, and Philadelphia.

The term universal service emerged from within this environment. It was put forward by the Bell system as the policy alternative to dual service. Universal service meant consolidating the competing telephone exchanges into a local monopoly so that all telephone users could be interconnected. It did not mean a telephone in every home, or government policies to subsidize telephone penetration or affordability. (That argument, which is vehemently disputed by historians whose work has been supported by the Bell system, is documented at length in chapter 8, and also in chapters 9 and 11.) After 1907, the Bell-independent business rivalry was transformed into a political and ideological struggle between two opposing principles of industry organization: dual service vs. universal service. Vail and other Bell spokesmen challenged the fragmentation and duplicate subscriptions caused by the presence of competing telephone exchanges. Independents defended it as a small price to pay for the price restraints, service improvement, and innovation promoted by competition. It is impossible to understand the historical meaning of the term *universal service* without grounding it in the context of dual service competition. One goal of the book is to reconstruct that original meaning and explore its implications for our understanding of telephone history and policy.

There is another reason why the universality of telephone service was implicated in the competitive struggle between Bell and the independents. It was true that dual service competition restricted universality by fragmenting telephone users. But, paradoxically, such competition also *rewarded* the pursuit of universality by the telephone companies themselves in a way that regulation and monopoly have never been able to do. A telephone system with more people on it is *ceteris paribus* more valuable than one with fewer subscribers.¹⁴ Competing systems which are not connected to each other gain a competitive advantage over their rivals as they extend service to more users and locations. This dynamic was the driving force behind the Bell-independent rivalry of the early 1900s. Dual service propelled both systems into a race to wire all parts of the country and attract as many subscribers as

¹³ Technological differences did play a role, however, as independents often used automatic switching during these years whereas the Bell system was still relying on manual switching.

¹⁴ This is known as the “network externality” in economics. A more formal analysis of its properties and its implications for early telephone competition is conducted in chapter 3.

rapidly as possible. Penetration and geographic coverage in the United States, particularly in rural areas, made the most rapid gains in that period. The other goal of the book is to construct a systematic argument that dual service competition did more to promote the universality of the telephone than the later policies and practices of regulated monopoly. Together, the two arguments challenge orthodox views of telephone industry history. The reconstruction has both historiographical and policy import.

Perhaps most importantly, recasting that period of telephone history leads to a fundamental reinterpretation of why the telephone system became a monopoly. Odd as it may seem, after three anti-trust cases and scores of journal articles, the monopolistic character of telephone service is still a subject of intense historical and theoretical controversy. Traditionally, economists explained the structure of the telephone industry as the most efficient form of organization due to the presumed existence of supply-side economies of scale and scope. This explanation is grounded in the theory of natural monopoly. Many historians and economists have rejected the natural monopoly explanation, however, insisting that monopoly resulted from abusive and predatory actions of the Bell System. Whether monopoly was a product of “natural” economic forces or market manipulation is a matter of some consequence in a country governed by antitrust laws, and until now these two positions have defined the spectrum of opinion on the subject.

This book rejects both views. A different explanation, which might be called the *universal service theory of monopoly*, is advanced. That theory portrays telephone monopoly as a product of a conscious, publicly mediated policy decision to “unify the service;” i.e., to eliminate the user fragmentation created by dual service. In chapter 3, I characterize that outcome in economic-theoretic terms as an attempt to realize *demand-side economies of scope*. That represents a new theoretical position, in that it shifts the explanation for the efficiency of monopoly from the supply side to the demand side and from economies of scale to economies of scope. It is also a distinct historical position in that it stresses that the elimination of dual service was the product of a political consensus rather than a unilateral product of the Bell system. (The existence of a policy consensus, however, does not necessarily mean that the right decision was made, nor does it mean that there was no cleavage between losers and winners. In chapter 11, I explore the political dimension of this choice by examining in detail the consolidation of competing telephone exchanges in several major urban centers after 1915.)

Another historical issue revisited by this text is the role of interconnection (and the absence of interconnection) in the development of the American telecommunications infrastructure. This is a badly neglected and often misinterpreted topic in the historical literature. The most influential account of the competitive period, the *Telephone Investigation* of the Federal Communications Commission (1939), devotes only a few dismissive sentences to dual service competition.¹⁵ Its incomplete and inaccurate treatment of the subject has misled two generations of historians. Lipartito (1989), Langdale (1978), Fischer (1987, 1993), and other historians with access to primary sources mention it, but fail to draw the crucial linkages between the lack of interconnection, the pursuit of universality by the competing telephone companies, and the demand for complete interconnection as the rationale for the choice of regulated monopoly as the institutional form for the telephone. Since dual service has not been taken seriously by historians, data about its nature and extent has not been systematically collected. Previous

¹⁵ Duplication of telephone exchange service is dismissed by the FCC Report as “wasteful from the viewpoint of investment and burdensome to the subscriber.” Federal Communications Commission, *Investigation of the Telephone Industry*, 133 (GPO 1939).

studies have never adequately quantified the phenomenon. Aside from that, the existence of fragmented telephone service raises a number of intriguing historical questions. To what extent did the division of subscribers into two systems correspond to other social divisions, such as social class or ethnic groups? How frequently were users unable to reach desired parties due to competitive fragmentation? Which user groups perceived subscriber fragmentation as the most serious inconvenience? To what extent did the availability of long-distance connections affect the choice of a local subscription? How many and what type of users took out duplicate subscriptions? This book explores these economic and communicative features of dual service in detail.

When the phenomenon of non-interconnection is not simply overlooked, it is often misrepresented. Policy analysts and economists who have written about the early competitive period generally treat the lack of interconnection as an anti-competitive abuse. The interpretation that has generally arisen from those works is that it was Bell's refusal to interconnect with the independents which ultimately defeated them. The truth, as subsequent chapters will show, is very different. Until 1910, the independents were as uninterested in interconnecting with Bell as vice-versa. Further, Bell's refusal to interconnect utterly failed to stop the independents from proliferating throughout the country. Conversely, Bell's decisions from 1901 to 1908 to aggressively *interconnect* its toll lines to noncompeting independent exchanges was a damaging blow to dual service and the most powerful method of promoting its concept of universal service. Furthermore, the Kingsbury Commitment of 1913, which is almost unanimously represented by historians as the "end" of the dual service era and mistakenly counted as the beginning of universal interconnection, has been completely misinterpreted.

If revisiting the dual service era leads to substantial revisions in the way we understand and periodize telephone history, it also has important implications for current and future telecommunications policies. The policy relevance of history is often neglected by decision makers in business and government. Their attention consumed by an uncertain future and a complex, demanding present, they tend to assume that historical analysis can contribute little to their understanding. But upon reflection it is apparent that conceptions of the telecommunications industry's past can and do play a decisive role in policy thinking. The origins myth linking the Communications Act and universal service policy did not come about for nothing. In chapter 13, I show how and why this myth was created in the 1970s, when AT&T was beset by new competition once again. Likewise, current conceptions about the competitive consequences of interconnection and the need for "equal access" are derived mainly from interpretations of telephone and telegraph history. Telephone history has policy implications, which is why it so often has been, and will probably always remain, a contested area. The real issue is whether decision makers will be guided by accurate history or inaccurate history.

This book attempts to reframe the ongoing debate about universal service. If the standard historical assumptions about regulated monopoly's role in the creation of universal service are true, then developing countries and other nations considering competition and liberalization must control and limit competitive forces to preserve universal access. If, on the other hand, dual service competition played a critical role in the development of a ubiquitous telephone infrastructure, and that experience accounts for the tremendous U.S. lead in the extension of telecommunications service, then very different policy conclusions can be drawn.

More broadly, interconnection of competing networks is a critical issue – perhaps *the* critical issue – in contemporary telecommunications policy. The Bell-independent rivalry of the early 1900s provides a reservoir of empirical data about the effects of various approaches to interconnection. True, the social and technological conditions of that period are far different than today’s. The economic principles, however, are the same. A historically accurate portrayal of the evolution of interconnection arrangements in the U.S. telephone industry from the 1890s to the 1920s can only be helpful. The implications of that evidence for current policy are discussed in chapter 14.

3

A THEORY OF ACCESS COMPETITION

ALTHOUGH THIS IS PRIMARILY a historical work, it must begin with a discussion of theory. The argument of the book is that the refusal of competing telephone companies to interconnect gave them a powerful incentive to expand the scope of their networks. That incentive played a crucial role in bringing about universal service as we know it. More generally, the book is about the problem of interconnecting competing networks, and how those relationships of interconnection lead to competitive or monopolistic industry structures. To clarify the historical treatment of those issues, a theoretical framework regarding network competition is outlined.

The chapter begins with a critique of the common assumption that telephone monopoly can be explained by means of supply side efficiencies alone. It shows that from the standpoint of traditional natural monopoly theory, the telephone system has always been an exceptional and seemingly contradictory case. The next four sections sketch out a theoretical alternative to the natural monopoly paradigm that avoids those problems and, it is hoped, sheds new light on the interpretation of the historical events. In essence, it argues that a better understanding of the unique characteristics of telephone competition and monopoly must come from two sources: i) a better definition of the output of networks and ii) a focus on demand side rather than supply side economies. The discussion of theory is intended to be accessible to readers who are not professional economists, while maintaining a level of logical rigor sufficient to satisfy those who are. (It is possible of course that neither audience will be satisfied with the result, but such are the exigencies of interdisciplinary work.)

Natural Monopoly Theory and the Telephone

Economists typically attempt to explain monopoly organization by reference to the theory of natural monopoly. Although that theory is the main conceptual tool available to account for the existence of a monopoly as pervasive and long-lasting as the telephone system, the uneasy fit between

the two has been apparent for more than seventy years. I will begin with an account of the theory and its development over the years, and then cite six reasons why telephone monopoly posed a puzzle within that theoretical framework.

The Development of Natural Monopoly Theory

From the 1870s to the 1930s, business regulation by specialized regulatory commissions gained acceptance by nearly all states. The thinking behind it was the product of a new school of political economy, born in the populist turmoil of the 1880s, which held that in certain industries competition was destructive and inefficient and ought to be superseded by government regulation. In their attempt to come up with a scientific definition of which industries should be regulated, they developed the concept of natural monopoly.

Natural monopoly theory concentrated on supply-side phenomena; that is, it attempted to explain industrial organization by looking at the costs of the firm. The simplest and most straightforward definition of natural monopoly was articulated in 1887 by Henry Carter Adams, an influential professor who was also the recipient of the first doctorate in Economics awarded by Johns Hopkins University. Adams divided industries into three classes: those with constant returns to scale, those with diminishing returns to scale, and those with increasing returns to scale. Businesses in the first two categories, he believed, could be left to the regulatory pressures of the market. In industries characterized by economies of scale, however, competition was disruptive, inefficient, and temporary. A firm became more efficient as it controlled more of the market. "The control of the state over industries should be coextensive with the application of the law of increasing returns in industries," Adams wrote.¹⁶

Other theorists concluded that there was no single characteristic defining natural monopoly, though scale economy was always an important factor. Thomas Henry Farrer, the Secretary of the British Board of Trade, listed five separate factors defining inherent monopolies, four of them pertaining to the peculiar fixity of utility infrastructures.¹⁷ The 'natural monopoly' label was coined by Richard T. Ely, a contemporary of Adams's. Ely was a professor of political economy at Johns Hopkins University and the founder of the American Economic Association. Like Farrer, he saw monopoly as the product of a conjunction of factors, including scale economies, a high proportion of fixed to variable costs, and physical obstacles to the multiplication of competing facilities.

Since the time of Ely and Adams, natural monopoly theory, like economic theory generally, has become more refined and formalized. Economists no longer equate natural monopoly with economies of scale as such. In the 1960s James Bonbright contended that a single firm could be the most efficient supplier even when the expansion of output results in increases in average cost.¹⁸ A theoretical breakthrough came with Faulhaber's (1975) work on the sustainability of cross-subsidies in markets

¹⁶ Henry Carter Adams, *The Relation of the State to Industrial Action*, 1 Publications of the American Economics Association, 465-549 (Jan. 1887).

¹⁷ Farrer's criteria of monopoly were: 1) What they supply is a necessity, 2) They occupy peculiarly favored spots or lines of land, 3) The product or service they supply is used at the place where and in connection with the plant or machinery by which it is supplied, 4) The product or service can be increased in supply without a proportionate increase in plant and capital, 5) The business requires a "certain, and a well-defined harmonious arrangement, which can only be attained by unity." Quoted in Edward D. Lowry, *Justification for Regulation: The Case for Natural Monopoly*, *Public Utilities Fortnightly* 18-19 (Nov. 8, 1973).

¹⁸ James Bonbright, *Principles of Public Utility Regulation* 14-16 (Columbia University Press 1961).

which were naturally monopolistic.¹⁹ The emergence of the ‘contestable markets’ school of industrial organization theory, developed by Baumol, Panzar, and Willig, verified Bonbright’s observation.²⁰ In the new theory, cost subadditivity replaced scale economies as the recipe for natural monopoly. Cost subadditivity means that the production costs of one supplier serving all of the market are less than those of any combination of multiple suppliers serving a portion of the market. The improved formalization vindicated Bonbright’s earlier observation that a monopoly could be the most efficient supplier in the absence of decreasing costs. At a given output, scale economies are sufficient to make cost functions subadditive, but cost functions can still be subadditive when average costs are increasing.

The revamped industrial organization theory was a powerful advance in that it formalized and mathematicized the definition of natural monopoly. Gone are the clumsy, descriptive lists of special features set out in the works of Ely and Farrer and the early utility textbooks. But the refinement in theory did not change its exclusive focus on supply-side efficiencies. The key to industrial organization was still sought in the way the production costs of the firm(s) responded to changes in the quantity of output. Despite the revolution in analytical technique, the basic conception of natural monopoly, as reflected in the verbal definition, did not change. Natural monopoly was said to exist “when one firm can supply the entire market at less cost than two or more firms.”²¹

The Telephone as Natural Monopoly: Six Anomalies

The theory of natural monopoly had developed primarily from observations of the railroad and natural gas industries in the 1880s. The telephone was perceived to be like those industries in that monopoly, once controlled, was thought to possess certain benefits. But if one returns to the writings of the earliest observers of the industry, a very different view of the rationale for telephone monopoly can be found. Instead of pointing to increasing returns or other supply-side efficiencies, the utility economists of the 1920s and 30s asserted explicitly and repeatedly that the telephone had become a monopoly in order to “unify the service.”

J. Warren Stehman’s *Financial History of AT&T* (1925) was the first comprehensive economic history of the American telephone industry.²² It was written in the years 1920 to 1922, just as the competitive phase of the industry was drawing to a close. Stehman asserted that “complete monopoly” was “the ideal condition for telephone service,” and added that the telephone industry, “perhaps to a greater degree than any other public utility, [is] essentially monopolistic in character.” According to Stehman, however, “wasteful duplication of facilities” was not the primary reason for its special status:

¹⁹ Gerald Faulhaber, Cross-subsidization: Pricing in Public Enterprise, 65 *American Economics Review* 966 (1975).

²⁰ William Baumol, John Panzar & Robert Willig, *CONTESTABLE MARKETS AND THE THEORY OF INDUSTRY STRUCTURE* (Harcourt, Brace, Jovanovich 1982); William Sharkey, *THE THEORY OF NATURAL MONOPOLY* (Cambridge University Press 1982).

²¹ Lowry, *supra* note 17, at 22. Compare Lowry’s pre-contestable markets definition with Sharkey’s: “There is natural monopoly in a particular market if and only if a single firm can produce the desired output at lower cost than any combination of two or more firms.” See also Richard Posner, Natural Monopoly and its Regulation, 21 *STANFORD L. REV.* 548-643 (Feb. 1969).

²² J. Warren Stehman, *THE FINANCIAL HISTORY OF THE AMERICAN TELEPHONE AND TELEGRAPH COMPANY* (Houghton Mifflin, 1925).

[T]here is an additional and more important peculiarity of the telephone industry: that is, that the efficiency and value of the service depend upon the number of persons with whom the subscriber can communicate. Two telephone systems in a community are a source of great inconvenience and usually of expense to the subscribers. An individual who desires to talk to people on each of the two systems is compelled either to install telephones of both companies or to go, from time to time, to some other place than his residence or place of business to use the telephones of the system to which he is not a subscriber.²³

The need for universal interconnection was thus recognized as a *separate* and even *stronger* reason than supply-side efficiencies for preventing competition in telephony. Thus, anomaly #1 is that *unification of the service*, not increasing returns on the supply side, was cited by the most informed contemporaries as the reason why a telephone monopoly came about.

Anomaly #2 is even more striking: *those familiar with the telephone industry at the time it became a monopoly believed that it did not possess decreasing costs on the supply side*. On the contrary, the average cost of providing local exchange service was thought to *increase* with the number of subscribers. The main source of the diseconomy was switching technology, specifically, the geometric increase in the number of possible connections as the number of subscribers grew.²⁴ Within a city, growth in the density of stations could result in decreases in per station expenses, as the additional subscribers led to more efficient utilization of outside plant. But growth in the size of an exchange always increased the average costs associated with switching and maintenance.²⁵ That generally offset the other economies so that utility commissions usually granted rate increases as exchanges grew. During the 1930s, it was normal for textbooks about public utility regulation to contain explicit discussions of that peculiar aspect of the telephone system. Jones and Bigham's *Principles of Public Utilities*, for example, published in 1931, recognized that subscriber growth produced diseconomies rather than economies. The ultimate justification for monopoly, they maintained, was not scale economies but "the necessity of a unified service."²⁶ Similar arguments were made in other utility manuals published before 1940.²⁷ Thus, the cost characteristics of the industry not only failed to conform to the expectations of natural monopoly theory, but actively violated them.

The Jones and Bigham text cited above also dwelt at some length upon another anomaly, even more central than the previous one. In telephone service, the authors observed, it is not obvious what is the appropriate *unit* with which to measure increasing scale. In the early discussions of the diseconomies of scale associated with telephony, economists generally treated the number of subscribers as the measure of the scale of output. But, Jones and Bigham argued, a telephone exchange

²³ *Ibid* at 234.

²⁴ In the manual and electromechanical switches of that period, every terminal was hardwired to every other terminal in the switch, so that as subscribers were added to a switch the number of connections multiplied by $N(N-1)/2$. Larger telephone exchanges thus had higher average costs than smaller ones. For a detailed history of the diseconomies of growth in switching technology, see Milton Mueller, *The Switchboard Problem* 30 *Technology & Culture* 534-60 (July 1989).

²⁵ For a quantitative study of those issues see "Cost of Exchange Telephone Service," memo from Joseph P. Davis to Frederick Fish, October 14 1902. AT&T Archives.

²⁶ Jones & Bigham, *Principles of Public Utilities* (MacMillan 1931).

²⁷ G. Lloyd Wilson, James M. Herring & Roland B. Eutscher, *Public Utility Industries* (McGraw-Hill 1936); James M. Herring & Gerald C. Gross, *Telecommunications: Economics and Regulation* (McGraw-Hill 1936), 189.

that connected a user to a larger number of other users was offering a distinctly different service, not more of the same service.²⁸ The volume of traffic was also an important aspect of telephone system output. Perhaps, they speculated, some composite unit such as the “call-mile-minute” could be developed to provide a more scientific measure of the telephone system’s output. Although neither the authors nor other utility economists of the period pursued the matter, the question they raised had profound implications. The concept of the scale of output is fundamental to economic analysis. Natural monopoly theory, in both its classical and modern incarnations, hinges on mathematical analysis of the relationship between scalar variables P (*price*) and Q (*quantity*). Yet here was an open confession that economists did not know how to define Q . Thus we are left with anomaly #3: *in telephony, the unit of output is problematical.*

An intuitively plausible definition of the ‘scale’ of a network is the number of users. That is in fact the definition used most often by classical and contemporary economists. Equating the number of users with the Q scale, however, *has the paradoxical effect of creating an upward-sloping demand curve* (Anomaly #4). In their work on network externalities, for example, Katz and Shapiro (1985) treat the number of users as the output scale of a network, and explicitly state that firms will raise their prices as more subscribers join.²⁹ While that assumption is an accurate description of how consumers really do value a growing network, it contradicts everything economics tells us about marginal utility and the downward slope of demand curves. That problem was noted by Allen (1988), who went to extraordinary lengths in an attempt to square that anomaly with orthodox economic theory.³⁰

By the time of the debate over AT&T divestiture in the late 1970s and early 1980s, the issue of monopoly organization in telephony had been fully absorbed by the supply-side paradigm. The historical basis of telephone monopoly in universal interconnection, and the early doubts about the paradox of diseconomies and the definition of output, had been largely forgotten. Instead, during *United States v. AT&T* econometric studies of Bell system cost functions were brandished by both sides in the courtroom. Oddly, (and that is anomaly #5) *empirical studies of the supply side failed to uncover conclusive evidence of scale and scope economies*. It was clear from empirical studies that there were significant economies of density; i.e., that urban areas were cheaper to serve than rural areas. But some of the most comprehensive studies failed to prove the hypothesis that there were economies of scale and scope across all telecommunications services.³¹ Other studies, using different statistical techniques and different measures of output, concluded that there were significant economies of scale and scope.³² Once again, defining output proved to be problematical. In his review of empirical studies of returns to scale in telecommunications, Littlechild (1979) observed that the only obvious scale economies were

²⁸ "To one who uses electricity, gas, water and street railways it matters not whether he be served by the same company as his friends, but to the user of the telephone it is highly important that he be on the same system with them and with all those with whom he might wish to get in touch... Jones & Bigham (1931) at 89-90.

²⁹ Michael Katz & Carl Shapiro, Technology Adoption in the Presence of Network Externalities *Journal of Political Economy* 1985.

³⁰ David Allen, New Telecommunications Services: Network Externalities and Critical Mass 13 *Telecommunications Policy* 257-71 (Sept. 1988).

³¹ Melvyn Fuss & Leonard Waverman, The Regulation of Telecommunications in Canada, Technical Report No. 7, Economic Council of Canada, March 1981; David Evans & James Heckman, A Test for Subadditivity of the Cost Function with an Application to the Bell System 74 *American Economic Review* 620 (1984).

³² Baldev Raj & H.D. Vinod, Bell System scale economies from a randomly varying parameter *Journal of Economic Surveys* 1: 1-14 (1987); J. EcoN. BUSINESS 247-52 (Feb. 1982); J.B. Smith & V. Corbo, Economies of Scale and Economies of Scope in Bell Canada, Working Paper, Department of Economics, Concordia University, Mar. 1979.

in long distance transmission, whereas the least clear pattern of scale economies was in the local exchange.³³ We need not become too deeply embroiled in the complex and highly technical issues raised by those studies to find corroboration for the main point here: the results of studies of supply-side costs have been equivocal, despite the industry's long-term status as a monopoly.

Occasionally, a modern economist resurrected the old puzzles. The most notable example is in Alfred Kahn's classic two volume treatise, *The Economics of Regulation*. In the course of arguing for a definition of natural monopoly as a product of long-run decreasing average costs, Kahn had this to say about the telephone system:

There are cases of natural monopoly that would seem at first blush not explicable in terms of long-run decreasing costs. [A]s the number of telephone subscribers goes up, the number of possible connections among them grow more rapidly: local exchange service is therefore believed to be subject to increasing, not decreasing unit costs, when the output is the number of subscribers. And yet, it seems clear that this service is a natural monopoly: if there were two telephone systems serving a community, each subscriber would have to have two instruments, two lines into his home, two bills if he wanted to be able to call everyone else. Despite this apparent presence of increasing costs, in short, monopoly is still natural because one company can serve any number of subscribers (for example, all in a community) at lower cost than two.³⁴

That passage bears close analysis. Kahn recognized that the requirements of connecting telephone users forces a competitive system to completely duplicate the network of its rival, and that subscribers in such a competitive market would be forced to pay twice for essentially the same service. But for him, the simple observation that one company can interconnect "any number of subscribers ... at lower cost than two" is sufficient for it to qualify as a traditional natural monopoly. The argument appears persuasive and was often cited by others. In reality, it highlights another theoretical anomaly (#6), namely that the efficiencies which are alleged to make telephone service a natural monopoly occur on the *demand* side and not the *supply* side. Contrary to natural monopoly theory, Kahn's rationale for monopoly is entirely independent of the scale of output (if users are taken as the unit of scale); the elimination of the need for duplicate subscriptions occurs whether a telephone system has 100 subscribers or 100 million subscribers. Moreover, the argument proves that a single firm is more efficient not because it makes telephone service cheaper to *produce*, but because it makes telephone service cheaper to *consume* by eliminating the need for duplicate subscriptions.

To recap, the application of industrial organization theory to the telephone system has generated a series of puzzling inconsistencies:

1. Contemporary observers of the monopolization process insisted that its object was to "unify the service" and not to realize supply-side efficiencies;

³³ Stephen C. Littlechild, *Elements of Telecommunications Economics* (Institute of Electrical Engineers 1979). Ironically, long-distance transmission is precisely where new competition took root, and local exchange service remained largely monopolistic.

³⁴ Alfred Kahn, *The Economics of Regulation: Principles and Institutions* Vol. 2, 123 (Wiley 1971).

2. The firm's unit costs appeared to increase rather than decrease as the size of the network grew;
3. There was considerable doubt about the proper definition of output;
4. The most common definition of the scale of a network, the number of subscribers, resulted in a paradoxical, upward-sloping demand curve;
5. Empirical studies failed to verify the existence of the supply-side cost characteristics of a monopoly; and
6. The most convincing argument for the efficiency of a single system was based on demand-side rather than supply-side phenomena.

Despite the number and persistence of those issues, few economists have been willing to make an explicit break with the classical natural monopoly paradigm.

The rest of the chapter proposes an alternative conceptual framework for the analysis of network competition, one that resolves these problems. That theoretical framework has two basic elements. One is a redefinition of the output of networks. The other is a focus on demand-side rather than supply-side economies as the critical determinant of market structure. The latter draws on a new branch of economic theory about the *network externality*. Network externality theory developed in the mid-1970s, independently of the natural monopoly tradition. It uses game theory as well as standard economic techniques to model the way one consumer's demand for a product is affected by the behavior of other consumers. Originally applied to understanding telephone demand, it found fruitful application in economic analysis of standardization and new technology adoption as well. The pioneers of that theoretical literature are Rohlfs (1974), David (1985), Arthur (1989), and Farrell and Saloner (1987). Prior to that, however, the theory has not been applied to that period of telephone competition.

Communications Access Networks as Radically Heterogeneous

A key assumption underlying natural monopoly theory, and indeed most economic analysis, is that a firm's output is composed of homogeneous units. Homogeneity means that each unit of q must be the same as any other unit; or, to put it another way, the product remains constant as the amount produced increases or decreases. That assumption seems plausible enough when the product in question is potato chips, electric power, soft drinks, or wheat. It is easy to imagine identical units of such items increasing or decreasing in quantity along a scale Q . When the product is communications access, however, the assumption of homogeneity is both false and misleading.

The most important output dimension of an access network is the people and places it connects. From an economic point of view, neither users nor the locations connected are interchangeable; each one is *sui generis*. Access to New York is not a substitute for access to Chicago. A telephone connection to one's mother is not a substitute for a connection to a phone sex number. Each unit of access represents a separate output. A telephone directory is a gigantic menu, a Sears-Roebuck catalogue listing all the different access services a user can order by punching numbers on the phone. The economic discreteness of those services is demonstrated forcefully whenever a wrong number is dialed. The wrongly dialed party is not a substitute for the desired party; the system has failed to deliver what the customer wants as surely as when a restaurant brings sake and tofu to a table that ordered beer and pizza.

If each unit of access is a different good, the growth of a network involves an enlargement of the product's scope rather than an increase in scale. Economists have made similar arguments before.³⁵ With one recent exception,³⁶ however, even economists who explicitly recognize that point tend to ignore or back away from its implications. For the sake of simplicity, they assume that access is homogeneous and get on with the business of normal economic analysis.³⁷ To do so, however, assumes away the central problem in the economics of network interconnection and competition, as we shall see. Ignoring the heterogeneity of access is understandable (if not entirely justifiable) in an environment of widespread telephone penetration and interconnected competitors. It is particularly troublesome, however, when analyzing early telephone competition, in which differences in the access units supplied by the networks played a crucial role in the contest.

Figure 3.1 is a simple but useful representation of network output. It is a matrix in which each member of the population ($A-n$) is assigned a row and column. Each cell in the matrix represents an access link or connection between a specific pair of users. Each cell is a separate output (Q), and thus has distinct supply characteristics and its own (downward sloping!) demand curve. Any combination of cells represents a distinct output scope. From the supply side, the efficiency of a network depends on how successfully its engineering can realize economies of scope by sharing facilities across cells. Economies of scale are meaningful only *within* one of the cells. From the demand side, the addition of new users to the network creates an economy of scope for existing users. Users obtain additional service capabilities without a proportional increase in their payments for access.

Figure 3.1
MATRIX REPRESENTATION OF NETWORK OUTPUT

	A				
B	Q_{ab}	B			
C	Q_{ac}	Q_{bc}	C		
D	Q_{ad}	Q_{bd}	Q_{cd}	D	
n	Q_{an}	Q_{bn}	Q_{cn}	Q_{dn}	n

³⁵ Gerald Brock, Telephone Pricing to Promote Universal Service and Economic Freedom, Federal Communications Commission Office of Plans and Policies, Working Paper #18 (1985). A telephone network is described as $N(N-1)/2$ different products, where N is the number of persons and $N(N-1)/2$ is the number of potential conversations.

³⁶ Nicholas Economides & Lawrence J. White, One Way Networks, Two Way Networks, Compatibility and Antitrust, ms., EC-93-14 July 1993. This paper characterizes networks as complementary components. Customers tend to be identified with a particular component (e.g., an access line in telephone service). Service is a composite good. The addition of users to a network creates economies of scope in consumption.

³⁷ A typical example the testimony of Nina Cornell, former economist for the Federal Communications Commission, in a 1992 court case regarding telephone interconnection in New Zealand. Cornell wrote: "it could be argued that each potential connection from customer A to customer B is in a separate market from a customer's perspective" but later adds that "looking at each potential as a separate market...is commercially unrealistic. Most customers, when offered a choice among several carriers, select a single carrier to supply a group of such potential connections, rather than selecting a separate carrier for each." The testimony goes on to state that "as long as all local exchange providers are interconnected, duplicate access facilities only raise the cost to consumers with no added benefits." Thus, the heterogeneity problem is passed over by assuming that local carriers will be interconnected and hence that competition involves no choice among imperfect substitutes. Brief of Evidence of Nina W. Cornell, p. 9, Clear v. Telecom, Before the High Court of New Zealand, March 1992.

The author is aware of the fact that some deviation from standard usage is involved in that application of the term “economies of scope.” Traditionally, economists have considered the joint provision of local and long distance service, and ancillary services such as security alarms or telegraph service, as an example of scope economies in a telephone network.³⁸ At risk of being repetitive, it is important to stress that I am applying the concept of scope economies to communications networks in a far more thoroughgoing sense than is usual. That framework views *every* pairwise connection between telephone stations as a separate and distinct output. Hence the term *radical heterogeneity*.

Access Competition

I have stressed the heterogeneity of communications access because the concept neatly explains many of the unique features of competition in the supply of communications access. When competing networks are interconnected, it is easy to ignore the heterogeneity of access because the bundle of connections offered by each network appears to be the same. Heterogeneity becomes particularly important and noticeable, however, when competing networks are not interconnected or compatible. That, of course, was the case in the early era of telephone competition.

Access competition occurs when two or more networks supply access services which could be used as substitutes for each other, but do not provide access to each other. In that type of competition, the scope of the networks becomes one of the most important dimensions of rivalry. Each network offers consumers a different bundle of access units. Networks increase their value to consumers by attracting more users or supplying more access than their rival. The competitive process is complex, however, because users face inherently imperfect substitution choices, and the choices one user makes are affected by the choices other users make. That process differs greatly from the type of competition economists normally consider. It is worthwhile to make that distinction in more formal terms.

In the competition models of neoclassical theory, the quantity of a good demanded by society (Q) is divided up among numerous competing firms (q_1, q_2, \dots, q_J). The output of each firm is assumed to be homogeneous. Once that assumption is made, two corollaries follow: 1) each unit produced by the competing firms is a perfect substitute for every other unit; and 2) each supplier's output comprises an additive share of the total output Q that would be produced by a single firm supplying the entire market; thus, $Q = (q_1 + q_2 + \dots + q_n)$. An economist interested in industrial organization can then ask whether the amount Q is produced more efficiently under competitive or monopolistic conditions, or whether firm A or firm B has lower costs in producing amount q .

Those assumptions simply do not work when the output represents communications access. Networks are combinations of many different Q 's (communications access units). When competition exists, the market is not divided into additive “shares” of a homogeneous quantity Q ; instead, different users join different networks. Assuming that the networks are not interconnected, a user who joins one network is not accessible to the users of the other-unless she purchases access from both. A form of rivalry exists, in that users can choose the combination and price they prefer. But the combinations offered are not identical and therefore are imperfect substitutes. Moreover, the “shares” of

³⁸ More technically, economies of scope tend to mean supply-side cost subadditivity for the special case of orthogonal outputs.

communications access units offered by competing networks do not sum to constant quantities in different conditions.

Figures 3.2 through 3.5 are Venn diagrams illustrating the possible structures of the market for access. (The sets should be interpreted as groups of users, not as representations of geographic territories.) Figure 3.2 represents a monopoly; a single network connects all N users. Figures 3.3, 3.4, and 3.5 represent the three logically conceivable ways in which the market for access could be divided among two unconnected telephone systems, assuming that network 1 attracts some portion p of the available users.

In Figure 3.3, networks 1 and 2 attract two separate and mutually exclusive groups of users, representing a scope of s_1 and s_2 , respectively. By definition, the two networks offer completely different combinations of communications access units and cannot be used as substitutes. If the users of the two networks are geographically separated and/or have no interest in obtaining access to each other, then figure 3.3 really represents two cases of figure 3.2 above. If not, then the situation in figure 3.3 would rapidly turn into the one represented by figure 3.4, below.

In Figure 3.4, there are D duplicate users who purchase access from both systems, but $D < N$. In that case, the two networks can be used as perfect substitutes only in the supply of access to group D . Overall substitution is still imperfect, as each network has exclusive control of access to a specific group of users. Indeed, the willingness of some users to purchase access from both systems proves that they are not perfect substitutes.

In Figure 3.5, all subscribers purchase access from both systems ($D = N$). That alternative, universal duplication, makes the substitution choice perfect but creates an intriguing paradox. To be perfect substitutes, every user must join both competing networks. Readers will recognize that as the situation described by Alfred Kahn earlier in the chapter. Kahn stressed its inefficiency; I want to emphasize its practical impossibility. If all users joined two or more competing networks, any user would be able to access all other users on any one of the networks and therefore would have no incentive to duplicate.³⁹ That is a paradoxical feature of access competition: the greater the percentage of duplication, the closer the combinations of access units offered by competing networks come to being perfect substitutes; but the closer the networks' sets of users come to being identical, the less need there is for duplication.

Taken together, the diagrams prove that: 1) separate networks or incompatible standards are never perfect substitutes; and 2) access competition almost always looks like the model in Figure 3.4 – some users are exclusive to one of the competing networks or standards, while others, who desire more extensive access, purchase access from both systems; 3) the combinations of access units offered by competing networks do not sum to a constant quantity when the same number of users is divided among competing networks.

³⁹ Such a situation could only come about if the capabilities or services of the network were so different technically as to make them non-competitors (e.g. voice vs. data). But that leads us back to a situation in which the networks are not substitutes.

FIGURE 3.2
Monopoly (Single network)

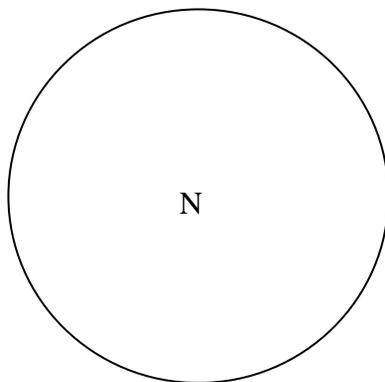


FIGURE 3.3
Dual Networks with no Duplication

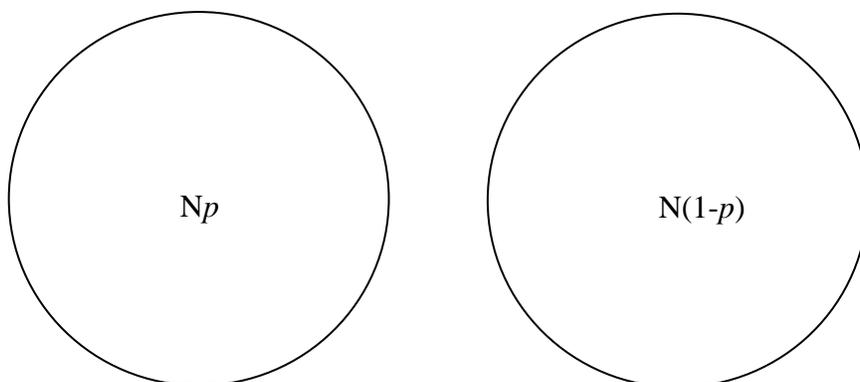


FIGURE 3.4
Competing Networks with Partial duplication

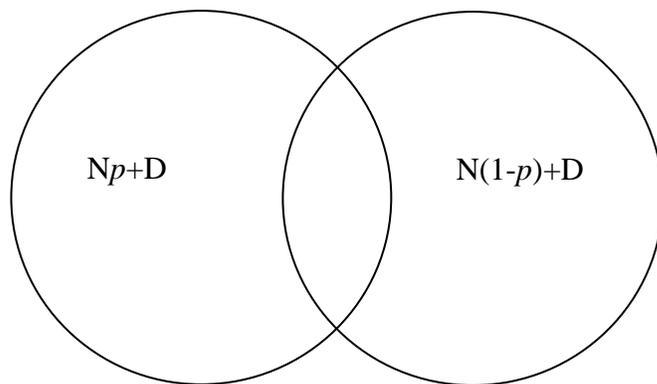
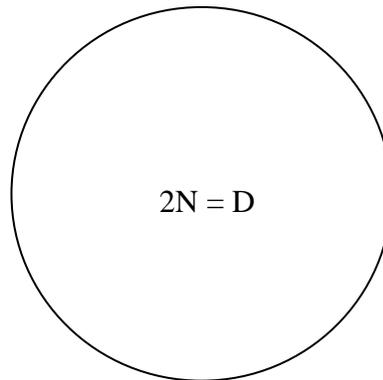


FIGURE 3.5
Dual Networks, Universal Duplication



Imperfect substitution choices give the competitive process a special dynamic. On the demand side, they set in motion a coordination game in which users try to assure themselves of access to all desired parties through joint consumption of the same network. The theoretical literature on network externalities has greatly expanded our understanding of that process, generating a colorful set of terms to describe the unique properties of access competition. Formal models have shown that at any given price for access there can be multiple equilibria. The equilibrium achieved is path dependent; i.e., it can be influenced by the sequence in which users join and other small, random events. There is the problem of achieving the “critical mass” of users required to make joining the network worthwhile. “Bandwagon effects” arise when users who have been “fence sitting” flock to a particular standard or network once critical mass is achieved. There is the danger that users who have committed themselves to a losing standard or network can become technological “orphans.” The demand for access and compatibility can also exhibit what Farrell and Saloner call “inertia,” or what Arthur and David call “lock-in” effects; users who have converged on a particular network become unwilling to risk sacrificing the benefits of joint consumption by moving to a new network, even when the new alternative is technically more efficient.⁴⁰ By making themselves accessible to users of both systems, duplicate subscribers play an important role in stabilizing that process.⁴¹

On the supply side, access competition puts a premium on universality. Networks with a larger scope are more likely to attract users. More specifically, three incentives to enlarge the scope of a network are created when competing networks are not interconnected:

⁴⁰ Theoretical work began with Rohlfs (1974), a game-theoretic model of interdependent demand for communications access. See also Brock (1981); Farrell and Saloner, (1987, 1989); Katz and Shapiro (1985, 1987); David (1985); Arthur (1989); Greenstein (1993). One problem with that literature is its failure to identify the expansion of networks and compatibility as an increase in scope rather than scale. Katz and Shapiro, David, and others erroneously refer to standardization as a product of “demand-side economies of scale.” With the exception of Rohlfs, the models tend to treat users as homogeneous and communication patterns as uniform, and thus to overstate the tendencies to converge.

⁴¹ A modified urn model developed by Mueller (1989) showed that convergence on a single network may not happen when there are non-uniform communication probabilities and there is the possibility of duplication by high-volume users.

1) *The incentive to be the first to serve unserved areas or markets.* The inertia associated with joint consumption makes it more difficult to attract existing users away from an established network. New competitors are most likely to gain ground by identifying and attracting new user groups. Thus, access competition is more likely to take place when a market is relatively undeveloped. As a corollary, it is difficult if not impossible to initiate access competition when an incumbent network is near-universal in scope.

2) *The incentive to lower the price of access.* The demand for telecommunications consists of two parts, access and usage. A regime of access competition encourages producers to reduce the cost of, and perhaps even temporarily cross-subsidize, access relative to usage. It also encourages the development of technologies which reduce the cost of access.

3) *The incentive to interconnect users in noncompeting networks.* The quickest way to expand an access universe is to establish connections with an existing network that has already attracted a critical mass of users (assuming, of course, that the existing network is not one's competitor). Competing networks will thus bid for interconnection rights to unaffiliated and noncompeting systems.

All three of those incentives are clearly visible in the historical data developed in subsequent chapters. Together, those three incentives form the basis of my argument that access competition promoted universal service.

Of course, there are corresponding disadvantages to access competition. It is often a transitory process; someone wins the competition and ends up with a monopoly, posing problems of inertia and regulation. Once a certain level of development has been achieved, the existence of separate networks can restrict rather than expand the scope of the system. Duplicate users may be saddled with significant demand-side diseconomies. The fragmentation can be irritating and inconvenient to users. Choosing one network over the other necessarily involves losing access to some potential communication partners. My intention is not to argue that access competition represents the ideal state of affairs. It is, rather, the more limited argument that it played an indispensable part in providing telephone companies the impetus to expand their scope, and that incentive bears the major responsibility for the achievement of universal service.

Access Competition and Appropriability

Economists typically frown upon exploitation of exclusive control of access for competitive advantage. They view the leverage derived from control of access as an exercise of monopoly power.⁴² Assuming that there are no insurmountable barriers to the duplication of access facilities, however, it is more accurate to say that access competition represents a qualitatively different *kind* of competition rather than a perversion or suppression of competition. In access competition, rivalry takes place over the *scope* of the product, not just its price. Competition on that dimension is not necessarily socially undesirable because widespread scope is one of the most important determinants of a network's social utility.

⁴² See John T. Wenders, *The Economics of Telecommunications* 171-90 (Ballinger 1987), where a telephone company's use of its control of local exchange subscribers to exert leverage over the long distance market is described as an abuse of monopoly power. See also Evans & Heckman, 1983.

In the absence of interconnection or compatibility, a network with a superior scope is able to fully appropriate the economic value of its bundle of access units. Connecting rival networks can eliminate or undermine their ability to appropriate the value of their particular combination of access units. Once again the root of the problem is the network externality, or the interdependence of demand. If the value of the network increases as new users are added, it may be socially efficient to charge some users a price below access costs, and make up the difference by charging higher access rates for users who value the addition of the new users more than the increase in their rates. As Gerald Brock has demonstrated, an access pricing scheme which discriminates among users will be more efficient than one which is uniform, or is based entirely upon cost.⁴³ A discriminatory pricing scheme which optimizes the scope of a network can only be sustained, however, when free interconnection with a competitor is not required. If interconnection is required, a competitor can undercut the higher access prices and rely on the incumbent to supply access to the users that could only be induced to join the network at a lower price (perhaps even below cost).⁴⁴ Thus the incumbent network's ability to appropriate the value of its access bundle deteriorates. The issue of *appropriability* played a major role in the historical drama. Both the Bell and independent telephone interests argued against compulsory interconnection of their networks on those grounds.

Demand-Side Economies of Scope

Understanding the heterogeneity of network output does more than clarify the unique nature of competition among networks; it also improves our understanding of the economic basis for monopoly. The framework established above can be applied to show that imperfect substitution choices can result in user convergence on a single network. The economic gains driving that process come from the demand side rather than the supply side. That framework can also be used to analyze which users have an interest in a monopoly network and who the winners and losers from convergence might be.

As long ago as the 1880s, the promoters of the telephone business remarked that the value of a telephone exchange increased as more people joined it and that the demand for telephone service by one person depended on who else subscribed.⁴⁵ That observation, in fact, formed an important part of Theodore Vail's argument for universal service.⁴⁶ That insight has been followed up by modern economists, who have given that phenomenon a label ("network externalities") and who have, as noted before, developed formal models of interdependent demand and competition between standards or networks. In what follows, I give that phenomenon a slightly different construction.

The increasing value of networks with a broader scope can be explained as a product of demand-side economies of scope. A user acquires access to a network by buying, building or leasing facilities,

⁴³ Gerald Brock, *Telecommunications Policy for the Information Age* 72-3 (Harvard University Press, 1994).

⁴⁴ *Ibid.* A two-person network connecting A and B charges each \$1 for access. Assume that one unit of access costs \$1 to supply. A third person, C, is added. Assume that A and B both value access to C at \$0.4, and that C values access to A and B at \$0.4 each also. C would therefore only be willing to pay \$0.8 to join the network. A and B, on the other hand, would be willing to pay up to \$1.4. Brock shows that a price vector of \$1.3, \$1.3, \$0.4 will induce all three to subscribe, exactly cover total costs, and make each person better off. If a unit of access costs \$1 to supply, however, a competitor could undercut the incumbent's price of \$1.3 and offer service to C via interconnection.

⁴⁵ George Bartlett Prescott, *The Electric Telephone* 236 (Appleton 1890).

⁴⁶ Theodore N. Vail, AT&T Annual Report 17 (1907); Vail's views are discussed in more detail in chapter 8.

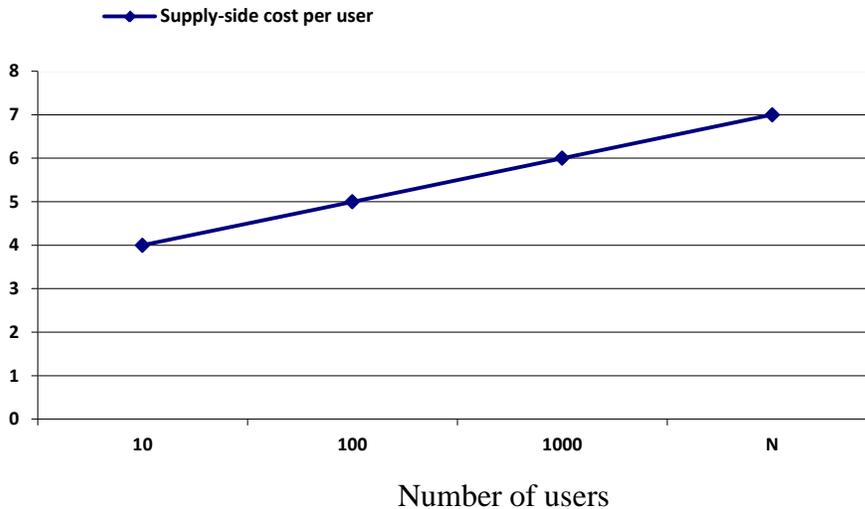
such as a telephone set and a local line. Those investments supply a gateway or entry point into a network, allowing the user to consume a specific set of access services. As additional users join the same network, the number of access services available through those gateway facilities expands. That expansion of service may take place without any increase in the user's investment. Even if the rate paid for access goes up, the increase is likely to be less than what the user would have paid if access to the additional users was purchased separately. Thus, a demand-side economy of scope is realized: additional access units are acquired for a less than proportional increase in user payment.

Conversely, the division of the market into fragmented competing networks can create demand-side diseconomies of scope. Users whose desired calling partners are divided among two or more networks must invest in two or more gateway facilities and subscriptions if they want to maintain access to all of them. Those duplicate investments in access facilities may not be utilized as efficiently as they would be in an integrated system. Returning to the matrix model (Figure 3.1), imagine the costs a user would incur if each pairwise connection, each cell in the matrix, required a separate transaction between the two users involved, a separate pair of instruments, and a separate line. Even with comparatively small networks, the multiplication of access facilities would quickly become monstrously inefficient. Users achieve economies when access units are bundled together.

Integrated networks almost certainly create some supply-side scope economies as well. But demand-side economies of scope can produce efficient user convergence on a single network even when the supply-side costs increase as users are added. That can be illustrated with a simple model (Figure 3.6). In a population of N people, assume the cost per subscriber of supplying telephone service increases as the number of users approaches N . The population is evenly divided among two competing, incompatible networks. Both networks charge \$5 per month for telephone service. Under those conditions, a user who wants access to every other user must purchase access to both systems. Thus, universal access costs \$10 per month. Now suppose that the city convinces the two systems to consolidate their exchanges into a unified system. The additional costs created by enlarging the integrated system's scope raise the monthly rate by 20 percent, to \$6 per month. Although the rate goes up, the duplicate users have still realized a significant demand-side economy of scope. They now pay \$4 less for universal access. Moreover, all users who wanted universal access but were unwilling to pay more than \$6 for it have also benefitted from the consolidation.

What was a paradox in natural monopoly theory is now easily explained: one telephone system can be more efficient than two, even when the per-user supply-side cost of one large system exceeds that of two or more smaller, competing systems. The model may make it appear as if a monopoly or a fully interconnected system is *prima facie* more efficient than the alternative. Not so; the realization of demand-side economies of scope in that simple example depended on two assumptions: 1) subscribers had to value access to all other subscribers more than the additional cost created by expanding the scope of the network; and 2) consolidation had to allow duplicate users to reduce the number of access lines they paid for.

FIGURE 3.5
DEMAND-SIDE SCOPE ECONOMIES



Empirically, either one of those assumptions may be untrue. With respect to 1), not everyone wants or needs a system that is universal in scope. Each individual's orders from the 'menu' offered by a universal telecommunications network are different, some being highly extended and others localized and restricted. Under those conditions the elimination of dual service may save money for some groups while raising the costs for many others. The model makes it clear that the distribution of the demand for access among users and the politics of the transition are important empirical issues. (Those questions will be explored in chapter 11, when the major urban consolidations of telephone exchanges are examined.) As for assumption 2), large businesses almost always require multiple access lines from the telephone company. Buying access from two competing networks would not necessarily constitute a waste under such circumstances, although it might be an inconvenience due to uncertainty about which one to use to reach specific parties. A company that ordered six access lines under dual service (say, two from one network and four from another) may still need six access lines from a consolidated system. Unless monopoly reduces the number of access lines needed, there is no demand-side economy of scope. (Empirical evidence about subscriber fragmentation and duplication patterns is explored in chapter 7.)

It should also be noted that the existence of a monopoly can restrict the scope of communication as much as, if not more than, the fragmentation caused by competition. The monopoly can charge higher prices for access than it would if faced with competition. It may be unwilling or unable to raise the capital needed to expand as fast as the market demands, or unwilling to risk its money on marginal markets. In general, a system exempt from competitive pressures can be indifferent about increasing the scope of its service.

Interconnection of Competing Networks

Thus far the analysis has assumed that competing networks are not interconnected. To contemporary readers, especially those familiar with current telecommunications policy, that perspective may seem strange, if not downright perverse. Contemporary regulations routinely require open interconnection and equal access. The obvious solution to the problems of access competition, so it would seem, is simply to interconnect the competing networks. That appears to retain the advantages of rivalry while eliminating the problems of imperfect substitution, diseconomies of scope for users, and the danger of eventual convergence on a monopoly. A reader familiar with that modern vantage point will immediately raise two pressing questions about the historical episode: 1) Why didn't public officials mandate interconnection of the competitors rather than permitting access competition to proceed? 2) Why didn't they choose to achieve universal service by interconnecting the independents and Bell, instead of by consolidating the system into a monopoly?

Those empirical questions can only be answered properly in the course of the historical exposition. The issue of how interconnection affects the competitive process is, however, relevant to the theoretical issues raised by that chapter, and are taken up now.

Interconnection homogenizes access. It makes the scope of rival networks appear to users as identical, *even though they are not*. Thus, a firm can offer a substitute for one unit of access without offering a substitute for the entire network. To the customer, the access universe offered is the same, regardless. Users can choose, for example, the local access service of one company and the long-distance service of another. By the same token, a competing network can benefit from the customer access created by a larger network's facilities while invading only those markets that look profitable. Interconnected networks thus have a dual status: they are both complements and competitors. Part of their value is derived from their links to the other network, yet they present themselves to users as substitutes for each other. The long term effects of that process are still unknown, but theory would suggest that it encourages unbundling of the combination of access units making up the network, and discourages rate averaging and cross-subsidization among the units. It also – and that is the critical point – seriously undermines a network's ability to appropriate the value of its scope. A network no longer gains a competitive advantage by maximizing its scope, nor can it maintain that price discrimination that will optimize the scope of the network.

Far from being ignorant of that issue, the telephone companies, users, and municipal and state officials of the early competitive era showed an appreciation of the economic consequences of interconnection that was in many respects more sophisticated than today's reflexive support for it. The main reason access competition persisted was that both competing telephone interests supported it. Their reasoning is described in chapter 5 and chapter 8. Essentially, both wanted to appropriate the value of their networks, and both thought they had a chance to win the competition. Is their attitude any different from the current promoters of incompatible wireless telephone technologies, computer operating systems, or software applications? Clearly, in the developmental stages of a technology, different approaches to compatibility and interconnection seem appropriate. Also, at that period in history, the courts were more willing to accept appropriability-based arguments regarding the property rights of the telephone interests.

Aside from the legal barriers to compulsory interconnection, access competition was often supported or tolerated by the users and public officials because, at that time, access competition was synonymous with competition. Eliminating it via interconnection, they feared, would lead to a state of complementarity between the networks rather than true competition.⁴⁷ Access competition was not an accident or a blunder. City councils deliberated for weeks or months before authorizing dual service competition. They were aware of the alternative of a single system. In the later stages of the competitive period, there were also experiments with interconnection of competing exchanges. The experiments tended to confirm the suspicion that competition would cease if rivalry over the scope of the network was eliminated (see chapter 9).

Another important factor was the supply-side cost of interconnection. The network of the early 1900s was not electronic and digital but a mixture of manual and electromechanical analogue. Interconnecting exchanges could not be accomplished automatically, by programming switches, but involved intricate coordination of the procedures of armies of operators. That cooperation would have to take place between business interests with a twenty-year history of hostility and cutthroat competition. Both interests expressed skepticism about the feasibility of such cooperation. Cities balked at its cost in large urban systems. Rather than imposing present-day preconceptions onto the past, that book takes access competition seriously as a historical phenomenon and attempts to explore its characteristics objectively.

To conclude, I have argued that the output of a communication network is radically heterogeneous; i.e., that each connection between users must be considered a separate output, a distinct service. Increases in the number of users attached to a network increase its scope and generally its value to users. Competition over the scope of a network leads to an entirely different kind of business rivalry than competition between firms with outputs that are homogeneous and substitutable. The analysis explored some of the properties of that peculiar form of rivalry and gave it the label access competition. The concept of rivalry over the scope of two non-connected networks provides the theoretical infrastructure for the historical narrative. The Bell-independent rivalry is framed as a history of access competition. Many aspects of the outcome, including the achievement of a ubiquitous telephone infrastructure in the United States, can be attributed to the peculiar incentives generated by competition over the scope of a network. Likewise, the convergence of users on a single network or standard can be seen as a product of demand-side economies of scope.

⁴⁷ Stehman, for example, knew that competing companies could be required to interconnect and exchange traffic. But he rejected that as an adequate solution to the problem of service unification. While it eliminated the barriers to communication created by competition, interconnection required the competing companies to make joint financial arrangements and to work so closely together that the result was tantamount to monopoly anyway. Stehman 234 (1925).

4

PROLOGUE: TELEPHONE DEVELOPMENT BEFORE COMPETITION

COMMERCIAL DEVELOPMENT of the telephone business began in 1877. From 1878 to 1880, there was a brief bout of competition when the Western Union telegraph company attempted to enter the business using instruments invented by Thomas Edison and Elisha Gray. Bell sued Western Union for patent infringement, however, and won a settlement from the powerful telegraph firm. The agreement cemented Bell's control of the business from 1880 until 1894, when the last patent protecting Bell's original invention expired.⁴⁸

Fourteen years of monopoly set the stage for the superheated rivalry that followed in three distinct ways. First, the Bell organization fought an unrelenting legal battle to preserve its patent monopoly, despite numerous indications that the demand for telephones was not being met. Second, growth of the system led to rate increases, leading to continual conflict with the public. Finally, the Bell interests, with Vail as the chief articulator of strategy, took a *nationwide systems* approach to telephone development, an approach modeled after its historical predecessor, the telegraph. That particular vision of universal service left huge pockets of demand unmet.

⁴⁸ In the out-of-court settlement of November 1879, Western Union agreed to withdraw from the telephone business for seventeen years, to sell its exchanges to the Bell Co., to transfer all telephone-related patents to Bell, and to pay 20 percent of the cost of any new Bell telephone patents for seventeen years. Bell agreed to stay out of the telegraph business, and to forward to Western Union all requests for telegraph service that came through its exchanges, and to pay Western Union 20 percent of its rental on telephones. FCC *Telephone Investigation* 124 (1939).

A Legacy of Suppression

The Bell patents did not automatically give it a monopoly. Alternative companies sprang up like crabgrass all through the 1880s, and Bell had to actively suppress them. The usurpers could be small, local enterprises or nationally organized stock promotions. Any inventor, backyard mechanic or charlatan who claimed to have invented a telephone could and did serve as the front men for entrepreneurs who needed a patent to enter the business.⁴⁹ The telephone instrument was a fairly simple and inexpensive device to make once the principle of voice transmission by electrical analogue was understood.

The real subject of that litigation was not who invented the telephone but who would get to profit from its commercial development. The high price of Bell telephones aroused the enmity of many subscribers and the avarice of many a potential competitor. A rival patent claim, no matter how spurious, gave promoters the pretext they needed to organize a company, sell stock, and begin to install lines and phones.⁵⁰ And there was always the chance that their claims might be sustained by the courts. Not until 1887, when the U.S. Supreme Court upheld the controlling nature of Bell's patents in a case combining many challenges to his rights, was the issue clearly settled. In the interim, the electrical journals of the 1880s routinely published notices of non-Bell telephone companies being formed and of their closure after a few months for infringing the Bell patents.⁵¹

Two specific cases from the mid-1880s illustrate the nature and consequences of that strategy of suppression. In May, 1884, two promoters paid \$15,000 for the telephone patents of one Dr. Myron L. Baxter and formed the Baxter Overland Telephone and Telegraph Company in the city of Utica, New York. By October of that year the Baxter Company was operating a telephone exchange with 300 subscribers, and had built up the physical capacity to serve 800. Whatever the merits of Dr. Baxter's patent, the operating company was not a fly-by-night stock promotion scheme but a serious effort to provide telephone exchange service.⁵² When the Bell exchange began to lose subscribers the Baxter exchange was shut down by an infringement suit.

At about the same time, an Indiana fanner named John Crump obtained non-Bell telephones from Canada and set up a private line between his house and the home of one of his tenants on an adjoining farm.⁵³ Crump was not selling telephones or telephone service – the line was for his own personal use. There was no Bell line or exchange anywhere near him. Had he gone to the nearest Bell licensee for his phones he would have had to pay \$100 a year to lease them, and he still would

⁴⁹ The conflicting patent claims are covered in detail in Robert Bruce, *BELL: Alexander Graham Bell and the Conquest of Solitude* (Little, Brown 1973).

⁵⁰ The importance of making and defending patent claims is clarified by George Smith's observation: "Typical of the organization of all the major firms in the electrical industries, telegraph and telephone company organization crystallized around patent rights, and so whoever desired to enter or sustain business in either field had to come to terms with the holders of significant patents... Survival (in this as well as in most emerging high-technology businesses of the era) required almost obsessive attention to patent claims wherever they arose." Smith, *The Anatomy of a Business Strategy*, 9 (Jolms Hopkins AT&T Series in Telephone History 1985).

⁵¹ Harry B. MacMeal, *The Story of Independent Telephony* 27-29 (Independent Pioneer Telephone Association 1934).

⁵² The construction and service quality of the new Company were reputed to be exceptional, and its rates were less than half those charged by Bell. *Ibid* at 43.

⁵³ 13 *Telephony* 92 (Feb. 1907).

have had to set up the line at his own expense. Nevertheless, Crump was soon visited by Bell agents who warned him that he was in violation of the law and confiscated his telephones.

Examples such as those could be multiplied. Throughout the 1880s, scores of local and national business interests had been willing and able to compete with Bell in the supply of telephone equipment and service. Farmers had always been eager to take the technology into their own hands. For fourteen years those forces of spontaneous development were held in check by injunctions, fines, and confiscations. The expiration of the Bell patents should not be viewed as the beginning of the competitive movement; it was more like the disintegration of a dike that for many years had protected the Boston corporation from a raging flood.

The suppression of independent activity prior to patent expiration also helps to explain the ideologically charged character of the later rivalry. Here was a distant, impersonal corporation growing rich by maintaining a legal stranglehold on a popular, useful device. The scenario could not have corresponded better with the archetypes of Evil promoted by populism. The publicity organs of the independent movement ceaselessly reminded their readers of what it was like in the bad old days of monopoly. Even the names of the early legal independents often mirrored those of the suppressed companies of the 1880s: the Peoples Telephone Co., the Citizens Co., etc.

The experience also deeply impressed itself upon the attitudes of the national Bell Company. As one independent propagandist put it, after fifteen years of skirmishes with patent violators, Bell management “had come to believe, and believe honestly, that anyone who attempted to enter the telephone field, no matter through what gate, was a lawbreaker – an infringer – an interloper.”⁵⁴ Bell's refusal to interconnect with the independents in the 1890s, and the independents' response in kind, was in part a reflection of that hostility.

Rate Wars

Bell's successful defense of its patent gave it the power to make monopoly profits on its telephones. The national company was not bashful about exploiting that power. It required its licensees to lease rather than buy the telephones manufactured by its Western Electric subsidiary at an annual charge of \$14 for each set. Since the machinery itself cost about \$4 to make, American Bell guaranteed itself large profits on every telephone in service. As protected monopolies, the operating companies were able to recover those costs in their subscription rates. The instrument lease price paid to American Bell accounted for one-fourth to one-half of the subscription price in small and medium-sized exchanges.

Bell's attempt to reap monopoly profits on telephones fueled public suspicions that the company was gouging its captive market. But the price of the telephones themselves was only one source of discontent over rates. Far more important in the long run was that the licensee companies' operating costs steadily increased through- out the 1880s. The resulting rate increases were not abuses of monopoly power but were legitimately rooted in the economic and technical characteristics of the telephone exchange.

⁵⁴ Paul A. Latzke. *A Fight with an Octopus* (Telephony Press 1906).

In 1877 Bell managers had assumed that the local companies were basically in the business of leasing telephones. The telephone did not catch on, however, until the development of exchange service. As switching became more important, the licensees' functions changed. They became operating companies with a large labor force and huge investments in switchboards and outside wires and cables. As the business underwent that transition, Bell managers made a disturbing discovery: the average costs of telephone exchanges increased as they grew. Most companies charged flat yearly rates of \$20 to \$40. Like their subscribers, Bell managers had expected their operations to realize economies of scope as more subscribers joined the exchange. In fact, the reverse was true.⁵⁵

By 1881, Bell managers had come to a rather grim conclusion: expansion had to be accompanied by rate increases. Only three or four of the more than 300 exchanges in operation in 1881 were able to pay for themselves at then-existing rates.⁵⁶ Rates would have to be raised “for our self-preservation, even though it places us in the light of a monopoly taking advantage of its position.”⁵⁷ In noting that it would probably be necessary to raise rates \$5 for every 100 new subscribers, one Bell exchange manager warned: “any system which does not provide for that expansion is going to be involved in continual conflict with the public.”⁵⁸

What was intended to be a warning turned out to be a prophecy. The need for growth-induced rate increases did involve the Bell companies in “continual conflict with the public” throughout the 1880s. Users responded to higher prices with outrage and frustration. They expected a bigger exchange to offer lower rates, as in any other normal business endeavor. With no alternative to the Bell Company, they felt helpless and exploited as rates went up.

The public responded first with boycotts, then with attempts to control rates by legislation. Neither technique gave the telephone-using public the kind of redress it desired. Boycotts were a costly and ultimately ineffective weapon. Legislation was too clumsy, arbitrary and drastic. In that context, the idea of starting an alternative telephone company backed by local capital and managed by local businesspeople looked very attractive. As noted earlier, hundreds of localities chose that option during the 1880s in flagrant disregard of its illegality. Most, however, were forced to acknowledge that any conceivable form of competition would infringe the Bell patents. So the local telephone users swallowed their frustration, paid their bills, and looked ahead to a time when challenges to the monopoly would be legal.

The link between exchange growth and rising costs would return to haunt Bell's competitors. Independent exchanges found it easy to undercut Bell rates when they first entered the field. They soon attracted so many customers, however, that their unit costs increased. Because many localities conceived of competition as a method of rate regulation, they wrote provisions fixing rates into the new company's franchise. As the independent grew, it was forced either to lose

⁵⁵ National Telephone Exchange Association Convention Number 3 (1881), Minutes, 46. AT&T-BLA.

⁵⁶ National Telephone Exchange Association Convention Number 2 (1880), Minutes, 137, AT&T-BLA.

⁵⁷ Edward J. Hall, Minutes of the National Telephone Exchange Association Convention Number 2 (1880), p.

⁵⁸ *Ibid.*

money or to ask for a rate increase, thus reneging on its promises and calling into question what many citizens saw as the justification for its existence.

One System, One Policy...

Conflicts over rates, service, and patent infringement all contributed to the simmering public resentment on which the independent movement capitalized. But two other factors, pertaining to the organization and goals of the Bell system itself, were equally important in setting the stage for the competitive struggle. Those were, first, the national Company's contractual relations with its local operating companies, which were consciously designed to protect its control of the business by weaving its members into an integrated system; and second, the Bell Company's vision of the telephone system as a substitute for the telegraph system—a network of voice communication designed to serve business users in the principal towns and cities. The development plan that flowed from that vision left most of America without telephones or exchanges.

Theodore Vail was the general manager of the national Bell Telephone organization from 1878 to 1887. He later returned as the president of AT&T from 1907 to 1919. Looking back on those early years of the Bell System after it had weathered fifteen years of competition Vail claimed that the Bell System had been organized to achieve universal service all along. "The Bell System was founded on the broad lines of 'One System,' 'One Policy,' 'Universal Service,'" he wrote in AT&T's 1909 *Annual Report*.⁵⁹ Around 1918 he made the same claim even more emphatically. "From the commencement of the business," he wrote, "one system, one policy, universal service is branded on the business in the most distinctive terms."⁶⁰

What did Vail mean by that claim? Did he mean, as some modern observers might think, that the Bell system intended to put a telephone in every home and an exchange in every community? That question can be answered in a way that leaves little room for doubt. The behavior of the Bell system during the monopoly period defeats any attempt to read a modern conception of universal service into Vail's pronouncements. By 'One System, One Policy,' Vail meant that Bell intended to establish a centrally coordinated monopoly. By 'Universal Service' he meant that Bell aimed at a nationally integrated system whose subscribers could all talk to each other.⁶¹ The model for that concept was the telegraph industry, which was also both monopolistic and nationally integrated at the time, although far from universal in the sense of reaching into every household.

As general manager, Vail consciously pursued a vision of a nationwide, fully interconnected system. Vail's intentions were clearly revealed during his involvement in the negotiation of the patent settlement with Western Union. Which company would control toll lines was a major source of contention between the two parties. Western Union wanted Bell to confine itself to the local exchange business and allow the telegraph company to control all interexchange connections. Vail's biographer credits him with adamantly rejecting that proposition and insisting on Bell's right to construct and operate long distance lines.⁶² The contracts defining the relationship between the national Bell organization and its licensed operating companies provide even stronger evidence of

⁵⁹ Theodore Vail, *AT&T Annual Report* 18 (1909).

⁶⁰ Gerald Brock, *THE TELECOMMUNICATIONS INDUSTRY*, 102 (Harvard University Press 1981).

⁶¹ Chapter 8 contains a more extensive discussion of Vail's usage of those terms and their meaning.

⁶² Albert Bigelow Paine, *IN ONE MAN'S LIFE* (Prentice Hall 1920).

the nature of Vail's vision. The Boston headquarters did not have the capital or the ability to construct and operate exchanges directly throughout a country as vast as the United States. It relied instead on franchise-like agreements to develop the business. Local operating companies were licensed to lease telephones, raise capital and build and operate exchanges in an exclusive territory. Those contracts were drawn up under Vail's direction and constitute his most important accomplishment as general manager.⁶³

Vail's license contracts were shrewd attempts to reconcile the need for integrated development with the fact that the system's actual operations were being conducted by many separate, semi-autonomous companies.⁶⁴ The controlling nature of the Bell patents was of course the bedrock on which Vail's system of organization rested, for there was no other legal supplier of telephones. In return for the right to lease telephones, the exclusive Bell licensee in a territory agreed to certain conditions, the intent of which was to bind them to the national Bell organization far beyond the life of the patents themselves. One of the key features of that contract was the parent company's reservation of long-distance interconnection rights. As Vail said in 1918, "it gave us control of the connection of every exchange under license with the outside.... [W]e believed that no exchange could exist without being more or less tied up with the others..."⁶⁵ Any licensee company that attempted to break away from the Bell system could be isolated by its inability to connect with any of the surrounding Bell exchanges. That was in fact the same method Western Union had used to achieve its dominance of the industry, as Vail certainly knew.

Vail's organization, in short, was designed to create a unified system, impervious to fragmentation and competition, and capable of providing an end-to-end communications pathway between all of its customers. Monopoly control and universal interconnection were strongly linked, mutually reinforcing categories in his mind: the conditions which led to one necessarily led to the other. The supply of systemic interconnection required centralized control. Systemic interconnection, however, was not merely a product to be offered to customers-it was itself a powerful lever by which Bell's control of the telephone business could be maintained against centrifugal or competitive forces.

Universal service, in the sense of service everywhere, to everyone, is not the same as universal interconnection within a system. A system can be universal in the latter sense while being very restricted in scope. In fact, the phrase "universal service" never appeared in any Bell documents until 1907, the peak of the independents' strength, and by that time the scope and usage of the telephone had been transformed so profoundly that the concept of a universal system had taken on a meaning far different from what Vail had meant when he spoke of a "grand telephonic system" in 1878.

⁶³ See Robert Garnet, *THE TELEPHONE ENTERPRISE* (Johns Hopkins AT&T Series in Telephone History 1985) for a detailed history of the license contracts.

⁶⁴ "...the Bell policy was to establish the business on the same lines as if it was done direct by the company with its own lines, only substituting a corporation with its Manager ... performing the duties of a District Manager." Theodore Vail, cited in BROCK, *supra* note 21, at 102. See also Garnet, *supra* note 24, at 70.

⁶⁵ Testimony of Theodore N. Vail, *Read et al v. Central Union Telephone Co.*, Superior Court of Cook County, Illinois, Chancery General No. 299,689, p.1086.

What Vail had in mind during those early years was not the ‘universal service’ of 1907, much less the ubiquitous network of 1990. The closest model was the telegraph system of the 1870s – a nationwide, business-oriented message communications network linking terminals in all the principal commercial centers.⁶⁶ The telephone would reach largely the same people and places, but improve the efficiency and speed of communication by relying on direct conversation instead of written messages and the mediation of telegraph operators. As K. Lipartito observed, Bell managers’ idea of what telephone users wanted was based on an “image of a world of businessmen, engineers, and professionals communicating about technical matters with peers with whom they were not intimately acquainted. Such a world demanded a high-quality long-distance system because its residents had many and distant correspondents and contacts.”⁶⁷

That this was the model on which his vision was based is, to borrow Vail’s words, “branded on the business in the most distinctive terms” if one looks at the pattern of development taken by the system in its first two decades. In 1894 after seventeen years of commercial development, the Bell Company had installed only 240,000 telephones, one for every 225 people in the United States. 85 to 90 percent of those phones were in businesses.⁶⁸ The remaining telephones were generally in the homes of businesspeople who wanted to be able to communicate with their offices from their residences. A noted Bell agent often assessed the demand for exchanges in smaller towns by examining its commercial register.⁶⁹

Of course, many new technologies “trickle down” from business to the home as their costs decrease. But in the case of the Bell system, the overwhelming predominance of business users reflected a deliberate policy, a specific vision of what the telephone was for and who would be interested in using it. From the beginning, Vail was committed to matching the telegraph network in geographic scope, even though voice transmission over long distances posed enormous, unprecedented technical challenges. (The goal of transcontinental voice transmission was not reached until 1915.) Most of the money in telegraphy was made in intercity communication. If the telephone could supersede district telegraphy in local communications, would it not be even more profitable to replace telegraphy’s hold over *long-distance* business communications?

⁶⁶ The telephone operated in an environment dominated by telegraphy for its first twenty years, fulfilling the role of adjunct to, complement of, or substitute for its predecessor. *History of Engineering and Science in the Bell System*, Vol. I, 489 (M.D. Fagen, ed. AT&T 1975). See also Joel Tarr, Thomas Finholt & David Goodman, The City and the Telegraph: Urban Telecommunications in the Pre-telephone Era, 14 *Journal of Urban History* 38-80 (Nov. 1987).

⁶⁷ Kenneth Lipartito, *The Bell System and Regional Business* 92 (Johns Hopkins AT&T Series on Telephone History 1989).

⁶⁸ A detailed breakdown of subscriber categories in the Buffalo, New York exchange in 1892 is contained in the transcript of the Third AT&T Switchboard Committee Meeting, New York, March 15-18, 1892, p.276-77. Residential telephones make up 289 of the total 1,850 stations in the city. The rest are in business offices of various types. By 1907, in contrast, residential telephones comprised 50 to 60 percent of the total in the cities, and a larger portion in the rural areas.

⁶⁹ In describing his methods for assessing the most promising places for small exchanges, Thomas Doolittle of AT&T wrote, “Reference was had to Bradstreet or Dun’s Commercial Registers, which disclosed the invested capital or what might be called the commercial standing of each place.” Doolittle, 1906 *Annual Report*, 17, Box 2020, AT&T-BLA.

Until 1889, local and long-distance telephone services were literally two separate, stand-alone systems. Local exchanges relied on cheaper Blake transmitters and iron, grounded circuits, equipment with a speaking range of about 50 miles. The toll network used circuits of copper twisted pair (known at the time as “metallic” circuits, to distinguish them from grounded circuits) and a more powerful transmitter capable of transmitting speech 800 miles. A subscription to the long-distance service, which was always purchased separately, cost about 35 percent more than the local service. AT&T soon discovered, however, that the development of the toll business was being retarded by its separation from the local exchange business. Most customers did not subscribe to the more expensive long-distance service and therefore were largely inaccessible to the users of the toll network in other cities. In order to increase the utility of the system as a long-distance network, Bell in 1889 decided to integrate local and long-distance telephony.⁷⁰ That was to be accomplished by upgrading the local exchanges to the transmission standards of the long-distance system. Henceforth, all circuits would be metallic and only the high-quality instruments would be used. In that case, the goal of complete system interconnection conflicted with the goal of encouraging *local* telephone use by larger numbers of people. The decision encouraged intercity communication at the expense of local use.⁷¹

The model of intercity business communications is also implicit in the Bell System’s decisions about where to put exchanges. The United States in 1890 was still a predominantly rural nation. Over 60 percent of its population lived in towns with less than 2,500 people, or on farms. The Bell network unambiguously ignored that majority and cast its lot in with urban America. There were more than 7,000 incorporated towns with populations under 10,000 in 1884, and the Bell system had established exchanges in only 52 of them. By 1895, rural penetration had improved, but the urban bias was still marked. The 346 largest cities, representing only 27 percent of the U.S. population, possessed 83 percent of the nation’s telephones (see table 3-1). In that, Bell was simply following the developmental trajectory of the telegraph system, which began by linking urban centers and gradually extended itself to smaller and smaller towns.

Table 4.1
Telephone Penetration by Community Size, 1895

Population level	# of places	% with telephone exchanges	% of Bell subscribers	% of US population
50,000 +	52	100%	50%	18%
10-50,000	294	98%	33%	9%
2,500-10,000	1150	49%	14%	9%
Rural	--	--	3%	63%

Source: 1900 Census, Exchange Statistics, AT&T-Bell Labs Archives

Apologists for the Bell system often claim that rural areas were ignored because they were more expensive to serve. But in the 1880s and 1890s, the truth was almost the opposite of that. The

⁷⁰ Hibbard, Pickernell & Carty, AT&T, “The New Era in Telephony.” Address before the National Telephone Exchange Association Convention No. 9, 1889, 35. AT&T-BLA.

⁷¹ David Gabel, *Technological Change, Contracting and the First Divestiture of AT&T* (unpublished ms, Jan. 12, 1989).

cheapest and least technically demanding course of action would have been to establish many small, local exchanges in the small and medium-sized towns. The equipment needed to provide that kind of service was fully developed and easy to mass produce. By contrast, the growth of exchanges in urban centers constantly posed new technical problems in switching, signaling, operation, and maintenance. Also, because of the diseconomies of growth associated with large exchanges, small-scale development would have required less capital investment and fewer workers per subscriber and less complex management practices.

Bell was clearly bent on another task. It was responding to a specific kind of demand for telephone service: the demand of urban businesses for voice telephony as a substitute for, and improvement upon, the nationwide telegraph infrastructure. It therefore left untapped a huge reservoir of public demand for local exchange service. Thousands of farm communities and small towns had no telephone exchange, and those communities embodied precisely those conditions which made entry into the telephone business easiest. The small, local exchanges they wanted required only modest levels of capital investment and technical expertise. There were also hundreds of larger cities in which the demand for purely local telephone service had been retarded, partly by Bell's monopoly prices and partly by its preoccupation with a grander vision of what telephone service could be.

Vail was at least partially right; a peculiar vision of *universal service* had informed the Bell system almost from its inception. But that was not universal service as we know it today, implying widespread household penetration and an effort to make telephone access available everywhere, to everyone. It meant, instead, a commitment to provide nationwide voice communication to business, even if that meant completely neglecting service to rural areas, local exchange service to households and short-distance toll connections. The Bell managers would soon discover, however, that their attempt to cultivate one grand system had left open enormous, fertile expanses where hundreds of smaller ones could grow.

5

ACCESS COMPETITION BEGINS: LEGAL AND ECONOMIC RATIONALES FOR NON-CONNECTION

ALEXANDER GRAHAM BELL'S patent on the telephone receiver lapsed on January 30, 1894. Almost immediately, an independent telephone movement with its own operating companies, equipment manufacturers, publications and trade associations took shape. By 1897, both the Bell and the organized independent interests had decided to conduct their rivalry as separate, closed systems, with the subscribers of one unable to place calls to the subscribers of the other.

Although price competition was often foremost in the minds of contemporaries, it was access competition that established the distinctive economic, political and social parameters of the contest and had the most far-reaching effects. One cannot understand the business strategies of the two interests, the rate policies and practices that were adopted, the reasons for the growth and eventual decline of competition, or the problems that ultimately had to be addressed by regulators without reference to the fact that two mutually exclusive networks were at war with each other.

Surprisingly, not a single published work on the history of the telephone in the United States investigates the reasoning behind either sides' decision to pursue access competition or the legal context in which that decision was made. Why weren't the two interests required to connect, and how was the decision not to exchange traffic justified? This chapter attempts to fill that gap in the literature.

The eruption of access competition was the cumulative product of three factors. One was the business policy of the Bell system. The Bell organization had always intended to maintain absolute control over its own system and thus resisted any attempts to make it cooperate with outsiders. A second factor was the prevailing interpretation of common carrier law, which militated against legislative attempts to compel interconnection. Third, and equally important, was

the development of a consensus among the independents themselves that interconnection was not a desirable goal. The independents came to see themselves as a mutually exclusive enterprise, a nationwide movement bent on displacing the Bell monopoly rather than coexisting with it.

Bell policy on interconnection

From 1893 to 1897, some independent exchange operators requested physical connections with Bell toll lines so that their subscribers could speak to telephone users in other cities.⁷² The early demands for interconnection took two distinct forms. First, there were formal requests for the installation of a trunk line connection between Bell and independent exchanges. The independent might propose to extend a line into a Bell exchange at its own expense, and offer to pay a toll or some division of toll revenue for each incoming or outgoing call.⁷³ In other cases, a competing independent exchange would simply subscribe to the Bell exchange and install the telephone in its own central office.⁷⁴ Then it would either orally relay messages between independent and Bell subscribers or, what was more significant and dangerous from Bell's point of view, physically connect the subscriber line into its own switchboard. In the first case, the demand was for a joint operating agreement that would enable Bell and the independent to exchange traffic at prescribed rates. The second tactic effectively erased the boundaries between the Bell and independent exchanges, allowing the independent to offer access to Bell subscribers without paying anything more than the regular subscription price.

A typical request for trunk line interconnection was made late in 1894 in Mt. Sterling, Kentucky, a small town about thirty miles from Lexington. The manager of the independent exchange there wrote a cordial letter to the manager of the Bell licensee in that area proposing to build a line to the nearest Bell exchange so that his subscribers would be able to call Lexington over Bell toll lines. If necessary, the independent manager would build his own toll line to Lexington, but he preferred that the Bell Company "run a line right into our central office, and let us transmit your business for you and increase your business here."⁷⁵

When the operating companies referred those requests to the national organization, they were invariably informed that licensee companies were not permitted to connect with "opposition" companies, nor could they permit opposition companies to forward messages over their lines.⁷⁶ That blunt dismissal was both predictable and logical. While joint operating agreements with the independents might have been mutually beneficial in isolated instances, their

⁷² "We are frequently asked by parties who have organized opposition companies what arrangements they could make to connect with our toll lines." O.E. Noel, President and General Manager, East Tennessee Telephone Co., to C. Jay French, General Manager, ABT Co., Dec. 10, 1894. Box 1066, AT&T-BLA.

⁷³ The Mt. Sterling independent operator offered to let Bell build a line into his exchange and pay a small toll for the use of the line by his subscribers. Letter reproduced in Noel to French, Dec. 10, 1894. Box 1066, AT&T-BLA.

⁷⁴ See, for example, C.A. Nicholson, General Manager, Central New York Telephone Co., to C. Jay French, ABT Co., Apr. 6, 1898: "Application is made to us by the opposition at Baldwinsville and Oneida for exchange connection, telephones to be placed in the Central Offices of the opposition companies at these points Under [the Bell] Exchange Contract can we discriminate against their customers forwarding messages to points on our trunk lines?" Box 1166, AT&T-BLA.

⁷⁵ *Ibid.*

⁷⁶ C. Jay French to O.E. Noel, "Business in connection with opposition enterprises," undated draft, Box 1066, AT&T-BLA.

overall effect would have been to completely unravel Vail's plan of organization. In effect, interconnection would have made independent companies part of the Bell system without their having to sign a license contract. Thus, Bell would have been helping to build up telephone companies over which it had no financial, managerial or technical control. Independent connecting companies could not be required to buy Western Electric equipment; nothing could guarantee that they would route their toll traffic over Bell lines; nothing could prevent them from later building their own, competing toll lines or competing exchanges. Later on, the task of technically integrating and organizing long-distance connections would have been greatly complicated. American Bell saw the license contract as the only way to maintain an integrated system under its control—and integration was also the bulwark of its strategy to control the telephone business itself. Now that the patents had expired, interconnection was the only way to induce operating companies to become Bell licensees. Bell management really had no choice but to resist these early, casual attempts to integrate its operations with independent companies. To do otherwise would have corroded the foundations on which its whole organization was based.

The Kentucky case, moreover, demonstrates clearly the economic consequences of the two approaches to interconnection. Had the independent been allowed to interconnect, it would have had no need to build an additional, competing toll line to Lexington. The two companies would have settled into a pattern of complementarity rather than competition. With interconnection denied, the opposition companies had to build their own facilities in order to match the scope of telephone access available through Bell. Refusal to interconnect was "anti-competitive" only in the sense that it prevented new companies from benefitting from the access facilities of the incumbent. In a far more meaningful sense, however, it was the *refusal* to connect that encouraged robust competition, because it impelled Bell's rivals to set up lines and exchanges that duplicated or, when possible, surpassed Bell's, and thereby allowed for more complete competition for subscribers and traffic.

Interconnection and common carrier law

When it became clear that overtures for voluntary interconnection would be spurned, some independents turned to the courts and the legislatures. Legal maneuvering over interconnection rights peaked in March of 1896, when three separate lawsuits pertaining to interconnection consumed the attention of the national Bell management.

The telephone was already regarded as a common carrier cast in the same general mold as the telegraph and railroad companies. The law regarding the relations between competing telephone companies was still unclear, however. The technical characteristics of the business differed enough to make the application of statutes and case law based on railroad and telegraph precedents less than obvious. It was true, for example, that state laws required telegraph companies to accept and deliver messages brought to them by other telegraph companies.⁷⁷ Early telephone interconnection bills in Michigan (1893), Ohio (1895), Indiana (1895), Illinois (1897), and Wisconsin (1897) seemed to have been drafted with those precedents

⁷⁷ A typical nondiscrimination statute, Section 103 of the New York state Transportation Corporations Law read: "Every such [telephone] corporation shall receive dispatches from and for other...telephone lines or corporations...and on payment of the usual charges by individuals for transmitting dispatches as established by the rules and regulations of such corporation transmit the same." The use of the terms "dispatches" or "messages" in these laws shows the extent to which the telephone business was viewed as an extension of the telegraph business. In reality, telephone companies were in the business of providing *circuits* for real-time voice communication rather than discrete "messages."

in mind.⁷⁸ But the transfer of telegraph messages did not necessitate physically linking and jointly operating the competing companies' wires. All it required was a willingness to accept a hard copy message from one company for transmission at the second company's convenience. Telephonic communication, on the other hand, involved a real-time link between two parties and thus would have necessitated integrating the facilities and operations of rival companies.

Some proponents of interconnection sought to base their claims on the common carrier status of railroad, telegraph, and telephone companies. Common carriers were required to serve all members of the public without discrimination. If the concept of nondiscrimination could be stretched to include service to competing companies, it could form the legal rationale for interconnection. Rivalry between separate systems had existed for some time in both the telegraph and railroad industries, however, and the courts had drawn a fairly sharp distinction between nondiscriminatory service to the *general public*, an obligation which was clearly imposed by the law, and contracts with *connecting companies*, where special arrangements favoring one company over another were considered normal prerogatives of business management.

The most salient precedent was provided by the railroad Express cases, a decision made by the U.S. Supreme Court in 1886. The case involved “express” services, companies which contracted with railroads to provide intermediary shipping services. The express companies assembled components of the various rail networks to provide through service to shippers. In an attempt to obtain what might today be called “equal access” to competing railroad facilities, various express companies sued the railroads, and the cases were tried together. The express companies were unsuccessful. In denying their attempt to compel the railroads to give them throughline facilities on a nondiscriminatory basis, Chief Justice Waite distinguished between common carriers and a “common carrier of common carriers.”⁷⁹ The railroads were required to be the former but not the latter; that is, they had an obligation to provide nondiscriminatory service to the public, but not necessarily to other common carriers. In a case based on the Express precedent, Judge Waite's opinion held:

Now while the rule is well settled that a common carrier must serve its public impartially, still it must be borne in mind that its duty is to the public, and not to other and competing common carriers. One common carrier cannot demand as a right that it be permitted to use a rival common carrier's property for the benefit of its own business.⁸⁰

The Supreme Court applied a similar distinction to the telegraph industry in 1887. Compulsory connections that allowed one company's facilities to be occupied or used for the commercial benefit of a rival company were rejected as a “taking” of private property, prohibited by the Fifth Amendment. Nondiscrimination, the court ruled,

⁷⁸ None of the physical connection bills listed in the text passed.

⁷⁹ “The constitution and the laws of the states in which the [rail]roads are situated place the companies that own and operate them on the footing of common carriers, but there is nothing which in positive terms requires a railroad company to carry all express companies in the way that under some circumstances they may be able, without inconvenience, to carry one company.” The Express Cases, 117 U.S. 601 (1886).

⁸⁰ Postal Telegraph Cable Co. v. Hudson River Telephone Co., 467 Supreme Court (1887).

Does not authorize [the plaintiff] to transmit its own messages over defendant's wires, on payment of the merely nominal sum required of its ordinary subscribers. Such a rule would result unjustly to the defendant, as it would enable the [plaintiff] to enter into competition with the defendant in the transmission of messages over its own wires.”⁸¹

Despite these favorable legal precedents, the Bell Company had no guarantees as to how the law would be interpreted in the case of telephone interconnection.

The first legal challenge came from a financially shaky independent, the National Telephone Construction Co. of Waukesha, Wisconsin. The National Co. exchange had attracted about 75 subscribers.⁸² In the fall of 1895, the Wisconsin Telephone Company discovered that the independent, which subscribed to Bell's long distance service, had linked the Bell line to its switchboard so as to allow its exchange subscribers to be patched into the Bell toll network.⁸³ When Wisconsin Telephone threatened to remove its phone and discontinue service, the National Company filed suit and succeeded in obtaining an injunction. "This will evidently be a test case," a Wisconsin Telephone official wrote to American Bell, "and will have great weight in similar proceedings which must arise elsewhere.”⁸⁴

While the Waukesha case was pending, the Norwalk Telephone Company, an independent exchange competing with the Bell Company in Norwalk, an Ohio town of 7,000, submitted a notice to the Central Union Company (the Bell licensee in the Midwest) requesting permission to build a trunk line connecting its exchange with the Central Union's. The letter was "carefully and formally drafted, with legal skill for its purpose," Central Union's lawyer observed. "It is of value in showing on what lines the attack on us in Ohio may be expected to come.”⁸⁵ News that this gauntlet had been thrown down soon reached President Hudson in Boston, who went about securing the best legal assistance available.⁸⁶

Simultaneous to the Norwalk case, an independent exchange in Madison, Wisconsin, sued the Western Union telegraph company in an attempt to compel it to place one of its telephones in the Madison telegraph office.⁸⁷ Wisconsin Telephone (the Bell licensee) already had a telephone in the Western Union office, allowing it to call in messages to be sent over telegraph lines. The cooperative arrangement between Bell and Western Union was a product of the 1879 patent settlement. Because telegraphy was still a far more prominent mode of communication than the telephone at that time, the Madison independent's inability to place calls to the Western Union

⁸¹ *Ibid.*

⁸² The telephones of the Waukesha independent were reputed to be of poor quality and its service unreliable. W.A. Jackson, Wisconsin Telephone Co., to John Hudson, President, ABT Co., Nov. 13, 1895. Box 1298, AT&T-BLA.

⁸³ Miller, Noyes, Miller & Wahl to ABT Co., Nov. 12, 1895, Box 1298, AT&T-BLA.

⁸⁴ W.A. Jackson to C.J. French, Oct. 7, 1895, Box 1298, AT&T-BLA.

⁸⁵ A.A. Thomas, Solicitor, to H.B. Stone, President, Central Union Telephone Co., Jan. 2, 1896. Box 1298, AT&T-BLA.

⁸⁶ Melville Egleston, AT&T Legal Department, to John E. Hudson, President, ABT Co., Mar. 16, 1896. Egleston took charge of the litigation and on his recommendation Bell retained the Cleveland law firm of Squire, Sanders & Dempsey. Box 1298, AT&T-BLA.

⁸⁷ Dane County Telephone Co. v. Western Union Telegraph Co., State of Wisconsin, Circuit Court of Dane County. Petition of the plaintiff, Box 1298, AT&T-BLA.

office limited its value to potential subscribers. Twice the independent company asked Western Union to allow it to put one of its phones in the office at no charge to Western Union. Both times it was ignored. Charging discrimination and injury, it filed suit in the State Circuit court February 20, 1896.

It was already well established in law that telephone companies were required to supply service to all telegraph companies who requested it. The Madison case, however, was an attempt to invert that doctrine, demanding in effect that telegraph companies be required to *accept* telephone service without discrimination. The AT&T counsel working on the Norwalk, Ohio, case recognized that the principle at stake was closely related to the right to compel physical connection of telephone companies:

The telegraph company is threatened with the establishment of a rule of law which might enable not only telephone companies, but also district messenger companies, and other similar companies, to compel the furnishing of facilities for delivering messages to a telegraph company on the premises of the latter, different from those allowed to the general public; and, going further, might enable other telegraph companies to compel a rival telegraph company to at least allow [their] wires... to be carried into the office of the defendant company, so that messages could be there repeated and forwarded; and the next step, of course, is to compel actual physical connection of the lines of the two companies.⁸⁸

American Bell was not optimistic about the outcome of the Wisconsin cases. In 1882 the Wisconsin legislature had passed a law requiring telephone companies to "receive and transmit without discrimination messages from and for any other company...upon tender or payment of the usual or customary charges therefor."⁸⁹ That was a straightforward application of telegraph precedents to the telephone system. An unfavorable decision might lead other states to pass similar laws. Bell looked for a way to avoid taking the case to its conclusion. It uncovered rumors that the Waukesha independent was eager to sell out, and began to make overtures to its management.⁹⁰ When the interconnection issue threatened to erupt into litigation in Wausau, another Wisconsin town, Bell offered to put its own long-distance instruments into the offices of independent long distance users for free in order to preempt the demand for linking the two systems.⁹¹

Attempts to avoid the issue notwithstanding, Bell's lawyers prepared a strong legal defense against compulsory interconnection. They asserted, first, that its status as a common carrier required it to serve the *general public* without discrimination, but not other telephone companies.⁹² That reasoning had been upheld by the courts in *Postal Telegraph Cable Co. v.*

⁸⁸ Egleston to Hudson, Mar. 9, 1896. Box 1298, AT&T-BLA.

⁸⁹ 1882 LAW OF WISCONSIN, Chapter 196. Cited in Gabel, 1987, p. 341.

⁹⁰ Fuller to Hudson, Nov. 16, 1895. AT&T-BLA, Box 1298.

⁹¹ Fuller to Hudson, Nov. 30, 1895. AT&T-BLA, Box 1298.

⁹² "[The Bell Company] only undertakes to do business on its own lines and through its own instruments. It does not offer to connect generally with other companies. It does not undertake business of that character, and a common carrier is only bound to do the kind of business it holds itself out to the public as doing." Legal memorandum, Miller, Noyes, Miller & Wahl, Nov. 12, 1895, p.5. AT&T-BLA, Box 1298.

Hudson River Telephone Co., as noted before. That defense, however, relied on the interpretation of statute law and thus could be superseded by new legislation. A more fundamental argument was that the requirement to connect with a rival company was an unconstitutional “taking” of private property. That argument had two separate nuances. Connection involved physically entering the premises of the company, attaching wires to its switchboard, and engaging its workforce in the operations required to connect subscribers. Such intrusions seemed an invasion of one company's property rights by another. But there was another element to the argument more directly related to the unique circumstances of the telephone business. The telephone company, its lawyers asserted, had expended large sums of money and energy on the construction of a telephone system linking subscribers all over the state. Its competitors had built only small, local exchanges. If the two exchanges were interconnected, the small exchange would be able to profit from the sale of widespread access without running the risks or assuming the burdens of building a large-scope system. To allow a competitor to benefit from the involuntary use of those facilities was nothing more than the expropriation of its property. In that argument, the “property” at issue was not so much the physical facilities of the telephone company, but the *access to subscribers* it had created by constructing those facilities.

In the middle of 1896, that view of the interconnection issue scored some important victories. In Waukesha, Bell mooted the issue by buying out its competitor. In the Madison lawsuit, the case for compelling the telegraph company to accept service from an independent telephone company was rejected. Relying on the precedent of the Express cases, the Judge ruled that a common carrier who makes special cooperative business arrangements with another company need not extend the same arrangement indiscriminately to all other companies. The principle of nondiscrimination applied to consumers only, not to business rivals.⁹³ The same reasoning was used two years later in a case involving telephone interconnection in New York state.⁹⁴

Independent opposition to interconnection

In Norwalk, Ohio, the independents themselves suspended the litigation – not because they feared losing, but because they feared they might win. According to an intelligence report gathered by F.R. Colvin, a Bell agent working undercover in the independent ranks, most independent exchange operators in Ohio opposed compulsory interconnection.⁹⁵ The Norwalk case was the first item of business when the Ohio Independent Association met in March of 1896. The Ohio meeting was also attended by a delegation from Indiana. According to Colvin's sources, “every delegate at the meeting rose one after the other and roasted Mr. Graham [the Norwalk Co. representative] alive for commencing the litigation.”⁹⁶ Already, the Ohio independents had exchanges in seventy five small towns. Bell, in contrast, had only 31

⁹³ Opinion of Judge Siebecker, *Dane County Telephone Co. v. Western Union Telegraph Co.* (document undated—decision made Mar. 18, 1896), AT&T-BLA, Box 1298.

⁹⁴ The Judge held that a reasonable construction of the common carrier statute in New York did not require one telephone system to supply connections with its system to another company enabling the latter to utilize the connected system as part of its own on payment of the nominal sum required of ordinary subscribers. *Syracuse Standard*, July 2, 1898. Box 1166, AT&T-BLA.

⁹⁵ F.R. Colvin to President Hudson, Apr. 8, 1896. Box 1298, AT&T-BLA.

⁹⁶ *Ibid.*

exchanges in Ohio towns with populations under 10,000. Most of the towns with non-Bell exchanges were connected, or were in the process of being connected, with independent toll lines. If the Norwalk Company won its case, they feared, the Bell Company would be able to demand and get access to those lines. That would increase the scope of Bell's access in the state and undermine the incentive for telephone users to subscribe to an independent exchange. According to Colvin, "the whole convention to a man then entreated Graham to have Judge Wickham withdraw the suit."⁹⁷ After some soul-searching, Graham returned to Norwalk and became a dues-paying member of the state independent association. The Ohio independents pursued a strategy of building exchanges and toll lines in areas not served by the Central Union Company.⁹⁸ Nothing more was heard of the Norwalk Company's lawsuit.

The Ohio meeting was not an isolated incident but came to typify the attitudes of the organized independent movement. In the years to follow, numerous state independent associations passed resolutions against interconnection with the Bell system.⁹⁹ In later attempts to compel interconnection by legislation, Bell and independent forces were usually united in their opposition.¹⁰⁰

Proposals to interconnect Bell and independent telephone exchanges continued to surface sporadically in various states throughout the 1890s and early 1900s. They failed because the weight of legal precedent was against them and because of the political opposition of the Bell and independent interests. From the skirmishes of 1894 to 1996 emerged a common doctrine regarding the effects of connecting competing telephone companies. Its essential tenets were accepted by both the Bell companies and by most of the organized independent movement and were bolstered by the U.S. Supreme Court's interpretation of the Fifth Amendment.

Access competition as property rights doctrine

The basis of that doctrine was a distinct way of applying the concept of property rights to the telephone business. The telephone companies were asserting ownership over the relations of access created by their toll lines and exchanges. For both Bell and independent, "competition" meant separate systems supplying different subscriber universes, each vying with the other to attract customers. The subscriber universe itself was their most important product—the valuable resource they offered to sell to the public. Competition was a matter of making that resource better than one's rival's, which in that case meant more universal. Interconnection destroyed that form of rivalry by eliminating the differences in their access universes. It thoroughly undermined the competitive advantage to be gained by attracting new subscribers, building competing exchanges, and constructing toll lines. J.W. Gleed of Bell's Missouri and Kansas Co., speaking against a physical connection law proposed to the Missouri legislature in 1907, put it that way:

⁹⁷ *Ibid.*

⁹⁸ The Secretary of the Ohio Association wrote a letter to every independent exchange "particularly touching the necessity of hurrying the construction of toll lines connecting towns so small as not to be reached by the Central Union Co." Colvin, *Ibid.*, at 8.

⁹⁹ C.A. Pleasance, *The Spirit of Independent Telephony* 81 (Independent Telephone Books 1989).

¹⁰⁰ *Telephony Magazine*, the voice of the independent interests, actually reprinted in full the testimony of a Texas Bell manager against compulsory interconnection.

My opponent has built up a telephone system of 1,001 subscribers. I have an exchange in which each subscriber has access to 6,000 other persons. Now assume this [physical connection] law to have taken effect. Where before my competitor owned an exchange which gave each of his subscribers access to 1,000 persons only, now my competitor owns an exchange in which each subscriber has access to 7,000 persons. What I may call the 'access value' of my competitor's exchange has simply been multiplied by seven...without a penny of expense or a particle of increase in his rate.¹⁰¹

The Ohio independents' reaction to the Norwalk case makes it clear that they too conceived of telephone competition in those terms. Their plan was to control telephone connections to towns neglected by Bell and eventually to attract subscribers away from Bell in other areas through its control of these connections. Even the independents who supported compulsory interconnection comprehended the issue in the same terms. Bell, they reasoned, was politically unpopular. It won subscribers because its lines reached places and subscribers that the independents' did not. If telephone subscribers did not have to choose between two mutually exclusive subscriber universes, one controlled by Bell and the other controlled by the independents, but could instead obtain access to Bell toll lines and subscribers while subscribing to an independent exchange, Bell would lose most of its customers. One independent spokesman predicted that with interconnection, "we can obtain at once every one of their exchange subscribers."¹⁰²

American Bell felt the same way about its toll network linking exchanges in the larger cities. Giving independents access to its more extensive toll network would eliminate its leverage over the subscription decisions of telephone users in the local exchange. As a commodity around which property boundaries could be drawn, however, access had an unusual feature. When independent companies subscribed to a Bell exchange and then connected the Bell line into their own switchboard, they acquired the ability to sell access to Bell subscribers. Technically, there was no distinction between Bell's sale of access to a normal customer of the exchange and the sale of exchange access to a competing telephone company, which could then profit from the resale of the subscriber set Bell had created. In order to maintain system boundaries, a legally enforceable distinction between those two classes of users had to be drawn. From a property rights standpoint, the situation was analogous to copyright and patent protection. Patent and copyright laws allow the creators of new information to sell access to it without losing their proprietary control of it. In prohibiting unauthorized reproduction of copyrighted material or unlicensed use of patented inventions, intellectual property law distinguishes between buyers who benefit from the use of the information itself and those who use the access to information created by the initial sale to profit from its resale. Both sides' unwillingness to interconnect stemmed in part from their recognition of that unique economic characteristic of telephone access. Merging the subscriber universes of competing telephone companies via interconnection, in their view,

¹⁰¹ J.W. Gleed, *Missouri and Kansas Telephone Company*, "Argument Against the Proposed Law Compelling the Physical Connection of Telephone Systems," 22 pp., printed, submitted to the Missouri Legislature 1907. AT&T-BLA.

¹⁰² David Gabel, *The Evolution of a Market*, Ph.D. dissertation, University of Michigan 346 (1987).

undermined their control of the basic resource on which their business was founded: communications access.

To the Bell interests, interconnection would encourage “all sorts of small, parasitic companies [to] spring up to sap the revenues of large companies already established.”¹⁰³ The independent opponents of interconnection emphasized not parasitism by small companies, but interconnection's deleterious effects on their own attempts to construct an alternative system. If Bell subscribers could obtain access to independent exchanges through Bell toll lines, who would invest in and who would subscribe to an independent long distance system? If a large city occupied by a Bell exchange was enabled to gain access to the surrounding towns dominated by the independents, why would the city franchise a competing exchange? By the end of 1897, most of the organized independent operators were willing to take up the gauntlet thrown down by Bell's refusal to connect with them. They confidently looked upon the thousands of small communities lacking Bell exchanges and the hundreds of new independent exchanges springing up in them. In the two hundred cities with dual service, they saw independent exchanges undercharging Bell companies and attracting as many subscribers in six months as the Bell exchange had gathered in the previous seventeen years. They knew they were up against a powerful foe; their public pronouncements and trade publications exhibit that blend of strident defiance and paranoia typical of an underdog unsure of its success. By embracing access competition as their *modus operandi*, however, the independents signaled their willingness to make it an all-or-nothing battle. By 1897, the course of telephone rivalry was set for the next fifteen years.

¹⁰³ J.W. Gleed, *supra* note 30.

6

THE DYNAMICS OF ACCESS COMPETITION

THE REFUSAL OF THE BELL and independent telephone interests to interconnect gave the ensuing business rivalry a specific form. Competition became a matter of whose network provided access to the most people within a particular user's community of interest. In the more technical language of chapter 3, the networks competed on the basis of their scope, or the size of their bundle of access units. That kind of competition gave the networks strong incentives to tap new user groups, enter undeveloped areas, lower access prices, and interconnect with non-competing networks. Caught up in that dynamic, Bell and the independents were propelled into a race to achieve universality. The dramatic expansion of telephone service did not occur because of altruistic motives, grand social visions, or government policy, but was literally forced upon the contestants by the dynamics of access competition.

This chapter recounts the progress of telephone exchange competition from 1894 until 1907. Its object is to document the linkage between access competition and the pursuit of universality. In accordance with the book's thematic emphasis, the growth of dual service is quantified by counting the *number of communities with competing exchanges*, as well as the gross number of Bell and independent exchanges and telephones. That data has not been published in prior accounts of the competitive period.¹⁰⁴ The presence or absence of competing exchanges in American cities is the best indicator of the growth and decline of competition. Only in cities served by both Bell and independent telephone exchanges did consumers actually have a choice of suppliers. Moreover, some independent companies connected with Bell, and therefore their telephones, though independent in manufacture, actually were united with the Bell system in the access competition.

Phase 1: Filling the gaps, 1894-1898

In the first phase of the competition, the independents achieved a quick and ultimately unbreakable foothold in the marketplace by filling the vacuums left by Bell's development strategy. The geographic distribution of independent telephony, and the market segments in which they succeeded, faithfully reflected the gaps between supply and demand left by the Bell system.

¹⁰⁴ Telephone Census, 1902, 1907, 1912; FCC Telephone Investigation, 1939; Brock, 1981; Lipartito, 1989. Those sources typically use the number of Bell and independent *telephones* in operation as the index of competition and market share.

From 1894 to 1898, 1,074 commercial, independent telephone companies began operation in the United States.¹⁰⁵ Hundreds more were started but never survived long enough to be counted by the 1902 census. Although they are often stereotyped as rural, mom-and-pop operations, the first wave of independents were a heterogeneous lot. They were formed in major urban areas,¹⁰⁶ in small towns, in mid-sized cities, and in rural areas. Competition developed in the industrialized East, the rural Midwest and South, and the West. The fate of those different approaches to competition differed markedly, however. Early attempts to occupy major cities were notably unsuccessful.¹⁰⁷ Most of the tiny rural farmer lines, on the other hand, came into existence five to seven years later.¹⁰⁸ The success and longevity of independents varied greatly by region as well.

The first wave of independents were concentrated in what the Census Bureau labeled the North Central part of the United States, which included the states of Ohio, Indiana, Michigan, Illinois, Wisconsin, Iowa, Missouri, Nebraska, Kansas, Minnesota, North Dakota, and South Dakota. Of the 740 commercial independent systems that were started between 1894 and 1897 and that survived until 1902, 424 (57.3 percent) were concentrated in those eleven states.¹⁰⁹ By way of contrast, only six surviving independent systems had been started in the states of Massachusetts, Connecticut, and Rhode Island, the more urbanized, industrialized areas of the East.

The North Central region had been neglected by the Bell system for three reasons. One was its aversion to rural small towns and its concentration on cities. In the three New England states dominated by Bell, 90 percent of the population lived in areas classified by the U.S. Census as “urban;” i.e., with a population of 2,500 or greater. In the North Central states, on the other hand, only 30 to 50 percent lived in cities of that size or greater. Bell’s bias was regional as well as urban. Although its grand plan was to become a national network, in actuality Bell was still rooted in the northeast. Its network had started in New England and gradually spread south and west. In 1894 about 35 percent of all the telephones in the United States could be found within a 300-mile

¹⁰⁵ Bureau of the Census, ELECTRICAL INDUSTRIES CENSUS, Table 10, 9 (1902). That statistic understates the amount of entry because it only counts telephone systems which remained in operation until 1902. Depending on the size of the community, the failure rate of independent exchanges ranged from 15 percent to 40 percent.

¹⁰⁶ The Mercantile Electric Co. announced plans to establish a telephone exchange for bankers and brokers in downtown New York City. The New York and Eastern Telephone Co. applied for franchises in Brooklyn and New York. See 24 ELECTRICAL REVIEW 175 (Apr. 11, 1894). The Drawbaugh Telephone and Telegraph Company, the Mutual Automatic Telephone Company and the Clamond Telephone Co. all took steps to establish themselves in Philadelphia. Between 1893 and 1898 four companies were organized to gain a competing franchise in Chicago.

¹⁰⁷ For more on the fate of dual service in the cities, see the section entitled *Dual Service in the Cities* of this chapter.

¹⁰⁸ Independent telephony is often associated with the small mutual companies and farmer lines that brought the telephone to rural America during the early 1900s. Although both movements were predicated on the expiration of the Bell patents and their interests often converged, their identities should not be confused. According to the 1902 Census of telephones and telegraphs, 774 of the new telephone systems that began operation from 1893 to 1897 were commercial independents, while only 84 were mutual companies. After 1900, in contrast, new mutual systems sprang up at the rate of 200-300 per year. Most of the 100,000 or so independent telephones in operation by the end of 1897 were in small towns and cities, not in the rural areas per se.

¹⁰⁹ Bureau of the Census, ELECTRICAL INDUSTRIES CENSUS, Table 10, 9 (1902).

radius of Boston.¹¹⁰ When the patents expired, AT&T's long distance lines were just beginning to extend into Missouri, Michigan, Kentucky, and the South.

The geographic bias was also an inadvertent product of the Bell organization's management structure. Most of the states of Ohio, Indiana, Illinois, and Iowa were included in the territory of the Bell licensee company known as the Central Union Company (see figure 6-1). The population in Central Union territory was dispersed into thousands of farms and small and medium-sized market towns. But it also included major cities such as Columbus, Toledo, and Indianapolis. Only one licensee company was responsible for developing what the Bell organization apparently thought of as an undifferentiated hinterland. By way of contrast, the Bell organization had given each of the metropolitan areas centered on Chicago, Cleveland, and Cincinnati their own individual licensee company. Serious underdevelopment in Central Union territory was the result.¹¹¹ Not coincidentally, the Central Union territory became the stronghold of the independent telephone movement. The strongest state associations and most ambitious operating companies originated in that region. Dual service competition and the independent share of telephones reached their highest levels in Central Union territory.

FIGURE 6-1



¹¹⁰ EXCHANGE STATISTICS 1894, AT&T-BLA.

¹¹¹ One AT&T manager, Thomas Doolittle, recommended dividing the Central Union territory into three or four territories. A. R. Chappelka, History of Independent Telephone Operating Companies in the United States, Memorandum for Messrs. Dewey, Ballantine, Bushby, Palmer, and Wood, Affirmative Topic #10, Civil Action #17-49 (1956).

Just as important as Bell's uneven geographical coverage was the huge gap in the market for local and regional connections left by Bell's pursuit of a national system modeled on the telegraph. Bell's licensee companies had concentrated their attention on exchange development in major urban areas, while AT&T had concentrated on supplying intercity long-distance communications. The most successful independents, in contrast, concentrated on providing broader coverage of a county or a multi-county market area. They built exchanges in small towns where there were no Bell exchanges, then tied them together with short-haul toll lines. Or, they built exchanges in mid-sized cities with an established Bell exchange, and supplied superior telephone access to the surrounding areas, which had been ignored by Bell. As table 6-1 shows, most of the dual service cities in Phase 1 were smaller cities (pop. 5,000-20,000) that served as communication nodes for the agricultural economy. While Bell had been laboring to make it possible for New York to talk to Chicago, for Boston to talk to Philadelphia and Pittsburgh, the independents were connecting towns like Massillon, Ohio, with the nearby tributary towns of Dalton, Beach Grove, Canal Fulton, and Navarre.

TABLE 6-1
DUAL SERVICE BY CITY SIZE, 1894-1901

Entry date	Large >50,000 pop.	Medium 20-50,000 pop.	Small 5-20,000 pop.	Total
1894 # cities	2	4	23	28
% Surviving after 5 yrs:	0	50%	74%	68%
1895-1897 # cities	16	43	161	220
% Surviving after 5 yrs:	81%	86%	87%	86%
1899-1901 # cities	20	29	136	185
% Surviving after 5 yrs:	95%	97%	96%	96%

Source: Chappelka, 1956

A typical example can be drawn from West Virginia, where new companies started exchanges in the rapidly growing towns of Grafton, Fairmont, Clarksburg, and Morgantown in 1895. The population of those cities in 1900 was 5,650, 5,655, 4,050, and 1,895, respectively.¹¹² The towns were situated in a thirty-square mile area, each one being about ten to fifteen miles apart. Although Bell exchanges had been started recently in all of those locales, the independents were able to attract subscribers, according to the Bell manager, "by reason of their [the independents] great extension of toll lines." "We cannot afford to cover that territory with toll lines of the character of construction which we have adopted as a standard," the manager wrote. He concluded: "I must confess to a feeling of discouragement, and am at a loss to determine what we can do ... to break down the opposition in our territory."¹¹³ The much-vaunted superiority of the

¹¹² 1900 Census. By 1910 they had all grown substantially: to 7,563, 9,711, 9,201 and 9,150.

¹¹³ J. King Goodrich to C. J. French, August 26, 1896. AT&T-BLA.

Bell long-distance system was of little help here. What was needed most, from the point of view of average telephone subscribers, were local and regional connections to the places with which they had regular commerce.

That this kind of development had the capacity to make serious inroads into Bell's business had become obvious by the end of 1896. Companies such as The Western Electric Telephone Company of Britt, Iowa, the Western Illinois Telephone Co., and The Farmer's Telephone Co. of Massillon, Ohio, constructed extensive networks of grounded iron toll lines connecting rural subscribers to city and town exchanges. The Farmer's Company used its control of access to rural telephone users in Stark County to establish a successful exchange in Massillon (pop. 12,000), the county's second largest city.¹¹⁴ The Home Telephone Company of Ft. Wayne, Indiana, a substantial city of 45,000, was connected with independent exchanges in over fifty towns by the middle of 1896.¹¹⁵ That it was access competition which provided the incentive to reach those areas is clear. In 1896, for example, the Secretary of the Ohio Independent Telephone Association wrote a letter to every independent exchange owner urging them to "hasten the construction of toll lines connecting towns so small as not to be reached by the Central Union [Bell licensee] Company."¹¹⁶

Aside from undersupplying regional connections in the country, Bell had often neglected connections between large cities and their own suburbs and tributaries. Believing that small exchanges in less populous communities could not support themselves, Bell usually just ran long-distance circuits out from a larger city and cut in one public station in each small town along the way. Such perfunctory service made telephone communication less than convenient. Users in those locations had to leave their office and go to the public station; and while they could place calls to other cities on the Bell network, it was not possible for people in other cities to call them. Worse, a single circuit serving public stations in five to ten towns was technically the equivalent of a gigantic party line. A call in any one of the towns along the way tied up the line for all of the towns along the circuit. Anyone talking on the line had to contend with constant interruptions from people in other towns who picked up the phone and tried to signal the central office.¹¹⁷ In the New Jersey and Pennsylvania suburbs of Philadelphia, lines of ten, fifteen, or twenty people waited an hour for a connection to Philadelphia and two and a half hours for an open circuit to New York.¹¹⁸ Bell's competitors thrived on the inadequacy of toll facilities and organization. Many suburban cities in New Jersey and eastern Pennsylvania fell into the hands of the independents as a result.

The state of Michigan affords an example of independent development compressed into an unusually short period of time. By 1895, competing exchanges had been established in thirteen of the state's thirty-nine cities with a population in excess of 5,000. All but one of the cities (Kalamazoo, pop. 24,000) were mid-sized towns with populations between 5,000 and 20,000. Fueled by lower rates, better rural connections, and public hostility to Bell, those exchanges met with quick success in attracting subscribers. In Cadillac (pop. 5,000), Bell held on to only fifteen subscribers, compared to the independent's 120. In Ispsheming (pop. 13,000), Bell had 100

¹¹⁴ 24 ELECTRICAL REVIEW 293 (June 13, 1894).

¹¹⁵ 26 ELECTRICAL REVIEW 35 (July 15, 1896).

¹¹⁶ F. R. Colvin to President Hudson, Apr. 8, 1896, Box 1298, AT&T-BLA.

¹¹⁷ Thomas Doolittle to President Hudson, June 27, 1899. Box 1330, AT&T- BLA.

¹¹⁸ Thomas Doolittle, Report on toll matters, to President Hudson, Sept. 11, 1899.

subscribers at the end of 1897, the independent 400. Encouraged by the success of smaller cities, independent entrepreneurs organized new companies to serve the state's two largest cities, Grand Rapids and Detroit. The Citizens Co. of Grand Rapids grew from 400 subscribers at its opening in mid-1896 to 2,300 by the end of 1897, surpassing the number of Bell subscribers by 1,000. The path to a Detroit franchise was opened by a reform mayor.¹¹⁹ The independent Detroit Telephone Co., which began operating in December 1896, quickly attracted 5,000 customers by offering monthly flat rates half the size of the Bell company's. (Those rates proved troublesome, however, as the exchange faced bankruptcy only three years later.)

Then, early in 1897, the New State Telephone Co. was organized to "spread low-rate telephone service to all parts of the state," beginning with the towns surrounding Detroit.¹²⁰ Both the New State Co. and the Citizens Co. eventually assumed the role of a long-distance company, connecting their dispersed exchange holdings in the state with high-grade, metallic circuits. Although independents usually entered the business using lower quality grounded iron circuits, successful commercial companies such as the New State upgraded to higher quality metallic circuits at the first opportunity. By 1898, New State Co. lines connected Port Huron, Grand Rapids, Lansing, Grand Ledge, and Lake Odessa.¹²¹ By 1899, thirty-six of the thirty-nine Bell exchanges (92 percent) faced direct competition. The Detroit independent exchange failed in 1900, and, along with the Kalamazoo exchange, was sold to the Bell interests. A new competing exchange was established in Detroit only two years later, however. Never financially healthy, it struggled along with about 20 percent of the market but was nevertheless maintained by the independent interests in order to provide termination in the state's largest city. The Grand Rapids-based Citizens Company, on the other hand, dominated its section of the state until its merger with the Bell system in 1916. From 1900 to 1907, the number of Michigan communities over 5,000 in population with dual service stayed at 70 percent or above.

The independents did not suffer much from their lack of connections to the Bell system-not yet. On the contrary, their exclusion from Bell exchanges and toll lines encouraged them to develop a critical mass of users by constructing toll lines and new exchanges in areas underserved by Bell and organizing themselves in ways that would facilitate the interconnection of all anti-Bell users. The supply of telephone facilities was so far below the demand for them that there was plenty of room for carving out new subscriber universes. During the 1894-1898 period, the number of independent subscribers doubled every eighteen months. Much of that torrid rate of increase stemmed from the establishment of new exchanges. Independent exchanges that already existed, however, usually doubled in size each year for the first few years of their existence. When independent exchanges failed, and many did, it was rarely for want of subscribers. By 1902 there were 1.3 million Bell telephone subscribers, more than five times the number that had existed in 1894. But there were nearly a million users of independent telephones.

¹¹⁹ The mayor declared that since telephone service cost \$25 per year in Canada and \$65 per year in Detroit, he would drive rates down or drive the telephone company out of the city. 25 ELECTRICAL REVIEW 118 (Sept. 5, 1894).

¹²⁰ 30 ELECTRICAL REVIEW 87 (Feb. 24, 1897).

¹²¹ 31 ELECTRICAL REVIEW 64 (Aug. 8, 1897); 31 ELECTRICAL REVIEW 146 (Sept. 22, 1897).

TABLE 6-2
GROWTH OF DUAL SERVICE COMPETITION, 1894-1907

	#Public Exchanges		#Telephone		Dual Service [^]	
	Bell	Independent	Bell+ Independent connecting	Independent non- connecting	#Places >5k	(%)
Jan 1, 1894	1,409	*98	266,000	*15,000	28	2%
1897	1,799	*1,700	415,000	*100,000	220	23%
1902	3,005	3,400	1,401,021	969,845	449	55%
1904	3,365	*4,400	2,399,213	1,348,000	483	60%
1907	4,889	5,400	3,958,489	2,279,578	466	57%

Sources: Telephone Censuses, 1902, 1907; Chappelka, 1956, Telephony, misc issues; ABT Co. and AT&T Annual Reports.

* Estimates based on 1902 Telephone Census. Independent exchanges do not count rural farm lines or exchanges with incomes less than \$5,000.

[^] Note: dual service points counted only in communities with population of 5,000 or more. Percentages = percentage of cities with population of 5,000 or more.

Phase 2: System overlap, 1898-1907

In the second phase of the competition, from 1898 to 1907, dual service competition was pushed from its stronghold in the middle-sized towns and previously undeveloped areas to the extremes of urban and rural America. Although, as noted in chapter 3, access competition makes perfect duplication of service impossible, it nevertheless gives the competing networks an incentive to match each other's scope as closely as possible. Thus, Bell and the independents entered a period of growing system overlap. In order to remain competitive with the independents, the Bell system extended its presence to small towns and rural areas, partly through new construction and partly by interconnecting with noncompeting independents. At the same time, the independents attempted to extend their access to major cities with established Bell exchanges.

From 1897-1904 the number of communities greater than 5,000 in population with competing exchanges shot up from 23 percent to 60 percent, and stayed over 55 percent until 1912. As dual service competition spread, price competition and service improvements in the affected cities typically doubled telephone users within a year. As that occurred, both sides raced to extend connecting service to new user groups, such as farmers and residences. Technologies which lowered the cost of access, such as party lines and automatic switches, were rushed into operation.

Dual Service in the Cities

Early independent efforts to compete in large cities had almost always failed. A variety of snares and pitfalls awaited those who ventured directly into Bell's urban strongholds. The political

maneuvering required to obtain a franchise in a major city was complicated and expensive.¹²² Heavy capital investment was required to match the facilities of the Bell system. In New York and Boston, where Bell had lavished most of its corporate attention, service was reasonably good. If there were complaints about the telephone company, they were limited to the high price of service. Under those circumstances the incumbent could undermine the demand for a new company by making rate concessions. The introduction of measured service in New York city in 1894 decreased the charges for most users, making telephone service available to small users for as little as \$8 a month. The number of subscribers in New York city more than doubled, going from 9,000 to 21,000, in the four years following the introduction of measured service.¹²³

When the first wave of independents did manage to establish a presence in a major city they were usually ill-prepared to handle the complex financial and management practices and rate structures required of a large exchange. Both of the independent exchanges started in 1894 in cities with populations greater than 50,000 failed within five years. The Home Telephone Company of Baltimore, organized in 1896, offered rates less than half those of Bell but became insolvent after three years. It was sold to a new company which had to rebuild the plant and raise rates by 57 percent.¹²⁴ The same fate befell the independent exchange in Detroit.

In contrast, large urban exchanges that were the culmination of four or five years of prior development in the surrounding areas generally turned out to be the financially strongest and longest-lasting independent operating companies. Buffalo, St. Louis, Indianapolis, Kansas City, Louisville, and Minneapolis-St. Paul all followed that pattern. A competing exchange was not established in Buffalo, New York, until 1901, but by mid-1896 the Electrical Review reported that all of the principal towns surrounding that city were connected by independent systems.¹²⁵ Kansas City did not admit an independent exchange until 1902, but by 1897 independents were thriving in Leavenworth, Topeka, and Ft. Scott, Kansas; and St. Joseph, Carthage, Webb City, Joplin, and Nevada, Missouri; and many other smaller towns within 150 miles for whom Kansas City served as the regional center.

Thus, from 1898 to 1903 a wave of new competition swept into the urban centers. It was the Bell strategy in reverse—a case of the periphery advancing on the center.¹²⁶ In the intervening years the independents had gained more than access leverage in the country-side; they had also gained management and technical experience. Table 6-3 shows the starting dates of independent exchanges in cities over 50,000 in population. Of the cities over 100,000 in population, only Boston, New York, Washington D.C., Cincinnati, Milwaukee, and Denver managed to retain a

¹²² In Philadelphia, the franchising of the Mutual Automatic Telephone Company was quashed when politicians were accused of exchanging their influence for stock in the company. In Brooklyn, the city council franchised an independent company three times only to have it vetoed by the mayor each time. 29 ELECTRICAL WORLD (Aug.

19, 1894).

¹²³ A residential user paid \$8 to \$10 per month and 15 cents for the first 600 calls. EXCHANGE STATISTICS 1894, AT&T-BLA.

¹²⁴ 34 ELECTRICAL REVIEW 26 (Jan. 11, 1899).

¹²⁵ 29 ELECTRICAL REVIEW 36 (July 15, 1896).

¹²⁶ As an independent spokesman put it, where Bell had worked from the top down, the independents developed from the bottom up. Harry MacMeal, THE STORY OF INDEPENDENT TELEPHONY 26 (1934).

single telephone system throughout the competitive period. Of those, only Washington and Cincinnati refused to franchise a competitor; the other cities authorized a new entrant but the independent failed to raise the capital needed to build a competing exchange.

TABLE 6-3
STARTING DATES OF DUAL SERVICE IN CITIES OVER 50,000 IN POPULATION
Numbers in Parentheses indicate city's population rank in 1900 census.

1898	
(7) Cleveland, OH	(52) Wilmington, DE
1899	
(43) Atlanta, GA (21) Indianapolis, IN (12) New Orleans, LA (4) St. Louis, MO	(2) Chicago, IL (19) Minneapolis, MN (11) Pittsburgh, PA (68) Wilkes-Barre, PA
1900	
(27) Allegheny, PA (65) Duluth, MN (24) Rochester, NY (62) Savannah, GA (30) Syracuse, NY	(28) Columbus, OH (55) New Bedford, MA (64) San Antonio, TX (23) St. Paul, MN
1901	
(8) Buffalo, NY (45) Dayton, OH (38) Scranton, PA	(51) Camden, NJ (33) Fall River, MA
1902	
(40) Albany, NY (69) Harrisburg, PA (18) Louisville, KY (50) Reading, PA (26) Toledo, OH	(13) Detroit, MI (22) Kansas City, MO (3) Philadelphia, PA (48) Seattle, WA (56) Troy, NY
1903	
(36) Los Angeles, CA (54) Oakland, CA (60) Utica, NY	(37) Memphis, TN (61) Peoria, IL
1904	
(55) New Bedford, MA (63) Salt Lake City, UT	(70) Portland, ME

Quincy, Illinois, typified some of the causes behind the independents' advance into the cities. A city of 36,000 in 1900, Quincy sits on the western edge of Illinois on the bank of the Mississippi river. At the time of patent expiration, the 500 subscribers of the Bell exchange there could call Springfield (102 miles away) and Peoria (132 miles away), but no other places within the city's own county of Adams, nor any exchanges in neighboring Brown, Hancock, and Pike counties. New, independent exchanges grew up in those areas very rapidly after 1894. They

remained isolated for only a year, as in 1895 the Western Illinois Telephone Company of Augusta began to construct toll lines connecting the independents in the region. In January of 1896 the Western Illinois Co. obtained the city's permission to bring its lines into the building of a grocery supply company in Quincy, where a toll telephone was set up. From contemporary newspaper accounts it is clear that the line served small town merchants in the farm counties who ordered supplies from wholesalers in Quincy.¹²⁷ That short-distance service was very popular with the local merchants and farmers.

The convenience of the Quincy telephone line was noticed immediately by the wholesale merchants of Newark, Missouri (pop.400), a town 40 miles to the west. They began to raise money to construct a line crossing the Mississippi river linking Quincy, Newark, and thirty other points in Lewis, Knox, and Marion counties, Missouri. Word of the proposed new telephone line spread through the county newspapers and was received with great enthusiasm.¹²⁸

The money was raised by local stock subscriptions and by advance purchases of toll tickets. A submarine cable was laid before the end of the year. By March, 1899, the Western Illinois Co. owned exchanges at Macomb, Rushville, and Carthage, Illinois. It operated 700 miles of toll line in six counties and maintained toll stations at fifty-nine towns. Through its submarine cable across the Mississippi river it connected with points in Missouri and Iowa; another cable across the Illinois river at Beardstown linked users to the farming areas around Springfield.¹²⁹

Still, there was no independent exchange in Quincy itself, the largest city within 100 miles. As the Bell exchange there was closed to independent connections, the only way to obtain access to the independent systems surrounding the city was to install a private line and toll station on private business premises. The number of those private, independent toll stations in Quincy grew from one in 1896 to at least eight in 1903, illustrating the growing demand for independent connections.¹³⁰ Those private lines were more expensive than a subscription to an exchange, and were becoming increasingly difficult to set up because the lines had to pass over private property in order to avoid the need for a franchise. The burgeoning independent presence outside the city lent support to the idea of establishing a competing exchange. Several began to approach the city for a franchise. Soon Quincy was forced to debate the merits of dual service.

Independent control of a majority of telephone users outside a city did not guarantee that it would franchise a competing company. In cities where public sentiment was overwhelmingly against Bell (as in Indianapolis or Detroit), or where state laws made it possible to enter the city without a municipal franchise (as in St. Louis), there was little debate and only a year or two of preparation was needed. In other cities, (e.g. Chicago and Milwaukee) public debates about franchising a new company dragged on for years. Quincy was one of the latter cases.

¹²⁷ QUINCY HERALD, Jan. 10, 1896.

¹²⁸ QUINCY HERALD, Feb. 10, 1896.

¹²⁹ THE WESTERN ELECTRICIAN, Mar. 11, 1899, at__.

¹³⁰ Theodore Vail, *Telephone Pioneers of America*, in THE STORY OF THE TELEPHONE IN QUINCY (AT&T L&R).

Public discussion of dual service seems to have begun in 1899. Opponents praised Bell's "excellent service" and complained about the inconvenience of duplicating subscriptions for businesses.¹³¹ Supporters asserted the need to obtain access to "country lines."¹³² After five and a half years and at least three separate applications to establish competing exchanges, Quincy's City Council franchised the Quincy Home Telephone Co. on September 19, 1904. Quincy Home was the brainchild of Charles Wheat, a local promoter who managed to win the support of several prominent citizens. The company opened an automatic exchange system in the summer of 1906. It replaced many of the older independent toll lines with copper metallic circuits and arranged interconnection with the association of small independents. In the fall of 1906 it organized a separate company, the County Home Telephone Co., to acquire and connect independent lines in the farm areas. In the first year after the entry of the Quincy Home Co., the presence of a competing exchange did more to stimulate new users than to take subscribers away from Bell. The Bell exchange, which had been growing by about 300 a year since 1902, canvassed for new subscribers and grew at the same rate.

In larger cities, the dual service debate centered on rates. City councils approached competition as a way of controlling or reducing charges, often contrasting it with municipal rate regulation or measured service as a means to that end. Cities also used the threat of a new franchise to attempt to extract rate concessions from the Bell company. To the independent movement, of course, building an access universe comparable to Bell's was the paramount consideration. The state associations lobbied city governments to open their inhabitants to an independent exchange with the argument that businesses in the city would benefit from the availability of connections to their subscribers. In Oregon and Washington, independent promoters who had been blocked by city governments obtained franchises by means of the public initiative and referendum.¹³³ Still, an independent company attempting to enter a city was forced to make rates the basis of their franchise pitch, promising prices half that of Bell's and a variety of free services to the city government. The outcome depended on how satisfied the local business community was with the Bell service.

Between 1893 and 1906, nine different companies were organized to provide competing telephone service in the city of Chicago.¹³⁴ The early applicants (1893-1898) vanished with little to show for their efforts. After 1898, however, the prospect of competition could hardly be ignored. There were more than 300 exchanges unconnected to the Bell system in Illinois and Indiana

¹³¹ QUINCY HERALD, Mar. 20, 1899 (reprinted editorial from the *Chicago Evening Post*: "Of what advantage will a telephone rate half as large as the present be, if one has to have two telephones in order to keep in touch with the business world? That is a problem which is troubling a good many people just now. Of course the answer is that in time one company or the other would be forced out.")

¹³² "An exchange at Quincy with 200 or more of the principal business houses... would be of immense benefit to Quincy merchants, besides a matter of greatest convenience to the country merchants and farmers who do their trading almost exclusively in Quincy." Letter to the editor, QUINCY WEEKLY HERALD, Dec. 12, 1902, at 134

¹³³ 12 TELEPHONY 15-17 (July 1906).

¹³⁴ The Chicago Twin Wire Long Distance Telephone Company, 1893; the Cosmopolitan Electric Company, 1895; the Commonwealth Electric Company, 1897; the Independent Telephone Company, 1898; S. J. Heafield, 1898; Illinois Telephone and Telegraph, 1899; the Hyde Park District Telegraph and Electric Company, 1901; the United Telegraph, Telephone, and Electric Company, 1901; and the Manufacturer's Telephone Company, 1906. Illinois file, AT&T L&R.

clamoring for connections to the city.¹³⁵ There is also evidence that the business community thought Bell's telephone service was too expensive. A bill that slashed telephone rates in Chicago by more than half passed the Illinois House unanimously in 1899.¹³⁶ As the newspapers pointed out, the bill was a little more than a public relations gesture by the legislators; its rate reductions were so extreme that it was certain to be invalidated by the courts. But it did allow the politicians to appear as if they were doing something about telephone rates, which evidently were the source of widespread discontent in Chicago.

Three well-organized independent attempts to enter Chicago were mounted between 1899 and 1906. They resulted in one partial victory and two defeats. The Illinois Telephone and Telegraph Co. was franchised Feb. 20, 1899. ITT was the owner of the Automatic Electric manufacturing company. Using the slogan "Prompt, Private, Perfect," it offered automatic switching of the Strowger type and all single-line metallic circuit service. The company's rates were usage-sensitive, charging for each switch up to a maximum of \$85 for businesses and \$50 for residences, well below the Bell rates. Those rates were fixed as the maximum in its franchise. It is not clear when its service actually began, but by August 1906 it had about 6,000 subscribers.

ITT never lived up to its potential as a competitor of Bell, however. The financial interests backing the project were really interested in developing an underground subway system to transport mail and parcels. The telephone business was seen as an easier way to get the underground tunnel privileges needed for that purpose.¹³⁷ In 1905 it changed its name to the Illinois Tunnel Company. The Tunnel Co. had to keep up its telephone business to prevent its franchise from being invalidated, but never aggressively developed it. It also failed to connect with the independent toll lines and ex-changes outside Chicago until 1911.

The United Telegraph, Telephone, and Electric Co. was franchised to serve Hyde Park before that neighborhood was absorbed by the city of Chicago. Its exchange at 47th and Cottage Grove operated 600 telephones. In December 1900 an ordinance allowing the United Co. to extend facilities throughout Chicago was introduced in the City Council.¹³⁸ In 1906 another new company with solid backing from the independent movement, the Manufacturers Telephone Company, sought a franchise. In both cases the proposals led to lengthy hearings before the city council committee on gas, oil, and electric light.

The reports that emerged from those hearings tended to support the view that it was better to reduce rates through municipal regulation or by introducing measured service than by competition.¹³⁹ Both competing franchises were denied. An ordinance imposing detailed regulation of rates and service upon Bell's Chicago Telephone Co. was passed November 6, 1907.¹⁴⁰ The

¹³⁵ S. P. Sheerin, quoted in the CHICAGO RECORD-HERALD, June 27, 1901.

¹³⁶ The Western Electrician, Mar. 25, 1899, at 174; THE WESTERN ELECTRICIAN, Apr. 8, 1899, at 201.

¹³⁷ Illinois Tunnel Co, memorandum dated Dec. 20, 1902, Boxes 65 and 1357, AT&T-BLA.

¹³⁸ Hot Telephone Talk, CHICAGO RECORD-HERALD, June 27, 1901.

¹³⁹ Report of the Special Committee on Telephone Rates and Service. Presented to the City Council of the City of Chicago, Mar. 2, 1903; Hugo S. Grosser, Telephone Service and Rates, Report of the Committee on Gas, Oil, and Electric Light to the City Council of Chicago (Sept. 3, 1907).

¹⁴⁰ Chicago City Ordinance of Nov. 6 1907, text in Box 65, AT&T-BLA.

prevailing attitude was summed up by a *Chicago Daily News* editorial of 1903, which opposed dual service as a “scheme to fool the weak-minded” but supported action to reduce rates. “There is no reason why [the Chicago Telephone Co.] cannot be compelled to give fair rates to the people when it comes asking for a renewal of its franchise [in 1909]. If that company will not consent to be reasonable let the city go into the telephone business itself.”¹⁴¹

Indianapolis, on the other hand, authorized a competing telephone company very quickly. In 1898 there were only 2,286 subscribers in the city of 169,000, and the service of the Bell company in that city was generally considered to be poor. A long history of disputes over rates had marred relations between the telephone company and the state’s citizens; yet the company’s franchise made no provisions for rate control and contained no expiration date. In March 1898 the New Telephone Company obtained a franchise, but the city Board of Public Works compensated for its lack of control over the Bell exchange by attaching important restrictions to it. The New Company franchise fixed maximum rates at \$40 for business and \$24 for residences, 55 percent and 50 percent of the respective Bell rates. The franchise expired after twenty-five years and became void if the new company was consolidated with or purchased by a competitor.¹⁴² That competition was conceived as a method of rate control is clear from the franchise itself, which stated that “the principal consideration for the granting of the franchise... is and will be the securing of a reduction of telephone rates to the citizens.”¹⁴³ By January 1906, the New Company was serving 9,354 subscribers while the Bell exchange had grown to 7,670 subscribers. Thus, despite user fragmentation, a telephone subscriber in Indianapolis had access to four times more users after competition than before it.

Contrary to the trend in the rest of the country, dual service declined in the South after 1898. Due to cheap construction, unrealistically low rates, and a lack of regional cooperation and interconnection, independents in Mississippi, Louisiana, and parts of Virginia, Alabama, and Kentucky were decimated by bankruptcy and Bell acquisition after 1900.¹⁴⁴ The Cumberland Co. was particularly active in gobbling up financially exhausted independents, acquiring twenty noncompeting exchanges and six competing systems in Mississippi, Louisiana, and Kentucky between January 1900 and April 1901. The competing New Orleans exchange was one of the properties acquired.¹⁴⁵

Those failures portended financial problems that were to haunt the urban independent systems. In large exchanges, the independent promoter’s calculation of the profits that could be made at lower rates had overlooked two critical considerations: depreciation and the diseconomies of growth. In the first year or two of operation, the new exchange performed well and appeared to make profits and even pay dividends. After four or five years, the company learned that the “profits” and “dividends” of the preceding years had not been profits at all, but should have been

¹⁴¹ CHICAGO DAILY NEWS, June 8, 1903.

¹⁴² Patrick O’Neill, *Franchising the New Telephone Company*, paper delivered at the Midwest Journalism Association Conference, 7 (1988).

¹⁴³ /d.

¹⁴⁴ Lipartito 129-34 (1989).

¹⁴⁵ Cumberland Telephone & Telegraph Co., acquisition of independent telephone companies, Box 1336, AT&T-BLA.

retained to renew the exchange's physical facilities.¹⁴⁶ They also learned that their costs increased as they added subscribers, making their initial rates inadequate. Compounding the problem, low rates were often locked into the franchise. By 1906 the independents in St. Louis, Cleveland, Indianapolis, Pittsburgh, Toledo, Madison, and many other cities had been forced to swallow their rhetoric and ask for rate increases of 20 to 50 percent.¹⁴⁷ Others began to engage in acts of financial legerdemain, such as issuing new bonds to pay for the old ones before they matured, in a desperate attempt to raise the capital needed to renew and expand. Access competition demanded that they expand and become more universal to remain competitive, and as the Bell system had learned a decade before, expansion demanded huge amounts of investment capital.

Access Competition and Rates

Telephone prices generally consist of two parts: a charge for access and a charge for usage. Pricing after 1894 was deliberately constructed to minimize the access cost barrier in order to encourage large numbers of new subscribers to join (or, in the case of Bell, to retain existing subscribers). From 1894 to 1900, the average monthly rate for local exchange service dropped by more than half. It was not unusual for Bell operating companies to temporarily set their rates at \$1 per month, or even to provide service for free, in cities where an independent exchange had taken away many of their subscribers.¹⁴⁸ Rate reductions occurred in part because competition from independent manufacturers forced the national Bell organization to lower royalty payments on Western Electric manufactured telephone sets from \$11.48 per telephone to \$2.18 from 1893 to 1899.¹⁴⁹ But reduced royalties accounted for only 42 percent of the cost reductions per subscriber.¹⁵⁰ The companies also were forced to operate more efficiently and to offer new classes of service which made a telephone subscription more affordable.

In nearly all cases the independents positioned themselves as the low-cost provider. A comparison of rates in over 471 competing exchanges by the Bell system in 1913 found that Bell's exchange rates exceeded the independents' in 9 percent of the cases.¹⁵¹ In the early years that did not necessarily mean that the independent's equipment was lower quality and their service inferior. A memo from the president of the New York Telephone Company in 1902 noted that the amount of capital invested per Bell telephone was \$328.20, whereas for independents the capital per phone was only \$192.30. He concluded:

...in nearly every instance the independent plants are new and represent the latest developments in telephone equipment, while in most cases the Bell plants are old. The Bell companies also have a larger number of phones on party lines while the independent phones are almost all on complete metallic circuits.¹⁵²

¹⁴⁶ *The Financial Side of Independent Telephony*, 11 TELEPHONY 14-18 (Jan.1906) (review of FREDERICK DICKSON, TELEPHONE INVESTMENTS, AND OTHERS). Dickson, President of the Cleveland-based Cuyahoga Telephone Company, actually argued in defense of the absence of depreciation charges.

¹⁴⁷ 12 CUMBERLAND TELEPHONE JOURNAL (1906), AT&T-BLA; O'Neill, supra note 40, at__.

¹⁴⁸ Lipartito 120 (1989); Gabel 88-97 (1987).

¹⁴⁹ Weiman and Levin, *Preying for Monopoly? The Case of Southern Bell Telephone Company, 1894-1912*, 102 J. POL. ECON. 113 (1994).

¹⁵⁰ *Id.*

¹⁵¹ Bell and Independent Exchange Rates, 1912-13, Box 29, AT&T-BLA.

¹⁵² President of New York Telephone Co. to President Fish, Mar. 25, 1902. AT&T-BLA.

In 1909 AT&T conducted a study that compared telephone penetration levels and rates in twelve cities without competition and twenty-seven cities with competition.¹⁵³ The study found that the average development in non-competitive cities was only 8.2 telephones per 100 population, compared to 11.2 stations per 100 in cities with competition. The cover letter transmitting the report to President Vail concluded “it seems that with competition development is somewhat greater than without. Of course part of that greater development is to be ascribed to the lower rates prevailing under competition.”¹⁵⁴

The need to maintain a large subscriber universe also affected the structure of the technology. Both contestants began to offer inexpensive two-party, four-party, and sometimes even eight and ten-party lines to increase their subscriber universe.¹⁵⁵ The object was to get as many subscribers onto the system as quickly and as cheaply as possible. From 1894 to 1906 the ratio of subscribers to exchange circuits in the Bell licensee companies plummeted from one to one-half; in some cities the ratio was as low as one-third. One particularly novel attempt to respond to competition by broadening access was the development of the “Kitchen Telephone” by the California Bell licensee. The kitchen telephone was a very low-priced, compact instrument capable of making outward calls only. Unlike other residential telephones at the time, which were placed only in halls or dining rooms, they would be placed in the kitchen, “conveniently located for the use of the servants ... through which to order supplies from the butcher, grocer, coal dealer, and other tradespeople.”¹⁵⁶ Though the model in mind here is clearly one of an upper class home, by the end of the competitive period, the telephone had become commonplace among the middle class, reaching 70% penetration in some parts of the country (see chapter 12).

Dual Service in the Country

Around 1900 a new force entered the telephone competition, a development as important in its own way as the initial wave of independent competition. Huge numbers of farmers began to buy their own telephones and wire and set up country telephone systems. Farmer lines were basically party lines which passed through five to twenty houses. Many were built by cooperative organizations which drew on their own member-subscribers for capital and operating labor. Subscribers were expected to maintain their own part of the line, the poles on their property, and their own phone. Advice on how to construct them was disseminated to millions of farmers through periodical publications such as the *Farm Journal*. To the large number of Americans who lived on farms, those neighborhood party lines provided welcome relief from isolation. According to one source, “from the day the second telephone is put on [the line] for about two months there is never a time when the line is not busy.”¹⁵⁷ Once one line was established in a farming area, “telephone

¹⁵³ Walter S. Gifford, AT&T Statistician, Aug. 10, 1909, *Statement Showing Growth in “Bell” and Independent Telephone Development Together With Changes in Exchange Rates in Various Cities of the United States Arranged by Five Year Periods from 1894 to 1909*, AT&T-BLA.

¹⁵⁴ *Effect of Competition on Development and Rates*, C.G. DuBois, Comptroller, AT&T, to Theodore Vail, President, AT&T, Aug. 20, 1909. AT&T-BL98.

¹⁵⁵ Party Line Development, 1898-99, Box 1258, AT&T-BLA.

¹⁵⁶ *Kitchen Telephone Service*, advertising flyer, Sunset T&T Co., 1895, Box 1278, AT&T-BLA.

¹⁵⁷ 10 CUMBERLAND TEL. J. 13 (Jan. 1904).

contagion” struck the whole community. Nearby farms, hearing tales of its success, decided to build one of their own.

Initially, each small farm line had its own organization. Its business had to be submitted to a vote of all of the members. As the lines proliferated throughout a region, those organizations made arrangements to interconnect their lines at someone’s house. Farmhouse “nodes” usually were not exchanges with switchboards but simple serial connections. They were run by farm wives or daughters who could be relied on to stay nearby to listen for the signal bell. If a person on one farm line wanted to talk to someone four farm lines away, he or she had to signal and make a connection through four different homes. Making a connection could become a long and socially interesting process. “I know men ... who cannot communicate with people in their neighborhood because the people that keep up the home exchange don’t like some of the people in the other neighborhood,” complained one telephone company employee.¹⁵⁸ As the use of the telephone in the area spread, those small cooperatives often combined and adopted a corporate, commercial form of organization.¹⁵⁹ Commercial rural systems averaged about eight telephones to a line; the mutual and farmer systems averaged about twenty-four telephones to a line.

The telephone Census of 1902 documents the initial phases of a massive increase in the number of rural telephones. According to the census, there were 5,979 tiny farmer lines and rural mutual systems in 1902, and another 15,598 rural lines run on a commercial basis.¹⁶⁰ Rural lines accounted for more than a quarter of a million telephones in the United States, about 11 percent of the total. As the social historian Claude Fischer has shown, during the next ten years telephone penetration in the farm areas caught up with and surpassed that of the urban areas.¹⁶¹ The growth of farm lines had begun to alter the long-standing rural/urban imbalance in the distribution of telephones.

As the farm lines blossomed, they were drawn into the access competition. Farmers wanted connections to markets and merchants in the cities; the telephone companies wanted to obtain a competitive edge by controlling access to rural subscribers. Independent and Bell alike took note of what came to be known as “the farm line proposition.” That referred to the negotiations over which system the farm lines would choose to interconnect with. The once-neglected farmer became a highly sought after prize. One Bell manager who was particularly active in urging his local managers to go after the farmers said, “I say to you managers that whenever you have the farmers tied on to your exchange you have got the merchants where you want them.”¹⁶² Another Bell manager, decrying the lack of rural development of the Bell system in the Rocky mountain area, warned that if the independent got the farmers, “he has anchored his exchange.”¹⁶³

Those rural lines are generally counted by economic historians as part of the independents’ “market share,” but a large percentage of them—perhaps half—had no vested interest in competing

¹⁵⁸ *Ibid.*

¹⁵⁹ 76-77 TELEPHONE CENSUS 1907.

¹⁶⁰ ELECTRICAL INDUSTRIES CENSUS, 1902, table 13.

¹⁶¹ Claude Fischer, *The Revolution in Rural Telephony*, _ J. Soc. HIST. 5 (1987).

¹⁶² 10 CUMBERLAND TEL. J. 12 (Jan. 15, 1904).

¹⁶³ Pickernell to G. Y. Wallace, President, Rocky Mountain Bell, Mar. 27, 1905 (cited in Chappelka, 1956).

with Bell. Their goal was to bring the benefits of the telephone to their areas at the lowest possible rate. They would agree to connect with whoever offered the best terms, which might be Bell, the independent, or neither. Rural telephone systems proved to be as independent of the Independents as they were of Bell. When they became dissatisfied with the toll charges imposed on them by a connecting exchange, they would frequently disconnect their line and set up their own terminus in the same town. Whereas the organized independents almost never entered into direct competition with each other, the farmer lines didn't care who they competed with. In some cases four different switchboards operated in the same community due to disagreements over connecting charges.¹⁶⁴ That type of competition so exasperated the organized independent movement that their associations tried to get manufacturers to refuse to sell equipment to independent companies that initiated competition when another independent was already adequately serving the community.¹⁶⁵ From a competitive standpoint, the farmers were not part of the organized independent movement, but truly independent "swing voters" who had to be courted by both sides.

It was the presence of access competition that gave the farmers their leverage over the telephone companies. Dealing with the farmers was extraordinarily difficult for both telephone interests because there were no standard terms of trade. Each farm line had to be negotiated with on an individual basis, and the farmers were very demanding. Bell and many urban-based independents probably would have preferred to ignore them. The competition for subscribers, however, forced both Bell and the independents to seek out the farmers and offer favorable terms for interconnection. In 1900, for example, the New York and Pennsylvania Telephone Co., a Bell licensee, issued a general order announcing that "during the current year it is the intention of the company to push the development of telephone service in the rural districts."¹⁶⁶ The New York and Pennsylvania Telephone Co. also developed two special rural line contracts, one to establish a small switching station in farm houses, the other to connect farm lines to a toll station along the Bell lines. Not coincidentally, the Company's territory in western New York and northern Pennsylvania was overrun with competing independents. The (Bell) Cumberland Company was also active in courting rural areas in response to competition. To farmers who built and maintained their own lines, the Cumberland Co. offered connections to its exchanges for only \$2 per year.¹⁶⁷ That low rate prompted the Mississippi Independent Telephone Association to charge Bell with predatory pricing before the state Railroad Commission.¹⁶⁸

In addition to expanding the access universe of the telephone companies, interconnection agreements sometimes provided capital or maintenance for farmer lines that had grown beyond the capacity of the local organization to manage. Farm lines were easy and inexpensive to establish, but once they grew and achieved a wider scope of interconnection, the farmers rarely had the time to maintain them or the capital to upgrade them to higher technical standards. When it became necessary to consolidate the management of many small, separate lines into an integrated system, a shift from a mutual to a corporate form of organization usually had to be effected. That could

¹⁶⁴ 3-31 Chappelka 78 (1956).

¹⁶⁵ *Id.*

¹⁶⁶ General order #34, Feb. 14, 1900, Box 1330 AT&T-BLA.

¹⁶⁷ *Report on Tennessee*, 11 CUMBERLAND TEL. J. (Mar. 15, 1905).

¹⁶⁸ 10 CUMBERLAND TEL. J. (Oct. 15, 1904).

involve some form of capital assistance from one of the two telephone interests. In other cases, the farmers would simply sell their lines to Bell.

Bell's response to competition

Bell embraced a variety of tactics in response to independent competition. Correspondence between the national organization and the licensee companies reveals that five basic methods were employed: 1) the adoption of “fighting” rates, i.e., temporarily lower prices for local exchange access in order to drive the independent from the field;¹⁶⁹ 2) buying out competitors; 3) improving and extending service; 4) interfering with the franchising of independent companies; and 5) spreading unfavorable publicity about independent companies in order to scare away customers and financiers.¹⁷⁰

Although evidence can be found that each of those tactics did some damage to the independents in isolated circumstances, ultimately national and local Bell management came to understand that improving and extending service was the most powerful response to competition. Price wars produced nothing but financial losses for the licensee companies.¹⁷¹ Rate cuts were more expensive for Bell than for its rivals because the independents' costs were generally lower.¹⁷² Besides, rate cuts from Bell were utterly lacking in credibility, as people would not easily forget seventeen years of monopoly prices. Buying out competitors was a highly expensive proposition, too, although it was employed in a few strategic circumstances. Successful independents, however, had little incentive to sell, and by 1898 there were far too many of such for Bell purchases to make much of an impact. Blocking franchises worked in a few large cities,¹⁷³ some of them of great strategic importance, but the growth of independent-controlled exchanges in the surrounding areas

¹⁶⁹ For typical correspondence of that sort see C.E. Yost, President, Iowa Union Telephone Company, to C. J. French, American Bell, Apr. 18, 1899, AT&T-BLA; E. B. Field, General Manager, Colorado Telephone Company, to C. J. French, Aug. 28, 1895, AT&T-BLA. French, the national organization's person in charge of competitive tactics, advocated “fighting” rates lower than the opposition's as a temporary expedient.

¹⁷⁰ Chappelka (1956) 195 discusses the variety of competitive tactics used by ABT in the early years of competition.

¹⁷¹ American Bell's Annual Reports from 1899-1907 note repeatedly that competition had forced many licensee companies to reduce their rates to unremunerative levels and adversely affected their financial condition. See ABT ANNUAL REPORT 9 (1902); ABT ANNUAL REPORT 12 (1906). In 1902, President Fish wrote to C. E. Yost, “the plans of meeting the opposition by reducing rates has, I believe, rarely if ever succeeded.” Cited in Chappelka (1956).

¹⁷² Mr. Jackson, President of the Central Union Company, wrote to President Hudson, ABT, in 1899 complaining that in medium-sized towns of 10-20,000 population the independents were charging annual flat rates of \$24 (Business) and \$12 (residence) for single-party metallic circuit lines. “We cannot meet these rates, and cannot sell our metallic service at the present rate of \$60-66 per annum in exchanges of that size.” Cited in Chappelka (1956).

¹⁷³ Bell lobbied city governments to prevent franchising of competing companies, and when that failed they loaded the franchises with restrictive provisions that made life difficult for the competitor. Bell's political efforts paid off most heavily in Washington D.C., where the influence of the Chesapeake and Potomac Company on Congress was strong enough to ensure that authority for competition was shelved in 1900. Lobbying efforts by the General Manager of Bell's Colorado Telephone Company prevented a competing Denver franchise in 1901, and in 1902 the Vice President of the Colorado Company helped elect the Governor of the state. In Scranton, Pennsylvania, Bell interests defeated three pro-competition ordinances in four years. From 1896-1899 pro-Bell politicians in Kansas City buried several competing franchise authorizations. In Scranton and Kansas City, however, an independent company eventually was franchised.

maintained constant pressure on cities to franchise an independent. The effort by Bell's public relations agents to discredit the independents could only work in areas where people had no direct knowledge of independent telephony, such as New England and New York. In most areas, independents had a track record and support from local capital, local merchants, and local politicians. Bell's survival as a system could not rely on any of those methods.

Toll Line and Exchange Development

As the other tactics failed, Bell managers increasingly came to understand that its own underdevelopment was the root of the problem of independent competition. Increasingly, Bell's main competitive advantage came to be seen as its ability to offer comprehensive service within a given region. Although independent exchanges and telephones often outnumbered Bell in a given territory, Bell still had more exchanges than any individual independent company. With its coordinated business management and superior access to capital, it was in a better position than the independents to expand, interconnect, and integrate the operations of many dispersed exchanges. In effect, Bell began to try to beat the independents at their own game. The "opposition" had stolen a march on the Bell system by offering access to a larger number of local and regional points. Now Bell would expand and integrate its operations so that it could offer users an even larger bundle of regional connections than the independents. Expanding their toll lines to improve connectivity among Bell exchanges would "crush the opposition," according to one licensee company manager.¹⁷⁴ The President of AT&T, Frederick P. Fish, put it more delicately in 1903: "it is upon your toll facilities that you must depend for holding your own against the opposition."¹⁷⁵

The renewed Bell emphasis on exchange and toll line development is often misunderstood as a strategy based on superior long-distance transmission technology.¹⁷⁶ In that view, Bell exploited new technology such as loading coils¹⁷⁷ to create ultra-long-distance connections which the independents lacked the technological wherewithal to match. That misconception is based on the ambiguity of the term "toll lines." Contemporary usage referred to interexchange connections within the licensee companies' territories as *toll lines*, and the longer distance, intercity lines of AT&T as *long lines*. The toll lines which the Bell managers saw as their salvation were *not* the long lines of the AT&T Company, but regional connections within a 100-mile radius, which were usually supplied by the local operating companies. Bell's toll lines utilized the same basic technology that was available to the independents; AT&T had no controlling patents on the technology needed to make connections of that length.¹⁷⁸ The real source of competitive advantage

¹⁷⁴ C. J. Glidden, President, Michigan Telephone Company, to President Hudson, ABT Co., Jan. 28, 1899. AT&T-BLA.

¹⁷⁵ President Fish, ABT Company, to G. Y. Wallace, Rocky Mountain Bell, May 25, 1903. AT&T-BLA.

¹⁷⁶ FAULHABER, TELECOMMUNICATIONS IN TURMOIL: TECHNOLOGY AND PUBLIC POLICY 2-3 (Ballinger 1987). Faulhaber stresses the technological advantage achieved by the loading coil and that "the linchpin of Vail's strategy was to gain control of the technology."

¹⁷⁷ See NEIL WASSERMAN, FROM INVENTION TO INNOVATION: LONG DISTANCE TELEPHONE TRANSMISSION AT THE TURN OF THE CENTURY _ (Johns Hopkins University Press 1985). Wasserman's account of the application of loading coils makes it clear that it did not play a significant role in the competitive battle.

¹⁷⁸ In correspondence dated Apr. 3, 1903, President Fish of AT&T admitted that the company held "no controlling patents on long distance telephone apparatus or systems. [L]ong distance lines of some commercial value [could] be constructed and operated by anyone." Fish to C. H. Cutting, Apr. 3, 1903. Cited in Chappelka (1956). See also Thomas Lockwood, AT&T, to Theodore Vail, Aug. 8, 1908. AT&T-BLA.

was *comprehensive coverage* of a particular region corresponding to the community of interest of the majority of telephone users. To be sure, the scope of access desired by different types of users varied greatly. But the best way to satisfy all possible users was to create a comprehensive, universal network.

The demand for telephone connections between points over 200 miles apart was still restricted to a tiny minority of users. No more than 5 percent of all telephone calls were to points more than fifty miles away.¹⁷⁹ For communication over long distances (say, 500-1,000 miles), the telegraph was still the dominant and by far the most economical service. As late as 1909, a telephone businessman wrote that while ultra-long-distance telephoning “appeals most strongly to the imagination,” it was still “occasional” and “of little commercial or social importance.”¹⁸⁰ Long lines business was profitable, but it had always been in Bell’s control; in fact, Bell’s pursuit of that market to the exclusion of most others prior to 1894 was the reason it had left itself vulnerable to competitors. The new emphasis on intensive toll line development within the licensee companies’ territories was actually a sharp departure from the old Bell vision. It was, however, a logical and indeed unavoidable response to access competition.

Prodded by competition, the Bell licensee companies opened approximately 3,500 new exchanges in cities with populations under 10,000 between 1894 and 1907.¹⁸¹ That was three times the number of public exchanges they had opened in the previous seventeen years. Between 1902 and 1907, Bell’s wire mileage grew by 164 percent, which was actually a faster rate of expansion than the independents.¹⁸² Table 6-4 documents the bulge in the growth rates of Bell system physical plant during the competitive period. Between the year 1898, when the new strategy of expansion began, and the financial panic of 1907, which temporarily dried up capital resources, Bell plant grew by an average of more than 17 percent per year, double the earlier rate. In 1899, 1900, and 1906, the annual rate of growth exceeded 22 percent. A 1909 statement by a Southwest Bell representative confirmed that the expansion was a product of access competition. “We have scraped along for the past ten years,” he said, “building exchanges and toll lines that we ought not to have constructed except for the purpose of causing the service to be more valuable than that of our adversary.”¹⁸³

¹⁷⁹ A graph showing the volume of toll calls as a function of distance was prepared by Doolittle for the New York and Pennsylvania Telephone Co. for 1900. For cities with exchanges, 98 percent of all calls were to points within 50 miles. For toll stations in small towns, the percentage was somewhat smaller—about 95 percent. Box 1330, AT&T-BLA.

¹⁸⁰ Gansey Johnson, Columbus Citizens Tel. Co., 17 TELEPHONY (Jan. 2, 1909).

¹⁸¹ TELEPHONE CENSUS 1907.

¹⁸² *Id.*

¹⁸³ 14 TELEPHONY (Jan. 1909) emphasis added.

TABLE 6-4
BELL SYSTEM PLANT EXPANSION, 1885-1912

Year	Total Bell Plant	Increase	% Increase
1893	\$73,136,242	---	^8.20
1894	\$77,731,161	\$4,594,919	6.28
1895	\$87,858,500	\$10,127,339	13.03
1896	\$95,241,646	\$7,383,146	8.40
1897	\$104,487,524	\$9,245,878	9.71
1898	\$118,123,841	\$13,636,317	13.05
1899	\$145,511,290	\$27,387,449	23.19
1900	\$180,699,800	\$35,188,510	24.18
1901	\$211,780,200	\$31,080,400	17.20
1902	\$250,013,200	\$38,233,000	18.05
1903	\$284,567,800	\$34,554,600	13.82
1904	\$316,520,600	\$31,952,800	11.23
1905	\$368,065,300	\$51,544,700	16.28
1906	\$450,061,400	\$81,996,100	22.28
1907	\$502,987,900	\$52,926,500	11.76
1908	\$528,717,000	\$25,729,100	5.12
1909	\$557,417,146	\$28,700,146	5.43
1910	\$610,999,964	\$53,582,818	9.61
1911	\$666,660,702	\$55,660,738	9.11
1912	\$742,287,631	\$75,626,929	10.19

^average annual growth rate, 1885-1893

Source: FCC Telephone Investigation Report, 1939

Within the national Bell organization, Thomas B. Doolittle of AT&T was the most consistent, committed advocate of responding to competition with the development of systemic connectivity. Doolittle was the inventor of hard drawn-copper wire and opened one of the first commercial exchanges. Practically from the beginning of the Bell system, Doolittle had taken a special interest in the toll line business. His interest came not only for its potential earning power but as a means of protecting the business from the ‘dangers’ of competition. In 1891 he received permission from AT&T to devote all of his time to it and began to travel through the country studying the operating conditions of the licensee companies. As Doolittle and his staff passed through the territories, they studied traffic patterns and volume, rates, and the operating procedures used in making up toll connections. When Doolittle began his work, the toll facilities of the licensee companies generally were poorly developed and inefficiently run. The management of the national company and that of the licensee companies were not well coordinated. As one of his reports observed, operating company managers were suspicious of “the Boston influence.”¹⁸⁴

¹⁸⁴ Doolittle to Vail, January 29, 1908, AT&T-BLA.

Working patiently for fifteen years, Doolittle spearheaded the administrative rationalization of the interconnection process and the growth of toll connectivity in the Bell system.

Doolittle's arguments for toll line development were based on a clear, explicit grasp of the demand interdependence of telephone service. His records of toll calling receipts convinced him that the average revenue that could be expected from a place increased as it was connected to more places. That in turn enabled him to recommend extending toll lines to smaller and smaller towns.¹⁸⁵ In an effort to convince the Boston management to invest in exchange and toll line development, he prepared a diagram illustrating the increased traffic over a toll trunk line that would result from connecting groups of tributary towns.¹⁸⁶ Doolittle's grasp of demand interdependence made him an advocate of exchange as well as toll line development. When people were attached to an exchange they could receive incoming calls in addition to placing outgoing calls. That increased the scope of service that could be offered to users in other cities. His reports on the licensee companies from 1896 to 1902 always contained long lists of towns where small exchanges should be placed.

In promoting the development of small exchanges, Doolittle pioneered the theory and practice of "subsidizing" local exchange access with long-distance revenues. The company would gain by establishing inexpensive exchange service in small towns even if the exchange itself lost money on a "stand-alone" basis, he argued, because giving users in other locations access to subscribers in the smaller towns would stimulate increased use of the toll lines. Oftentimes the access rates for residences and small town exchanges were kept artificially low in order to create a larger subscriber universe which would stimulate long-distance usage. Doolittle's reasoning must have influenced President Fish, who wrote in 1902:

it is at least worth considering whether or not cheap exchanges in the small towns do not add enough to the toll business to make them a proper investment, even if there is no profit in the small exchanges.¹⁸⁷

That access competition produced "cross subsidies" from toll usage to exchange access is particularly noteworthy, since it is commonly assumed by economists that such practices are a product of governmental rate regulation and would not exist in a competitive market.

But it was access competition, and not merely the desire to enhance toll traffic, that propelled the Bell system to extend access at lower rates in order to stimulate usage and expand its scope. The degree to which Bell expanded even to the most economically unattractive rural areas, was evident in 1907 correspondence between G.Y. Wallace, the President of Rocky Mountain Bell, and the national organization:

"We opened a number of small exchanges in Utah-not remunerative-but helped us in our fight for supremacy. Our actions were the virtual undoing of Utah Independent Telephone Company."¹⁸⁸

¹⁸⁵ Doolittle to Fish, March 22, 1904 Box 1330, AT&T-BLA.

¹⁸⁶ Doolittle to Davis, June 4, 1896, Box 1285, AT&T-BLA.

¹⁸⁷ President Fish to C.E. Yost, August 30, 1902.

¹⁸⁸ G.Y. Wallace, Rocky Mountain Bell, to T.N. Vail, AT&T, November 7, 1907, AT&T-BLA.

In the same letter, Wallace reported building twenty exchanges and “unremunerative” toll lines connecting them in Wyoming, and claimed that the superior access had forced the opposition to give up. Similarly, competition in the South was overcome when Edward J. Hall, the head of Southern Bell, managed to increase Southern Bell’s capital resources by thirty-fold between 1897 and 1906 to invest in toll line construction and in upgrading local exchange circuits from grounded to metallic to make them more compatible with the toll network.

The expansion of the network increased the complexity of making connections. AT&T responded to that challenge by pioneering a method of routing, handling, and accounting for calls known as “center checking.” Center checking centralized the responsibility for routing and accounting for toll calls at designated exchanges.¹⁸⁹ When implemented, every operator in the region knew where to transfer toll calls headed to a specific destination, and the operators at the toll center knew how to get the call to its destination as directly and quickly as possible. Rationalizing the process of toll interconnection reduced the amount of time consumed by making a connection and resulted in great savings in plant facilities.¹⁹⁰ The rationalization process also made it possible for the licensee companies to exploit “phantom circuits,” a method of creating a third voice circuit out of two metallic circuits.

Rate rationalization was another important achievement of Doolittle’s. He went about systematically simplifying and reorganizing the licensee companies’ toll tariffs by replacing charges based on route mileage with a more uniform airline mileage basis for setting rates. Here again competition was the spur to efficiency. Doolittle’s reports identify the competitive losses caused by the “border problem,” the inefficiencies in interexchange service caused by Bell’s division of the country into separate territories under different managements. He noted that if two towns were only fifty miles apart but were located on opposite sides of a border separating two licensee companies, a caller could end up paying the rate for a 150 mile call due to the way the call was transferred between the two Bell companies. Independent competitors were taking advantage of such rate discrepancies, offering more direct, cheaper service. In line with his drive to rationalize toll organization, facilities planning, and rates, Doolittle brought the managers of AT&T, the licensee companies, and independent connecting companies together at conferences which established how traffic should be routed and which company’s lines should be used.

The competitive advantage derived from the Bell organization’s emphasis on toll connectivity can be appreciated by contrasting Bell’s systematic approach to that of the independents. Prior to their consolidation into regional systems, most independents relied on state associations to coordinate toll connectivity. The lack of a central management authority continually handicapped their attempts to coordinate toll service. In November 1904 Telephony Magazine observed that it was “the exception rather than the rule” that “we are able to offer competition on messages of over 100 miles.” In some cases the problem was poor construction, in other cases it was roundabout routing, in still others it was inconsistent or uncoordinated operating procedures. In a speech before the International Telephone Association, a prominent independent telephone operator summarized the independent movement’s managerial problems:

¹⁸⁹ A complete ‘center-checking’ matrix for the city of Harrisburg, Pennsylvania from 1903 can be found in Box 1330, AT&T-BLA.

¹⁹⁰ Doolittle, 1907 Annual Report, Box 2020, AT&T-BLA.

This is our strength ... we are better able to give satisfactory local exchange and “short haul” long distance service than companies managed and owned by directors and stockholders hundreds of miles away. Long distance service, however, under this kind of management is not satisfactory. Here is where we are weak: one company believes in a three minute time limit, another in five. One says one half cent per mile is enough; another three-fifths cent. This company’s lines are of copper, that one’s mostly iron. This company uses a code designed by its own traffic manager, that one the code of its state association, and the next one no code at all, and so on. What is the result? Confusion, bad service and dissatisfied customers.¹⁹¹

The problem, clearly, was organization rather than technology and in particular the comprehensiveness of toll interconnection within a region.

Doolittle felt that his work was not appreciated or used appropriately by the licensee companies until about 1904. As he admitted in retrospect, “a vast amount of laborious work was performed, which resulted in a report that was not understood, and in many cases, not even read ...” By 1904, however, he felt that he had gained the confidence and cooperation of the licensee company managers. Competition had forced them to pay attention. Toll lines, Doolittle stressed again and again, were the Bell system’s most effective weapon against competition because they expanded the scope of the network. Doolittle’s efforts helped to reverse the independents’ incursions into the short-haul toll market. In 1902, independents handled 37 percent of the toll calls. By 1907 that had declined to 24 percent.

Sublicensing independent exchanges

As the wave of dual service competition continued to gather momentum, both Bell and the independents struggled to weave their exchange holdings into an integrated system offering access to as many cities and towns within a 200-mile radius as possible. As part of that process, the Bell system was forced to liberalize considerably its no-interconnection-with independents policy. It began to expand its access to rural areas by “sublicensing” or interconnecting with non-competing independent exchanges.

Conventional histories present Bell’s refusal to connect with the independents as a harsh and powerful competitive tactic. More generally, theories developed by antitrust economists tend to classify such “refusals to deal” as inherently monopolistic. An established system which denies access to or makes itself incompatible with its competitors is, according to that doctrine, suppressing competition. Treatments of telephone history also tend to see the eventual interconnection of Bell and the independents as a product of regulatory intervention alone. In fact, the Bell system’s most powerful strategic ploy proved to be interconnecting with certain independents, and that policy change was made in response to market rather than political pressures.

¹⁹¹ TELEPHONY MAGAZINE, November 1904.

Between 1894 and 1902, the national Bell organization adhered to a policy of strict exclusion. Independent companies could not be connected to Bell exchanges or toll lines, even when they occupied territory remote from any Bell exchange and were not competing with Bell. Bell refused to purchase equipment from independent manufacturers and refused to sell Western Electric equipment to the independents. *The independents made their most rapid competitive gains in that period.* Their growth occurred because of, rather than in spite of, the no-connection policy. Bell was simply unable to keep up with the demand for telephone service in thousands of small towns. In 1901 there were still 112 cities greater than 5,000 in population (12 percent of the total) with no Bell exchange; in smaller incorporated places with a population between 500 and 5,000 there were Bell exchanges in only 1,775 of the 5,447 (32 percent of the total).¹⁹² In those conditions, the effect of the noninterconnection policy was to cut off Bell from the majority of telephone users in the undeveloped areas, and guarantee its competitors exclusive access to every exchange built independently of the Bell system. In the states of Indiana, Ohio, and Illinois, the independents greatly outnumbered Bell and were on the verge of achieving the kind of critical mass that could result in mass desertions of Bell exchanges.

By 1901 it was clear even to the distant Boston managers that absolute exclusion of independent companies had been a costly mistake. Some managers of the licensee companies began to consider exchanging traffic with independent exchanges that did not directly compete with those of Bell. That policy was known as “sublicensing” because it involved a licensee company extending the connecting privileges of the Bell license contract to independent companies within its territory. Two licensee companies that had been particularly hard hit by competition actually had begun to implement that policy on their own.

The national organization moved more slowly. Unlike other adjustments in Bell practices made in response to competition, sublicensing involved revising some of the fundamental assumptions underlying the license contract. The primary object of the license contract was to secure profits and control for the national organization while harnessing local initiative and capital. But how could the same level of control be maintained when interconnecting with independent companies? If Bell was to interconnect with noncompeting local exchanges, should it require them to lease Bell instruments, as it did of its traditional licensees? If so, what would induce those independents to lease Bell instruments when it could obtain independently manufactured telephones at a lower price? If not, how could it maintain the uniform technical standards it desired? Since Bell would have no ownership control over the connecting company, there was also the risk that sublicensed companies might break the connection contract later. On September 25, 1901, President Fish sent out a letter to the top executives of AT&T and ABT soliciting their opinions on those questions.

All of them agreed that the time for some form of sublicensing had come. AT&T Chief Engineer Joseph Davis admitted that the Bell Co. had had no idea how widespread the demand for telephone service would prove to be at the time the perpetual license contracts were drawn up in the early 1880s:

¹⁹² Joseph Davis to President Fish, October 23, 1901, AT&T-BLA.

[If] it could have been foreseen what an extensive development of the telephone business would be required to meet the needs of the people, and the amount of capital involved, it would have been good policy on the part of the ABT Co. to have encouraged its licensees to sublicense to local people the right to furnish service in country districts and villages and towns . . . , and to have supplied telephones for this purpose at very moderate rental. If this had been done the field for opposition companies would have been very much curtailed and we would now have friendly instead of hostile people in such places.¹⁹³

Davis's comment underscores the fact that universal service in the modern sense was never part of AT&T's original conception of the business. Never in their wildest dreams did the early Bell managers think that telephone service could be demanded by, and profitably extended to, as many people and places as turned out to be possible.

E. J. Hall, Vice President and General Manager of AT&T, George Leverett, AT&T General Counsel, and Thomas Sherwin, the ABT Co. General Auditor, all agreed that Bell should insist on leasing its own telephones to sublicensees rather than selling them or permitting them to use independently manufactured telephones. Interconnection with users of other telephones was objectionable on three grounds. First, it reduced the Bell system's control over its technical standards. Using only Bell phones promoted uniformity and compatibility, while leasing encouraged operating companies to turn in equipment as it became worn or obsolete, allowing the system to maintain better standards of communication. Second, the Bell system had publicly opposed physical interconnection laws on the grounds that independent phones were of lower quality than theirs, hence their use over the Bell system would impair the quality of the service. It seems fairly clear that President Fish and the others who made that argument knew that it was untrue; the quality of the major independent brands was equal to Bell's.¹⁹⁴ The real reason for opposing physical interconnection was the property rights argument outlined in the previous chapter. But having used the other argument publicly, they knew that connecting with independent equipment now would obviously contradict it and make them look dishonest and might thereby lend support to compulsory interconnection. Last, but not least, Bell knew that leasing telephones was far more profitable than selling them outright.¹⁹⁵ Leverett suggested that the requirement to use Bell phones could be made more acceptable to the independent companies if Bell offered to furnish them below cost, or even at a rate that was purely nominal.²⁴ Davis, on the other hand, believed that while every effort should be made to induce independents to use Bell telephones, the benefits of "extending the field of the Bell interests" via interconnection more than compensated for any disadvantages that might accrue from the use of non-Bell telephones.²⁵

What most impressed the Bell managers were the competitive advantages to be gained by sublicensing. Interconnection would allow Bell to gain access to small town and rural locations without building and operating what were likely to be unprofitable exchanges. The small exchanges so connected could serve as feeders to the Bell toll system. As it extended Bell connections to unserved areas, it would also take connections away from the exclusive control of

¹⁹³ *Ibid.*

¹⁹⁴ President Fish to Kilgore, February 24, 1902, AT&T-BLA.

¹⁹⁵ Thomas Sherwin to President Fish, October 22, 1901, AT&T-BLA.

competing independents. Potential competitors, Leverett observed, would be coopted by the new policy:

telephone companies established in regions which we do not occupy ... become starting points for attacks upon our system in other places where such opposition is extremely undesirable. [I]f people are willing to venture their own money and do business in a territory we have not occupied, we should regard them and endeavor to have them in fact as allies, and not as competitors.

The new policy was ratified late in 1901; henceforth, licensee companies could sublicense independent exchanges under a standard form of contract with the blessings of the national corporation.¹⁹⁶ The new sublicense contract demanded three conditions for interconnection: the independent exchange could not be in direct competition with a Bell exchange; it could use only Western Electric telephones; and it had to agree to connect with only Bell toll lines. Officially, Bell charged its sublicensees \$2 per year per instrument. In actuality, the licensees deviated from those conditions according to the exigencies of the competitive situation.¹⁹⁷ The beleaguered Central Union Co. connected with noncompeting independents from 1904 on regardless of what instruments they used.¹⁹⁸ Wisconsin Telephone gave its sublicensees ten years free use of Western Electric telephones until pressure from the national organization forced it to conform to the standard contract.¹⁹⁹

Under the terms set by the national organization, sublicensing progressed, but slowly (see table 6-5) Some licensee companies unilaterally relaxed the contract terms in order to attract more independent users into their fold. The Central Union company, for example, liberalized its terms in 1904, allowing sublicensed exchanges to keep using non-Bell telephones. The number of sublicensed exchanges doubled in one year. By 1907, the Central Union owned and operated 310 exchanges and 188,000 telephones, while its sublicensees operated 777 exchanges representing 192,000 telephones (see table 6-6) In other words, the majority of telephone users in that territory were connected into the Bell system through independent exchanges.²⁰⁰

¹⁹⁶ General Managers Letter Book #632, October 31, 1901, AT&T-BLA.

¹⁹⁷ President Fish to G.W. Wallace, Rocky Mountain Bell, June 20, 1903, AT&T-BLA.

¹⁹⁸ Atwater, *History of the Central Union Company*, (1913) p. 136-7.

¹⁹⁹ R. Gabel, 1987.

²⁰⁰ Central Union Co. Annual Report, 1907, AT&T-BLA.

TABLE 6-5
 SUBLICENSING: INDEPENDENT TELEPHONES
 CONNECTING WITH BELL, 1901-1906

Dec.31,	Number of Independent telephones			Percent Connecting
	Connecting	Non-connect	Total	
1899	10,000	328,000	338,000	3
1900	20,000	500,000	520,000	4
1901	47,961	692,000	739,961	7
1902	84,021	969,845	1,053,866	8
1903	120,936	1,124,000	1,244,936	10
1904	167,213	1,348,000	1,415,213	12
1905	246,337	1,596,000	1,842,337	13
1906	297,218	1,862,000	2,159,218	14

Source: Chief Statistician's Division, AT&T Co.

TABLE 6-6
 SUBLICENSING IN THE CENTRAL UNION
 COMPANY TERRITORY, 1902-1907

<i>As of Dec.31,</i>	1902	1903	1904	1905	1906	1907
Sublicensed Exchange	194	213	253	513	623	777
Central Union Co. exchanges	229	227	275	295	316	310
# sublicensed phones (000)	---	---	---	130	160	192

Source: Minutes of Central Union Co. Board meeting, March 11, 1907

Sublicensing was a powerful weapon in a battle between exclusive networks. It not only provided Bell with connections to the small locations Bell was uninterested in serving, it also removed those exchanges from the independent orbit. Sublicensing could also be used to withdraw from dual service competition without losing access to the city's telephone users. In mid-sized cities where the independent exchange had established a commanding lead in subscribers, Bell would offer to pull out if the independent would agree to become a sublicensee. If the independent agreed, Bell gained access to the preponderance of subscribers in the city while relieving itself of the need to maintain a facility under the rigors of competition. The independent gained access to Bell's toll lines and respite from competition, a chance to raise its rates. Thus, what appeared to be an independent success suddenly became a setback; a whole group of subscribers was snatched out from under them. Such was the case in Middletown, New York, whose independent exchange had 1,000 users to Bell's ninety. The Middletown independent entered into a sublicense contract with Bell's Hudson River Co. in January 1904.²⁰¹ The same thing happened in Emporia, Kansas, whose

²⁰¹ AMERICAN TELEPHONE JOURNAL (Jan. 28, 1905).

independent had 1200 subscribers to the Bell company's 131. The Emporia independent was sublicensed and the Bell exchange closed down in 1905.

The organized independents immediately recognized that sublicensing threatened to disintegrate their movement. Their publications and associations assailed the practice in the strongest terms. "You cannot be an Independent company and connect in any way with the Bell," James Hoge, President of the National Independent Association wrote in the pages of *Telephony*. "You cannot serve two masters. You must choose between the people and a greedy corporation."²⁰²

In December 1902 the convention of the Interstate Independent Telephone Association in Chicago was forced to deal with the problem at length.²⁰³ A delegate from Illinois moved that companies using Bell telephones be disqualified from membership. An Iowa delegate opposed the participation of "anybody in any way connecting with the Bell companies under contract." Connection with Bell lines destroyed the push for independent growth, added an Ohio delegate. In response, the owner of an exchange in Ashland, Kentucky, pointed out that his was the only telephone exchange in town. The steel mills and iron works there demanded long distance connections to New York and Chicago, which could only be obtained over Bell lines. He claimed that Bell did not enforce the exclusive connection feature of the contract in his territory; they allowed him to send traffic over their lines even though he was connected to other independent companies. His company, he claimed, was "independent from the ground up," but if it could make an arrangement with the Bell companies for long-distance connections and thereby keep a competing Bell exchange out of the city, he believed it was good business policy.

A committee was appointed and charged to make a report on the issue. Its recommendations made a slight concession to those independents facing circumstances like the Kentucky exchange, but basically came out strongly against any form of cooperation with Bell. Operating companies or individuals using Bell apparatus tend to "demoralize and destroy the independent movement" and should be barred from membership in the national, interstate, or state associations. Only companies that connect their toll lines and exchanges with independent companies should be eligible for membership.²⁰⁴ The resolution passed unanimously.

The progress of sublicensing has been documented before by scholars such as Langdale (1978), but its significance in the context of access competition and its implications for standard accounts of universal service have not been fully appreciated. Despite Bell's later claims that universal service in the modern sense was its policy from the beginning, Bell ultimately obtained most of its access to small town and rural America through interconnection agreements with independent companies. More importantly, its decision to "reach out and touch" the rural areas was not a product of its own commitment to universal coverage, but a policy forced upon it by the exigencies of access competition.

²⁰² 11 TELEPHONY 314 (May 1906).

²⁰³ WESTERN ELECTRICIAN 426 (Dec. 13, 1902).

²⁰⁴ "We deplore individuals or companies connecting lines and exchanges with Bell licensee companies, ... as we believe that no such relation should be permitted, except, possibly, in isolated cases, which arrangement should be passed upon and authorized by the state association, ...the executive committee of the interstate association, or the advisory board of the national association, the authority in each case to be granted only by a 2/3 vote." *Id.*

Each of the preceding sections demonstrates how access competition promoted a universal telephone infrastructure by placing a premium on a network's scope. Had the competitors been interconnected, on the other hand, the incentives to pursue universality would have been greatly weakened. Independent competitors would have found it much easier to establish service in the urban areas already developed by Bell, and could have concentrated on simply undercutting Bell's price. The Bell System might never have undertaken the massive capital investments required to enlarge its exchanges in outlying areas and its network of toll lines, as those investments would not have given it a competitive advantage over the less extensive networks of the independents. Likewise, the independents would have had no incentive to construct alternative toll networks to connect independent exchanges. Incentives to restructure the technology to cheapen the cost of access would have been less powerful. Neither Bell nor the commercial independents would have needed to be in any hurry to reach out to the rural areas and smaller towns because with interconnection it would not have mattered which system reached them first.

7

DUAL SERVICE: THE ANATOMY OF SUBSCRIBER FRAGMENTATION

FOR THE TEN YEARS BETWEEN 1902 and 1912, competing telephone exchanges operated in more than half of all American cities over 5,000 in population. When dual service peaked in 1904, it existed in 483, or 60 percent, of the cities with a population greater than 5,000. In terms of the total number of competing exchanges in cities of all sizes, dual service reached its apogee in 1911, when it existed in 2,290 places.

Because we are all familiar with universal interconnection and rely on it heavily in our everyday life, we tend to assume that its absence was simply a mistake – a problem crying out for a regulatory solution. But we are in no position to assess the significance of homogenized telephone access unless we know something about what things were like when it didn't exist. This chapter attempts to portray the reality of dual service as it affected telephone users of the period. The first section examines the way subscribers divided themselves between the two systems in a single urban telephone exchange, that of Louisville, Kentucky, in 1910. The second section examines the fragmentation of intercity telephone access. Maps showing regional exchange access in the Los Angeles area, the state of Indiana, and the state of New York have been prepared to display graphically the extent to which dual service affected intercity telephone calling in a region.

Dual service at the exchange

The analysis of subscriber fragmentation patterns in a dual system is especially rewarding from the standpoint of social theory. Much like the language barriers in a bilingual community, dual service divided communities by communication. Some users were confined to one of the two systems, others were “bilingual” or duplicate users. Unlike language, however, the division of the public into two telephone systems reflected consumer choice rather than cultural inheritance. By heightening our awareness of who was connected to whom, by illuminating peoples choices about to whom it was and was not important to have telephone access, subscriber fragmentation patterns provide a fascinating road map to the organization of urban society.

How did dual service work? In 1910 the telephone was not yet the dominant mode of communication for the majority of the people living in cities, although it was rapidly becoming so. Only 20 percent of the people in a large city had telephones in their homes. The rest of the public, if they used telephones at all, relied on public stations, which may or may not have been pay

telephones. Drug stores and saloons, for example, had a very high subscription rate because they were customarily telephones that could be used for free by the people in a neighborhood. Virtually all large businesses had telephones, especially if they were national or interstate in scope. About 50 to 75 percent of the smaller businesses used the telephone, the rate varying widely depending on the type of business. All of those adoption patterns had changed radically since 1894 and were still in flux in 1910. In that context, the presence of two incompatible systems created inconveniences, but they were accepted as part of the process of growth and experimentation, just as incompatible bank cards and computer models seem unobjectionable today.

To provide some historical perspective, it is useful to compare the telephone system with the city directories of the period as a communications medium. City directories listed the names, occupations, and street addresses of all the residents and also contained listings of the city's businesses, services, and institutions. Like its successor, the telephone directory, those publications were both a source of useful information and an advertising medium. Their publishers made money by selling subscriptions to the public and display ads to businesses. City directories had been an established and profitable genre of publication for at least seventy years. Every major city had one; some of the bigger publishers, like Polk's, supplied several cities.

After 1920, the *street* directories of the 1800s and early 1900s were gradually displaced by *telephone* directories and yellow pages. Every function that the city directories had served was absorbed by "the phone book." There was one important difference, though: the telephone and the automobile had radically redefined the nature of urban space. A directory that emphasized location was of little use when the bulk of urban commerce was organized around real-time telecommunications. The most important thing to know was not where people or businesses resided but how to get in touch with them by telephone. Communications access was primary; the street address, secondary.

In 1910, *city directories still sold more subscriptions than the telephone exchange*. Many businesses (not all) listed their telephone numbers in their directory ads, but for most of the public the really important information was where things were located. Dual service was thus a characteristic of an urban communications system in transition. Although rapidly emerging as dominant, the telephone had not yet absorbed and eliminated older media such as the telegraph and the city directory.

For many businesses, subscribing to both the Bell and independent exchanges was a simple way to get around the fragmentation caused by competition. As those advertisements from the Louisville, Kentucky, city directory of 1909²⁰⁵ show, duplicate subscriptions were treated as a routine part of doing business (see figure 7-1). Both numbers were listed in the advertisements, and many businesses arranged to have the same telephone number on both the "Home" (the independent) and the "Cumberland" (the Bell licensee company) exchanges. Their duplication, of course, made it unnecessary for many smaller subscribers to do so, for the latter were guaranteed access to those businesses regardless of whether they were Bell or Home Co. subscribers.

²⁰⁵ 39 Caron's Directory of the City of Louisville (1909).

FIGURE 7-1

Senn & Ackerman Brewing Co.

BRANCH CENTRAL CONSUMERS CO.

1710 West Main

Cumb. Phone West 452
Home Phone 452

LOUISVILLE, KY.

BREWERS AND BOTTLERS

—OF—

Strictly High Grade Beers

PHIL ACKERMAN, Manager

Schaefer-Meyer Brewing Co.

BRANCH CENTRAL CONSUMERS CO.

Cor. Logan and Lampton

Cumb. South 468
Home 468

LOUISVILLE, KY.

BREWERS AND BOTTLERS

—OF—

Straight Brews Only

CHAS. A. SCHAEFER, Manager

The decision to duplicate or not can be taken as an indication of who did and did not value, and of who could and could not afford, universal telephone access. As one might expect, different categories of users show very different rates of duplication. Fortunately, the Bell Labs Archives possesses a document with detailed data about duplication and subscription patterns in one city. In 1910, a lawyer for the independent competitor of Bell in Louisville and the surrounding region broke down all of the city of Louisville's telephone subscribers into 214 categories and compiled a list showing how many members of each category were Bell subscribers, Home Co. subscribers, or duplicators.²⁰⁶ The tables which follow are based on the data in that list. They yield interesting insights into the way telephone communication patterns and social structures were related to the dual telephone systems. In some cases it was possible to determine the telephone penetration rate for a certain category of businesses by counting how many were listed in the city directory and relating that number to the number of telephone subscribers in that category. In many cases, however, that method proved unreliable because it was not clear that all of the businesses in a specific category were listed in the city directory.

The city of Louisville was served by both The Cumberland Telephone and Telegraph Company, a Bell licensee, and the Louisville Home Telephone Company, a subsidiary of the independent Central Home Telephone Company. In 1910, the city had 16,263 telephone subscribers. Sixty percent of the phones were residential and the rest were businesses. The independent company enjoyed a moderate advantage, with a thousand more users than the Bell Company. 2,923 users subscribed to both the Bell and independent exchange. The aggregate duplication rate was 18 percent. That number is not very meaningful by itself, however. A breakdown of the subscribers shows that the duplication rate follows a hierarchy, with some groups duplicating at very high rates and others hardly at all. That hierarchy of information flow appears in some form in all social organization. The demand for communication is concentrated among a small number of large users. Those users make up a disproportionate amount of the volume of calling and also tend to demand communication over a broader geographic scope. Thus, among banks, railroads, hotels, and the suppliers of wholesale farm supplies like plows, seed, and fertilizer, both the rate of telephone subscription and the rate of duplication were very high (see table 7-1). All of the businesses in that category had telephones, and 75 to 100 percent of them duplicated. Businesses with a duplication rate over 75 percent accounted for only 1.5 percent of the total telephones in the city of Louisville, but made up 7.5 percent of all duplicate subscriptions. As those enterprises were generally large, capital-intensive, and highly dependent upon widespread communications access, a duplicate subscription was just an additional cost associated with doing business, not much different from ordering an extra telephone extension or another line from a single system.

In the middle of the hierarchy were smaller businesses who used the telephone frequently but whose markets and suppliers were more localized. Retail businesses and professional services, such as physicians, dentists, coal dealers, druggists, and attorneys, drew their customers from more than one neighborhood but were not really citywide in scope. That class of user duplicated at a fairly high rate, but not as often as the larger businesses (see table 7-2). Despite widely varying

²⁰⁶ Cumberland Telephone and Telegraph Co., acquisition of Central Home Telephone and Telegraph, Kentucky. Box 39, AT&T-BLA. Letter of Thomas Tracy to U.N. Bethell, Vice President, AT&T., Feb. 11, 1911.

levels of telephone subscription there was a relatively consistent duplication rate in the range of 30 to 50 percent. For those users, duplication was more of an economic burden than it was to the larger enterprises at the top of the communications hierarchy. Telephones in drug stores, it should be noted, functioned as free public telephones for the community, accounting for both the 100 percent subscription rate and the relatively high level of duplication.

The relative dominance of the Home Co. in Louisville made it much more likely that middle level subscribers who used only one phone would be independent subscribers. There are, however, interesting exceptions to that rule, such as lawyers and insurance companies. Whereas single-phone businesses such as coal dealers, butchers, and plumbers favored the Home Co. by ratios of five or six to one, in the aforementioned professions the Bell Co. was almost even. The disparity could be explained in a number of ways-the data by itself being insufficient to rule out several options. One possibility is that those involved in law and finance had a greater need for long-distance connections to Cincinnati and other major cities controlled by Bell. Another explanation is that certain lawyers and insurance companies formed a community of interest with other Bell users and saw little need for connection with Home Co. subscribers. The lower rates of the independent company must also be kept in mind.

The final class encompasses what might be called the neighborhood level of social organization (see table 7-3). Those users stood at the bottom of the communications hierarchy, in that there were large numbers of users with highly localized uses for the telephone and a relatively low volume of calling. In addition to residential users, it included smaller scale businesses-bakers, barber shops, tailors, and carpenters-and local recreational and cultural institutions, such as saloons, churches, and bowling alleys. Here the duplication rate is consistently low, averaging about 10 percent. Many of the residential duplications were business-related; e.g., physicians and dentists who needed to maintain access to their clients at all times. On the whole, that class of subscribers used the telephone over a limited local area and had less interest in universal access.

Once again, an uneven division of various subscriber categories suggests that subscription choices reflected other social boundaries. There is a marked bias toward the Home Co., for example, among "working class" institutions like bowling alleys, billiard halls, and saloons. The figures for residences and churches, on the other hand, are not so lopsided. That suggests that at the bottom of the hierarchy telephone users were divided by neighborhood and/or economic status. The wealthier sections of town went for the Bell system, which had higher rates and whose advertising tended to project an image of solidity and respectability. Those of more modest means responded to the independent's lower rates and, perhaps, its appeal to localism.

Unfortunately, no statistical breakdown of residential subscribers by neighborhood or economic status exists with which to support that hypothesis. There is, however, an interesting document dated December 3, 1909, concerning the Bell and independent exchanges in Quincy, Illinois. It is a field report on the state of competition in Quincy written for the Central Union Telephone Co., a Bell licensee. It states:

I find that the Central Union Co. is well thot [sic] of by the large majority of substantial business houses and of the better class of resident subscribers, while the

Quincy Home Telephone Co. receives their greatest support from the interest affiliated with the political and labor associations in Quincy. Our subscribers are of the better class, those more able to meet their bills promptly, while the Quincy Home Telephone Co. have the poor class and are running great chances on collecting their accounts.²⁰⁷

A report out of St. Joseph, Missouri, also noted that the independent exchange had attracted a large number of subscribers considered undesirable by the Bell system. The Bell manager there went through the independent company's directory and polled all of its subscribers by telephone. It discovered that eighty of the telephone users who claimed to have switched companies because of problems with Bell were listed as "No Good" on Bell's cash ledger. The report also counted 102 Home Co. subscribers as "undesirable" on account of their being "colored."²⁰⁸ In other communities, the independent, backed by prominent local citizens, may have attracted the "better class." Which telephone company attracted which group is not as important as the fact that the division of the telephone-using public followed other political, social and economic divisions.

TABLE 7-1
DUPLICATION RATES, LARGE-SCALE BUSINESSES

	Both Phones	Home only	Bell only	Duplic rate %	Subscr. rate %
Telegraph Cos.	4	0	0	100	100
Mill Supplies	7	0	0	100	100
Gas, Electric light	4	0	0	100	100
Fast Freight Lines	11	1	0	92	100
Railroads	21	2	2	87	100
Banks, Trust Cos.	25	2	2	86	100
Express Cos.	6	1	0	85	100
Fertilizer Mfrs.	8	1	1	80	100
Hotels	21	6	0	78	100
Laundries	26	7	1	76	?

²⁰⁷ Central Union Telephone Co., form dated Dec. 3, 1909: *Quincy Home Telephone Co.*, AT&T Legal and Regulatory Dept. records, Regulatory History Project.

²⁰⁸ *Extract from the Monthly Narrative Report-St. Joseph*, May 17, 1911, Box 17, AT&T-BLA.

TABLE 7-2
 DUPLICATION RATES, MEDIUM-SCALE BUSINESSES

	Both Phones	Home only	Bell only	Duplic rate %	Subscr. rate %
Hay, Grain, Feed	34	36	3	54	?
Druggists	83	69	3	53	100
Coal Dealers	46	42	9	47	100
Insurance	65	46	36	44	?
Dentists	35	44	3	42	63
Liquor Dealers	43	56	18	37	?
Plumbers	25	45	1	35	74
Attorneys	85	109	90	30	78
Buchers	19	47	7	26	?
Dry Goods	15	36	6	26	21
Groceries	182	466	62	25	?

TABLE 7-3
 DUPLICATION RATES, NEIGHBORHOOD LEVEL

	Both Phones	Home only	Bell only	Duplication rate %	Subscription rate %
Billiard Halls	1	5	0	16	?
Bowling Alleys	1	5	0	16	?
Carpenters	11	55	9	14	50
Barber Shops	1	6	1	12	?
Bakers	9	61	9	11	39
Saloons	64	487	19	11	87
Tailors	8	60	9	10	?
Churches	3	12	14	10	?
Residences	900	5,449	3,971	9	20

As a tool of citywide commerce and communication, then, dual service required large-scale, high-volume users to take out duplicate subscriptions. Business duplication gave both Home and Bell subscribers telephone access to a broad range of the city's institutions and services. As one moved down the scale of social organization from the regional and metropolitan levels to the neighborhood and the home, the rate of duplication progressively declined. In the middle of the hierarchy, there were small businesses who wanted and often needed universal service, but for whom a duplicate subscription represented a significant additional cost. At the lower levels of that hierarchy, where there were large numbers of small users, dual service noticeably restricted the degree of social integration. But it did not do so arbitrarily or randomly. Different classes and neighborhoods divided themselves into communities of interest with a high degree of self-contained communication. There was, of course, always a chance that one would not be able to call an acquaintance or a business. Public telephones on streets and in drug stores and groceries,

however, gave people a chance to use the other system. The lack of interconnection between the two systems was less of an impediment to the telephone users of 1910 than it would be now, precisely because telephone usage patterns and urban organization had not adapted to the possibilities of universal service.

If one of the two competing exchanges controlled less than 35 percent of a city's subscribers, as many as half of its subscribers might be duplicators. In St. Joseph, Missouri, for example, Bell subscribers outnumbered Home Co. subscribers by three to one. The 1,048 duplicate subscribers represented only 12 percent of the Bell list, but accounted for 40 percent of the independent subscribers. In Philadelphia in 1907, where Bell had 95,000 subscribers and the independent only 15,000, 65 percent of the independent subscribers were duplicators. A small market share was not necessarily fatal as long as new subscribers were joining the network at a rapid pace. If the smaller system had a significant pool of what were called "exclusives," i.e. nonduplicating subscribers, it could attract new subscribers and make it worthwhile for business subscribers to duplicate. Once rapid growth in the overall number of subscribers stopped, however, large disparities tended to reinforce themselves over time. More and more subscribers gravitated to the dominant system and the minority exchange's base of "exclusives" began to shrink.

In smaller cities, access competition made it possible for organized groups of telephone users to boycott one service in favor of the other. Group decisions to patronize one system were sometimes motivated by a desire to achieve coordination economies but more commonly arose to protest and punish a rate increase. The instigators could be boards of trade, merchants associations, or groups of physicians, grocers, or druggists.²⁰⁹ Because their decision affected the calling habits of other users, the organizers placed notices in the newspapers advising readers "We only use the Home Telephone" or "Call us over the Home." Or they issued cards with that message and distributed them to their customers.²¹⁰

A particularly effective mass shift of users to one system took place in Paducah, Kentucky, after a Bell rate increase. On June 1, 1911, virtually all of the city's retail merchants ordered their Bell phones taken out and the independent company's phones installed. The grocers, lumbermen and coal dealers kept the Bell phone until July 1 only because the swamped independent exchange did not have the capacity to serve them until then. The number of Bell subscribers decreased by 700 in two months.²¹¹ In an attempt to minimize the damage, Bell kept the names of many of the boycotters in its directory. Advertisements attacking the Home Company appeared in the paper, and five full-time salesmen were sent out to offer \$1 a month service to residences. Groups of doctors and dentists responded with newspaper notices informing the public that they were no longer Bell subscribers and denying rumors that they planned to return to the Bell exchange (see figure 7-2).

²⁰⁹ In one Indiana town the President of Bell's Central Union licensee attempted to break a boycott of its telephone system organized by local grocers by operating competing grocery stores. Sabin to Fish, May 19, 1902. Box 1333, AT&T-BLA.

²¹⁰ 13 TELEPHONY 109 (February 1907).

²¹¹ Powers, Paducah Home Telephone Co, to Thomas Tracy, June 15, 1911. Box 39, AT&T-BLA.

Dual service at the inter-exchange level

The presence of two nonconnected telephone exchanges had a more arbitrary effect on intercity calls. At the local level, the subscribers could gather a fairly accurate idea of to whom they were choosing access when they selected one system over the other. The need for toll connections was often less predictable and the factors determining whether Bell or the independent was dominant in a particular community were not necessarily the same as those in their own city. After 1907, legislatures, courts, and utility commissions began to enforce interexchange connection of Bell and independent systems even when they tolerated dual service at the local level.

The maps on the following pages are representations of telephone fragmentation patterns in three areas between 1894 and 1913. The cities selected for mapping were the State of Indiana in 1889, 1907, and 1912; the Los Angeles area in 1898, 1907, and 1912; and the State of New York in 1894, 1902, 1907, and 1912. Cities are represented by circles. The size of the circles is proportional to the number of telephone subscribers in the city. The circles are tone-coded to show which telephone interest controlled the city's exchange. A gray circle shows that the city was controlled exclusively by Bell. A white circle indicates an independent exchange. A black circle indicates a Bell-connecting, sublicensed exchange. In dual service cities, pie charts indicate what share of the telephone subscribers were controlled by the Bell exchange (gray) and the independent exchange (white).

The map does not represent which cities could be actually be called by a Bell or independent subscriber. In the Indiana and Los Angeles area maps, the area displayed is small enough that it is safe to assume that both Bell and independent subscribers in any exchange shown could call all or most of the other exchanges shown. That is not true of the New York State map, however. A subscriber to the independent exchange in Buffalo, New York, in 1911, for example, could make connections to the independent system in Utica, but probably could not make long-distance connections to Albany, even though there was an independent exchange there. The access universe offered by today's telephone system is perfectly homogeneous. A user in any city can call the same people and locations as a user in any other city. That was not the case between 1894 and 1920. When a telephone system is imperfectly interconnected, the points accessible to a user are different for every city. The system had an individual "perspective," as it were: which cities could be called depended on where one was calling from and the network to which one subscribed. That poses complex problems in data collection and mapping representation which have been avoided here.

Another important limitation of the mapping is that with a few exceptions it does not extend to exchanges communities with populations less than 5,000. There were, of course, a huge number of such exchanges, but data about them was sparse and unreliable. For that reason, the maps drastically underrepresent the significance of sublicensing, an activity which tended to be concentrated on the smaller exchanges.

With the exception of the independent exchange in Los Angeles, which did not make any interstate connections, the range of communication of both Bell and independent subscribers may have extended beyond the geographic area shown. A more extensive map, however, would have

imposed even more difficult data requirements. The limitation is justifiable, moreover, because the maps do show the area that would have been most important to subscribers in the selected cities. All the available evidence suggests that the ability to place calls to points more than 300 miles away was a negligible factor to telephone users at that time.

The concept of “telephone access” is not unambiguous. Documents in the Bell archives show that around 1900 it was fairly common for Bell operators to manually repeat messages over long-distance circuits if the speakers’ voices were too faint to be heard unaided.²¹² In a purely technical sense, the speakers were inaccessible to each other, but the intervention of a human “repeater” allowed a conversation to take place. Both Bell and the independents often placed public toll stations in cities where they lacked exchanges; thus, although all the exchange subscribers in that city could not be reached by one of the two systems, residents were able to place outgoing calls on either system. It was also possible for independent exchanges to be connected physically by long-distance lines but still be inaccessible. If the call had to pass through an excessive number of switching offices to get to its destination, conversation may have been impossible. Each transfer increased attenuation and waiting time, and beyond a certain number of transfers placing a call was either physically impossible or so inconvenient as to be worthless. That was more of a problem with the independents than with Bell, for after 1900 the Bell system began to consciously organize the relationship between local feeder lines and through circuits in ways that avoided those problems.

The maps graphically display developmental patterns that are described in greater detail in the narrative. It is apparent from the 1894 maps that prior to the expiration of the patents, the Bell system concentrated its development on major cities and neglected small towns. That pattern is particularly evident in the Indiana map. From 1894 to 1913 the Bell system dramatically extended its system. The maps show that many new exchanges were established in smaller towns and that Bell entered into interconnection arrangements with independents in other areas. The sublicensed independent exchanges are color-coded black. The maps show that after 1906 successful independent exchanges which had attained a dominant share of a city’s subscribers were induced to join the Bell system, thus decreasing the scope of independent access. The Utica independent exchange was cut off from connections to independents in and around Albany when the independent in Auburn was bought out by Bell, and other exchanges that once formed part of the independents’ link between Utica and the cities to the east were sublicensed. In the Los Angeles area, independent exchanges that had beaten their Bell rivals in exchange competition were sublicensed and brought into the Bell system.

The maps provide some interesting clues about the extent to which user convergence on a single network affected the Bell- independent competition. The maps show clearly that when convergence did take place it was quite localized. Either it was confined to a single city, such as Fort Wayne and its immediate suburbs, or, when a major urban center such as New York was involved, it occurred over a radius of about fifty to eighty miles. It did not occur over the nation as a whole or even over an entire State. The Southern California map, for example, shows that despite

²¹² On the use of human repeaters, see Doolittle to Cochrane, Jan. 16, 1901, *Hudson River Telephone Co.-Toll Requirements*, Box 1330, AT&T-BLA, at 8. Doolittle observed that many of the cancelled calls were from “women who do not seem to talk loud enough and [who] declined to have the messages repeated.”

the Bell system's connections to northern California and neighboring states, the independent exchange in Los Angeles was able to hold onto half of the city's subscribers for an extended period of time. The Los Angeles independent did not make any interstate connections and for most of its existence had no access to San Francisco, Oakland, or points north. Telephone communication patterns may have been increasingly interdependent at the regional and local level, but long-distance telephone connections over a 100-mile area did not seem to have a significant influence on the majority of local exchange subscribers.

Prior to 1898, the Bell system had established very little presence in Indiana's small towns. By 1898, the Fort Wayne independent exchange controlled the majority of that city's subscribers. By 1913, that lead had become an overwhelming one. From 1906 to 1913, Bell sublicensed many of the independent exchanges in Fort Wayne's vicinity, giving it access to those cities and denying it to the independents. While Bell's lack of access to the surrounding territory made it possible for the Fort Wayne independent exchange to grow rapidly at Bell's expense, once Bell improved its position in the surrounding areas it failed to erode the independent's dominance in Fort Wayne. With the bulk of telephone communication being local, the expanded short and long-distance connections offered by the Bell system were not enough to overcome the inertia associated with the Fort Wayne independent's near-monopoly control of local exchange service.

The situation is quite different in the regions surrounding the major urban metropolis of New York. There convergence effects seem to have been felt over a fifty to 100 mile radius. Bell's monopoly control of exchange service in New York city seems to have had a stultifying effect on independent exchanges over an eighty mile radius, affecting independents in Northern New Jersey (not shown on the map) and well into New York state. That can be interpreted as evidence that the formation of large urban centers created a regionally interdependent communication pattern. We will never know whether dual service would have been viable in the nation as a whole had there been a competing exchange in New York city. But it is clear that the absence of competition in New York thwarted dual service competition in the surrounding areas.

The map data conflict with the common belief that Bell's superior long-distance technology was instrumental in defeating the independents. The patented technologies would have given Bell an advantage in providing calls over 200 miles in length. Such ultra-long-distance connections were a negligible force in leading to convergence at the local level. The demand for long-distance connections would be concentrated on a small number of users rather than evenly distributed over many users. That kind of demand structure can sustain dual systems. When the communication patterns of a minority group are strongly concentrated on a small number of users outside the majority network the tendency to converge on a single system can be nullified. The maps provide some empirical support for that viewpoint. In many cities one of the local exchanges controls 75 to 90 percent of the subscribers. That did not, however, lead to total elimination of the competing exchange in all cases. A small sliver of the subscriber pie remained with the minority exchange. Those diehard subscribers were business users who wanted long-distance connections that the dominant system did not offer. In Fort Wayne, for example, the near-total dominance of the independent did not lead to the loss of all Bell subscribers. The demand of the Bell remnant was concentrated on long-distance points that could not be reached through the independent system.

For the majority of subscribers, however, making calls to places over 100 miles away was a rare event. If the Bell system had the only long-distance connections to a city and a subscriber was attached to the independent system, he went to the Bell central office, where there were special booths set up to handle toll calls, or to a public toll station somewhere in the city. Behavioral evidence from the early 1900s indicates that that fragmentation of toll calling was not then perceived as unthinkable as it would be now. A Mr. Schleicher, the Bell manager at Mt. Carmel, Illinois in 1904, noted that the only toll lines of the competing exchange in his city ran to a nearby farmer system:

Supervisor: Are the patrons of the Home Company complaining of inability to get outside connections?

Mr. Schleicher: Well, no, sir.

Supervisor: They inconvenience themselves by coming into our office?

*Mr. Schleicher: Yes, sir. I had toll business last month amounting to \$250. They will inconvenience themselves by walking three or four squares to our office.*²¹³

A vivid (but probably not typical) account of that process is contained in the correspondence of Thomas Doolittle. On an inspection of the Bell facilities in Middletown, New York, in 1901, Doolittle observed that poor Bell service had left its exchange with only eighty-nine subscribers to the independent's 400:

It must be remembered that the 400 opposition subscribers have to come to our office to get long line service. At the time of my visit there were six people standing in a dark place less than six feet square, with no place to sit, and all waiting for a long distance connection. I entered the booth to make a call for Albany, and felt compelled to step outside pending the making up of the connection, on account of the offensive odor of the place.²¹⁴

Apparently, to merchants, farmers, and other businesspeople-to whom long-distance telephoning was necessary but not routine, going to the Bell office to place a call seemed no more unusual than going to the post office to mail a letter.

²¹³ 10 CUMBERLAND TEL. J. (Jan. 15, 1904).

²¹⁴ *Hudson River Tel. Co.-Toll Requirements*, supra note 8, at 14.

8

UNIVERSAL SERVICE: VAIL'S ANSWER TO DUAL SERVICE

BY THE MIDDLE OF THE DECADE, both the telephone and competition had spread through American society widely enough to spark policy debates that transcended a particular locality. Discussions of telephone competition began to seep into national forums, much as the issue of railroad regulation had done twenty years earlier. In order to shape the debate to their advantage, Bell and the organized, commercial independents mounted nationwide public relations campaigns and found outlets for their views in magazine articles, advertisements, speeches, and books.

It was at that juncture that Theodore Vail, newly re-installed as President of AT&T, began to promulgate the policy of “universal service.” The term never appeared explicitly before that time. Nor had anyone inside or outside of the Bell system publicly defined such a comprehensive vision of the telephone industry and the respective roles of Bell, the independents, and the government. That being said, it is important to resist the temptation to approach Vail’s universal service doctrine anachronistically. Universal service did not mean rate subsidies to make telephone service more affordable. It meant the elimination of fragmentation and the unification of telephone service under regulated local exchange monopolies. As such, it was first and foremost a response to the situation created by access competition, a response that provided the Bell system with a critique of dual service and an appealing alternative. This chapter explores Vail’s elaboration of the doctrine and the context from which it emerged.

Dual service: The public debate

Fragmentation of telephone users, particularly business users, had played a critical role in political defeats suffered by independents in large cities. In June 1905 the Merchants Association of New York issued a report to the city franchising authority expressing adamant opposition to franchising any independent telephone company. “The effect of two rival telephone systems in one

city is to divide the population into two parts, without means of telephone communication with each other except at excessive cost.” Dual service “compels a choice of two evils: either half service or a double price.”²¹⁵ The New Orleans Board of Trade came to almost identical conclusions in its report of 1908.²¹⁶ Similarly, an assortment of user groups in Chicago had opposed the franchising of a competing telephone company in 1907 because of the inconveniences of dual service. The Telephone Users Protective League, which described itself as a federation of “28 of the largest and most important business and commercial associations in Chicago,” sent a resolution opposing dual service to the Chicago City Council.²¹⁷ The Chicago Federation of Labor, claiming to represent “large numbers of telephone users,” declared that “duplicate telephone systems in this city would be a calamity to all users.”²¹⁸

The independent trade press affirmed that business users in the top and middle of the communications hierarchy often opposed the introduction of dual service. “It is the merchants and business men of a community, newspapers, and other personal and impersonal leaders of public thought that are generally found in the forefront of the opposition to the ‘nuisance of two systems’ in towns where competition is first suggested,” noted the *American Telephone Journal*.²¹⁹

The Bell organization did everything it could to reinforce those complaints about fragmentation. One of the earliest entries in the national debate was an article in *The Atlantic* in 1905 entitled “Telephone Development in the United States,” by F.W. Coburn.²²⁰ Although no direct proof that Coburn was Bell-funded is available, the magazine was published in Cambridge, Massachusetts, near American Bell headquarters, and took an unambiguously pro-Bell stance. The author began by recounting the extraordinary growth of telephone usage and long-distance interconnection. Engineers, to whom he referred in tones approaching reverence, were projecting a telephone penetration rate of one telephone for every five households in the near future. In the not too distant future, Coburn claimed, the telephone would be within the reach of everyone and a “great national system” would “enable everybody to reach practically everybody else anywhere in the United States.”

What Coburn refused to admit, or did not understand, was that the goal of universal telephone coverage had only been brought within reach because of access competition. Prior to the stunning progress in telephone penetration and the geographic scope of the network in the preceding ten years, an article such as his could never have been written. In the author’s presentation, however, those impressive advances were attributed to *expert engineers*, not to business rivalry. Indeed, the very existence of independent companies was denounced as an obstacle to “that orderly development of the telephone utility upon which the engineering experts are basing their estimates.”

²¹⁵ DELOS F. WILCOX, MUNICIPAL FRANCHISES Vol. I 240 (The Gervaise Press 1910).

²¹⁶ *Id.* at 241.

²¹⁷ “The greatest possible inconvenience and unnecessary expense to telephone subscribers would result from the existence of two competing telephone systems in Chicago.” Chicago City Council, Committee on Gas, Oil and Electric Light, Communications, etc., 2023-24 (Nov. 4, 1907). AT&T-L&R.

²¹⁸ *Id.* at 2024-25. The Labor Federation also objected to the Bell policy of refusing to interconnect with independent exchanges outside of the city.

²¹⁹ AMERICAN TEL. J. 238 (1906).

²²⁰ *Telephone Development in the U.S.*, 96 THE ATLANTIC 644 (Nov. 1905).

The only “proper reason” for the independents’ existence was to occupy territories which no Bell company had ever preempted, and even then their presence was justifiable only when they agreed to restrict themselves to local service and rely exclusively on Bell to provide the long-distance connections.²²¹ The author condemned dual service as the cause of “manifold inconveniences” and “protracted irritation on the part of citizens:”

If one is a user of the Bell telephone, while one’s correspondent is a user only of the service of an independent company, the two people are still as far apart as if Mr. Bell had not invented the telephone. The only remedy in such circumstances is expensive and cumbersome; each man must use the service of both companies.

The *Atlantic* received so many outraged letters responding to the Coburn piece that it decided to give an independent spokesman equal time. The response, however, was poorly conceived.²²² It devoted most of its argument to a plodding discussion of other inventors besides Bell who had, allegedly, devised a telephone—an irrelevant issue by 1905.

A year later, the *Bulletin* of the League of American Municipalities began to carry articles by one H. J. Gondon condemning telephone competition.²²³ The League was an association of reform city officials based in Des Moines, Iowa. Its pages explored and advocated the new managerial techniques pioneered by the progressive movement: city government by commission, municipal ownership or regulation of public utilities, the elimination of bribery and corruption, etc. Its strongest ties were to city governments in Kansas, Nebraska, and Iowa.

The independent trade publication *Telephony* responded vigorously to the charges in the *Bulletin*, denouncing its author as a “Bell hireling.”²²⁴ Bowing to the pressure of the organized independents, the League’s *Bulletin* ceased its criticism of telephone competition and reprinted a speech by Francis Dagger, a Canadian advocate of competition, in the August 1906 issue. Dagger pointed out how competition had advanced the development of telephony, lowered rates, and improved service. The conflict probably made the midwestern urban reformers uncomfortable. All of their instincts led them toward expert planning: competition in utility services was wasteful and chaotic, regulated monopoly was the ideal. But they were also critical of big corporations and in favor of locally responsive government, which tended to make them sympathetic to independent, local companies.

The independents did not have Bell’s nationwide public relations organization, but they did not do badly. They relied on the trade press to monitor the public dialogue and used spokesmen

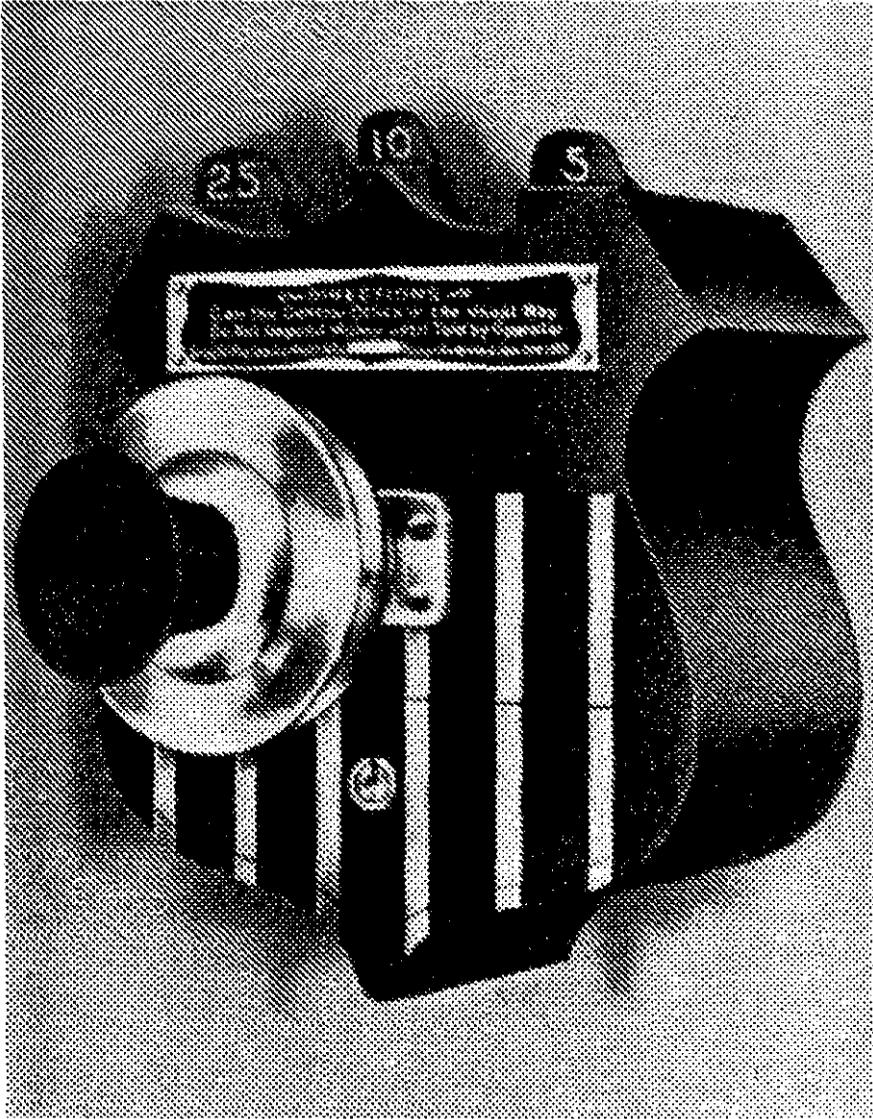
²²¹ That conception of the independents’ role in the industry mirrors so closely that of the Bell system itself that Coburn almost has to be viewed as a Bell propagandist.

²²² 97 *THE ATLANTIC* 236 (Mar. 1906).

²²³ *BULLETIN OF THE LEAGUE OF AMERICAN MUNICIPALITIES* (Sept. 1904-July 1906). New York Public Library, Room 228. Group 10 document file Misc. #5. For *TELEPHONY’S* attack on the *BULLETIN* see 12 *TELEPHONY* 130 (Aug. 1906) and 12 *TELEPHONY* 186 (Sept. 1906).

²²⁴ 12 *TELEPHONY* 130 (Aug. 1906).

FIGURE 8-1



from state and national associations to air their case in public hearings. Their national organization adopted a common symbol, “the shield,” to mark independent telephones and exhorted all its members to use it (see figure 8-1). In 1906, *Telephony* magazine published a propaganda book to present the independents’ side of the controversy. *A Fight With an Octopus* was written by Paul Latzke, author of popular magazine articles romanticizing industrial success. The essays making up *Octopus* first appeared in serial form in *Success* magazine. The book extolled the independent movement as a story of the triumph of honest, enterprising Americans over a greedy, distant trust. The publishers of *Telephony* took care to make the book “high-grade, dignified and attractive” but also inexpensive enough to reach a mass audience.²²⁵ It was sold in lots of 1,000 for thirteen and a half cents each.

Initially, the independent movement was put on the defensive by attacks on subscriber fragmentation. By 1907, however, it had developed a plausible and interesting set of counterarguments. Fragmentation notwithstanding, the rivalry for new subscribers had resulted in a net increase in telephone access for most users. Business users may have had to pay more in absolute terms for two subscriptions, but they were getting access to five to ten times as many subscribers for a price that was only a little higher than the rates of the monopoly period.²²⁶ In Indianapolis, a business subscriber paid \$72 per year for access to 2,286 other users in 1898. Following the entry of the New Company, a business user who subscribed to both systems paid \$94 for access to 21,000 subscribers. The independents also cited indisputable evidence that competition had improved the service offered by the Bell companies.²²⁷ Those benefits, they argued, were well worth the price of some fragmentation. Some independent spokesman responded that the very redundancy of which the business-people complained was of great value.²²⁸ The availability of more than one channel into the office promoted safety and reliability.

A more thought-provoking argument pointed out that businessmen accepted fragmentation and duplication as a normal and unobjectionable product of competition in other communications-related areas. An analogy was drawn between telephones and newspapers as channels for gaining access to the public. At that time most cities had many competing daily newspapers. “What forces the business man to take two telephones?” asked Col. Powers of the Louisville Home Telephone Co. “The same thing that forces him to advertise his goods in two newspapers in a town instead of one-in order that he may reach the people.”²²⁹ In theory, a newspaper monopoly would relieve the advertiser of the need to place duplicate ads in two or three

²²⁵ 12 TELEPHONY 155 (Aug. 1906).

²²⁶ Independent Telephone Association, *Some Comments on the 1907 Annual Report of the AT&T*, cited in Wilcox, *supra* note 1, at 18.

²²⁷ New York City Bureau of Franchises, *Result of Investigation of the Operation of a Dual System of Telephones in Various Cities* 8 (Nov. 21, 1906) Cited in Wilcox, *supra* note 1.

²²⁸ “When a subscriber says that two telephones are a nuisance, he means that the two instruments sitting on his desk are an inconvenience, they are irritating to his vision. He objects to two bells ringing simultaneously, maybe once a month or so. But two telephones on a man’s desk, reaching two different companies in active competition with each other...are vastly beneficial to that man. His ability to reach everyone in two different manners through different sources is of immeasurable value, as is the ability to have everyone in the community reach him over two different ways.” Burt Hubbell, quoted in *Chicago Hearings in Government-Bell Trust Suit*, 65 TELEPHONY 21 (Nov. 29, 1913).

²²⁹ 11 TELEPHONY (June, 1906).

different papers and would relieve the reading public of the inconvenience of buying and reading two or more newspapers. In actual practice, the competition between papers increased circulation, lowered advertising rates, and delivered to the business a larger audience at a savings. Thus, while the independents recognized the advantages of universal interconnection, they did not think that it made the telephone industry exceptional.

The independents also supported competition as the best way to control rates. Eliminating fragmentation was usually associated with returning to monopoly. (The debate over physical connection will be taken up in the next chapter.) That was, in fact, the most popular argument of the independents. To many users, the inconvenience of fragmentation seemed less worrisome than being subjected to rates set by a monopoly. Unification of the systems seemed like a fine idea in the abstract, but if it would result in a rate increase, many preferred to stick with dual service.

The material above makes it abundantly clear that as competition reached its zenith in 1907, fragmentation of the service had become the primary topic of telephone policy debate along with rates. That context is indispensable in any valid interpretation of Vail's concept of universal service.

Vail's doctrine of universal service

The biggest salvo in the debate was fired in AT&T's 1907 Annual Report, written by Theodore Vail himself upon his return to the presidency. In it, Vail articulated for the first time the triad "One System, One Policy, Universal Service" and the philosophy underlying it. The themes struck up in 1907 were repeated with variations in every succeeding *Annual Report* until 1914. The *Annual Reports* were as much political pamphlet as business reports; they were sent to thousands of newspapers and opinion leaders as well as the company's stockholders. In them, Vail hammered away at the theme that only an integrated monopoly offering connections among all subscribers in all locations could realize the telephone's potential.

Vail's doctrine of universal service is well documented.²³⁰ Once placed in the context of the ongoing public debate about access competition, its meaning is clear. Universal service meant forsaking the fragmentation and heterogeneous management fostered by access competition and choosing instead to develop the telephone as a unified, integrated monopoly. The following statement from the 1910 Annual Report contains the essence of Vail's conception of universal service:

[The Bell System] believes that the telephone system should be universal, interdependent and intercommunicating, affording opportunity for any subscriber to any exchange to communicate with any other subscriber of any other exchange within the limits of speaking distance.²³¹

²³⁰ Vail worked out the ideas promoted in the Annual Reports in a lengthy paper entitled Policy of the Bell System, Box 1080, AT&T-BLA.

²³¹ 1910 AT&T ANNUAL REPORT 43.

In other words, all users of the telephone should be interconnected. As the preceding passage makes clear, Vail's rhetorical style relied on alliterative triads, the elements of which were overlapping but not entirely redundant. "One system, one policy" meant a single physical network, centrally managed and coordinated to achieve compatibility. "Universal service" meant the interconnection of all telephone exchanges and users. It also had some connotations of geographic ubiquity, but Vail's sublicensing policy made it clear that geographic coverage of remote areas was to be achieved by interconnecting with noncompeting independents, not by extending the Bell system everywhere.

Implementing that vision required eliminating access competition. Indeed, it is impossible to understand the thrust of Vail's arguments unless it is seen as a critique of, and alternative to, access competition. The power of Vail's ideas came from their comprehensiveness and consistency. Universal service was not a ploy cooked up for Bell's momentary advantage but a coherent set of principles regarding the telephone's role in society and the proper way to develop the business. Vail's rationale for universal service had four basic components, enumerated below.

The "Network Externality"

The first element was that the value of telephone service grew as the number of subscribers grew:

"A telephone without a connection at the other end of the line is not even a toy or a scientific instrument. It is one of the most useless things in the world. Its value depends on the connection with other telephones-and increases with the number of connections."²³²

Vail's acute recognition of the network externality provided the basis for his critique of access competition. Competing exchanges fragmented the telephone calling universe, thus diminishing the value of the service. Those who subscribed to one system, he said, received "a partial value [which] cannot be satisfactory," while "important users" were forced to take out duplicate subscriptions.²³³ To that unwelcome predicament Vail contrasted his alternative:

The fundamental idea of the Bell System is that the telephone service should be universal, intercommunicating, and interdependent; that there are *certain people* with whom *one communicates frequently and regularly*; there are a *certain few* with whom one *communicates occasionally*, while there are *times* when it is *most necessary to get communication with some other one*, who, until the *particular necessity arose, might have been unknown and unthought of. It is this necessity, impossible to predetermine, which makes the universal service the only perfect service.*²³⁴ (italics in original)

²³² 1908 AT&T ANNUAL REPORT 21.

²³³ 1907 AT&T ANNUAL REPORT 17.

²³⁴ 1910 AT&T ANNUAL REPORT 39.

Vail's clear reference here to "the universal service" as a service that provides access to "unknown and unthought of" parties makes it undeniable that universality referred to the unification of service. Indeed, his emphasis on the value of unfragmented telephone access reveals a profound understanding of the growing interdependence and impersonality of industrial society. Dual service was less burdensome when parties could be reasonably sure of who and where their communication partners would be. But a modern urban society, with an increasingly specialized economy adapted to the capabilities of communication and transportation between remote points, required forms of coordination and cooperation that could not be predicted in advance. That was the strongest of his arguments for integration of the telephone system.

Clearly, the network externality implies that a continuous broadening of telephone penetration would be beneficial to users. But just as clearly, Vail's reference to "the universal service" in that context was not a commitment to extend service everywhere and to everyone regardless of cost. It simply meant that those who did have telephone service should be accessible to each other and not fragmented into competing exchanges. If the growth of penetration per se had been the primary issue, Vail's argument against competition would have lacked any force, for no one disputed the rapid increases in telephone diffusion that had occurred because of competition. Moreover, everyone knew at the time that Bell's prices were higher than its opponents'.

Centralization of Control

The second pillar of Vail's argument was the claim that universal intercommunication required centralized control and coordination. Service should be provided by, or under the control of, a single firm:

The Bell system was founded on the broad lines of "One System," "One Policy," "Universal Service," on the idea that no aggregation of isolated independent systems not under common control, however well built or equipped, could give the public the service that the interdependent, intercommunicating, universal system could give.²³⁵

Here again connectivity, not social ubiquity, is the basic issue being addressed. Unless the network developed under the guidance of a single firm, Vail contended, telephone users' ability to make connections with exchanges in other locations would be thwarted by uncoordination and technical incompatibility. Although compatibility is a precondition of social ubiquity, the two cannot be equated.

A corollary of that element of the universal service doctrine was the proposition that *monopoly*, not interchange of traffic among the competing systems, was the best way to achieve universal intercommunication. From 1907 to 1914, compulsory interconnection became an increasingly common demand among utility regulators. Vail condemned interconnection of competitors as unfair, because it allowed smaller competitors to share in the benefits of the Bell system's larger access universe. Such competition would parasitize the larger system and amounted

²³⁵ 1909 AT&T ANNUAL REPORT 18.

to legalized confiscation of its property.²³⁶ Interconnection also would create a messy, heterogeneous telephone system which would lack the technical integrity and coordination of a single system.²³⁷

The imperfection of competition in telephony

Third, Vail contended that competition between telephone networks is always imperfect competition. His argument was based on a clear grasp of the inherent nonhomogeneity of separate networks. Rival telephone services are never perfect substitutes for each other because both will offer access to different subscribers:

Competition means that the same thing, or a satisfactory substitute, is offered. In this sense there can be no competing exchanges unless each exchange has the same list of subscribers, which is in itself inconceivable.²³⁸

Consequently, competition requires either a duplicate subscription, which Vail considered wasteful, or restricted access.²³⁹ It is clear from this that in Vail's mind, competition was synonymous with *access competition*, and that his doctrine of universal service was in essence a critique of and alternative to it.

Regulation as the alternative to competition

Having made the case for monopoly, Vail indicated that he was willing to accept the consequences of removing his industry from competitive pressures: government regulation of rates and service.²⁴⁰ In the annual reports and in an article in the *Atlantic* published in 1913, Vail argued for a private monopoly monitored by an expert commission, a view that dovetailed with developments in other utility services.²⁴¹ That was an essential ingredient of the universal service doctrine because dual service retained a strong core of support among users who feared monopoly pricing if it were eliminated. But the role of government involvement, in that conception, did not go beyond substituting for the rate and service controls of a competitive marketplace. There is not a hint of the notion that Bell and the government were joining in a partnership to extend service to everyone.

Contemporary readers can easily misinterpret Vail's references to "universality" as a commitment to social ubiquity. By 1907, after fifteen years of independent competition, Vail did in fact make rhetorical jabs in that direction, although they were notable for their vagueness. In the 1910 Annual Report he wrote: "[the Bell system] believes that some sort of a connection with the telephone system should be within the reach of all."²⁴² Just what "sort of a connection" and the meaning of "within the reach of" are left unspecified. In all his pronouncements about universal

²³⁶ 1910 AT&T ANNUAL REPORT 44-46.

²³⁷ *Id.*, at 46-47.

²³⁸ 1910 AT&T ANNUAL REPORT 37.

²³⁹ 1907 AT&T ANNUAL REPORT 17-18; 1909 AT&T ANNUAL REPORT 22-23; 1910 AT&T ANNUAL REPORT 37.

²⁴⁰ 1907 AT&T ANNUAL REPORT 18-19.

²⁴¹ 111 THE ATLANTIC 311 (Mar. 1913).

²⁴² 1910 AT&T ANNUAL REPORT 43.

service, that is the closest Vail ever comes to enunciating a commitment to geographic ubiquity. There is a perfectly logical reason for the peripheral, passing way in which Vail handled that issue. Such statements represent a concession to the independent movement and to the pressures of access competition. Writing in 1910, Vail had, just two years earlier, drastically liberalized the company's sublicensing policies to encourage interconnection with independent exchanges in remote, "unremunerative" areas so that the Bell system would not have to build and maintain its system there. The Bell system's willingness to recognize independent systems as a permanent part of the country's telephone network represented a major retreat from its earlier belief that Bell and Bell alone should control the entire industry. The breakneck expansion of the Bell system after 1900 to develop more exchanges and short-haul toll lines, another policy change forced upon it by access competition also represented a sharp departure from its earlier vision of an exclusively urban, business-oriented national network. If Vail was now forced to admit that "some sort of a connection to the telephone system should be within the reach of all," the grudging character of that statement should not surprise us.

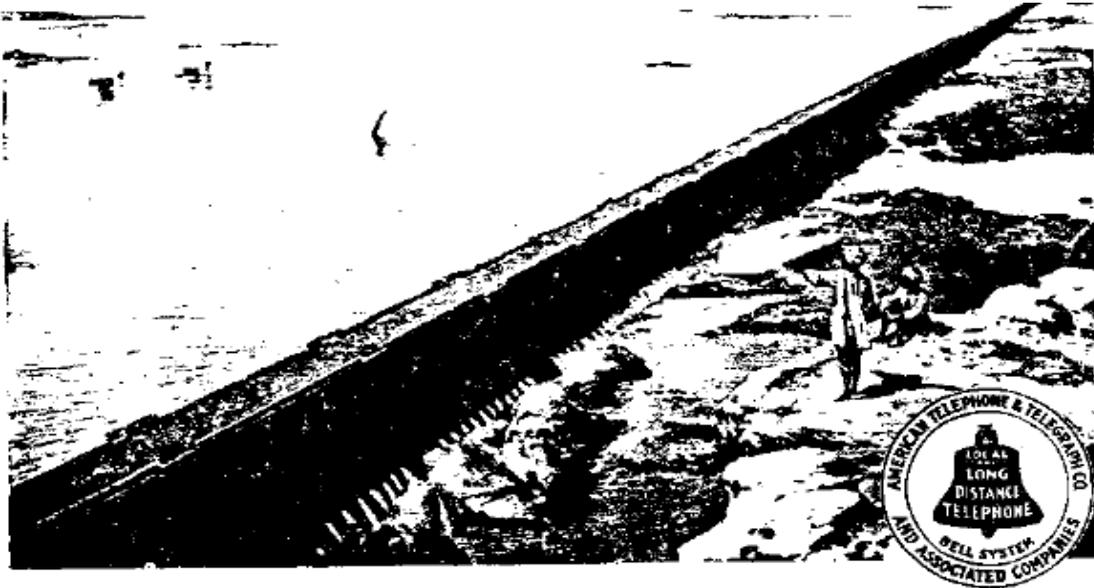
The uniqueness of Vail's vision lay not in AT&T's alleged commitment to extend service everywhere and to everyone. At that juncture, no one disputed either the desirability or the inevitability of the telephone's rapid diffusion. Indeed, the independents far outstripped the Bell system in their commitment to extend telephone service to previously unserved areas. The growth of penetration and the affordability of service were not really the points at issue at that time. What set the Bell policy apart was its commitment to interconnect all telephone users into one big, centrally managed, nationally integrated system. The real debate was between competition and monopoly, between unification and fragmentation. Vail's doctrine of universal service represented the most powerful case for the latter that could be imagined.

Vail's vision infused the Bell system with a new coherence. "Universal service" became a competitive strategy, a political slogan, and a catchy advertising term rolled into one. In a series of full page ads which began to appear in 1912, Bell presented itself as a nationwide system linking every community in the United States, even though it was years away from achieving that goal (see figure 8-2). "To one who has a Bell telephone at his lips," one ad declaimed, "the whole nation is within speaking distance." Another ad contrasted "Telephone Service: Universal or Limited" (see figure 8-3) and compared independent telephone systems to medieval walled cities because of their alleged lack of connections to the outside world.

Placed in historical context, Bell's commitment to universal service emerges as a coherent response to the pressures of access competition. Bell's ability to offer connections to more locations than its rival independent exchanges was its greatest competitive advantage. Instead of fighting to eliminate all independents, it would absorb them into the "universal" system by making them noncompetitive feeders through sublicensing. Above all else, universal service was the spearhead of Vail's drive to achieve political support for the elimination of competition.²⁴³ It provided an appealing rationale for the consolidation of competing exchanges that could be used to

²⁴³ Bell's positioning of itself as the universal system successfully concealed its own refusal to eliminate fragmentation by interconnecting with its independent competitors. Bell strategically withheld the benefits of a unified service from the public and the independents until it had succeeded in winning support for regulated monopoly as the industry structure.

FIGURE 8-2



The Nile System—The Bell System

For thousands of years Egypt wrestled with the problem of making the Nile a dependable source of material prosperity.

But only in the last decade was the Nile's flood stored up and a reservoir established from which all the people of the Nile region may draw the life-giving water all the time.

Primitive makeshifts have been superseded by intelligent engineering methods. Success has been the result of a comprehensive plan and a definite policy, dealing with the problem as a whole and adapting the Nile to the needs of all the people.

To provide efficient telephone service in this country, the same fundamental principle has to be recognized. The entire country must be considered within the scope of one system, intelligently guided by one policy.

It is the aim of the Bell System to afford universal service in the interest of all the people and amply sufficient for their business and social needs.

Because they are connected and working together, each of the 7,000,000 telephones in the Bell System is an integral part of the service which provides the most efficient means of instantaneous communication.

**AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES**

One Policy

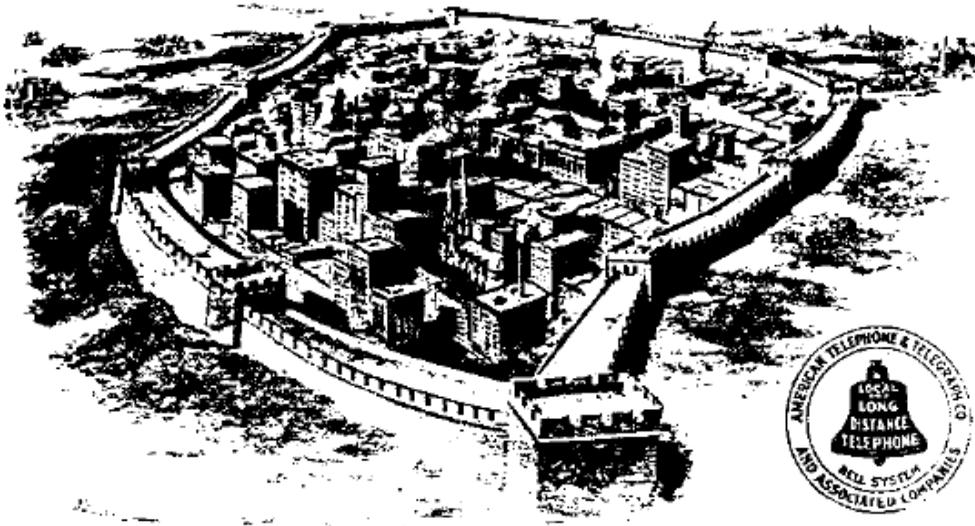
One System

Universal Service

49

Sept. 1912

FIGURE 8-3



A MEDIAEVAL CONDITION

Telephone Service— Universal or Limited?

TELEPHONE users make more local than long distance calls yet to each user comes the vital demand for distant communication.

No individual can escape this necessity. It comes to all and cannot be foreseen.

No community can afford to surround itself with a sound-proof Chinese Wall and risk telephone isolation.

No American State would be willing to make its boundary line

an impenetrable barrier, to prevent telephone communication with the world outside.

Each telephone subscriber, each community, each State demands to be the center of a talking circle which shall be large enough to include all possible needs of inter-communication.

In response to this universal demand the Bell Telephone System is clearing the way for universal service.

Every Bell Telephone is the Center of the System

**AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES**

32

April 1911

counter growing antitrust challenges to Bell's dominance. Far from being a benevolent gift of Bell management or government regulators, the universal service concept was a deadly competitive weapon and a very effective business strategy.

The early debate over universal service did conceive of telephone penetration in broader terms. Trade journals and the popular press at the turn of the century marveled at its rapid penetration of farm areas and residences and interpreted that as a sign of the inexorable progress of the industrial age.²⁴⁴ Where the 1880s and early 1890s saw the telephone as a specialized commercial device, few observers in the 1900s or 1910s would have disagreed with the assertion that eventually there would be or should be a telephone in every home. But that progress was seen as something that would occur naturally as industrialism increased wealth, lowered prices, and improved technology. Universalism in that sense posed no special policy issue and required no government action. The real policy issue was whether the telephone would develop under the guise of separate, competing systems or as a unified monopoly.

In 1907, public opinion was almost evenly divided, with dual service probably commanding more support because of its intrinsic constraints on rates. But the events of the next ten years would bring about a profound shift in public attitudes.

²⁴⁴ Commenting on the growth of residential subscribership in New York city, the ELECTRICAL REVIEW wrote, "it will not be long before no moderately well appointed residence will be considered completely equipped if it is not connected to the telephone system," 31 ELEC. REV. 180 (Oct. 13, 1897). For similar expressions of confidence in the inevitability of the spread of the telephone, see *The fanner and the telephone*, 31 ELEC. REV. 126 (Sept. 15, 1897), and *Making [Social] Calls by Telephone*, 30 ELEC. REV. 146 (Mar. 31, 1897).

9

THE POWER OF INTERCONNECTION, 1908-1913

FROM 1908 TO 1913, access competition entered a critical phase—the beginning of a *breakdown of system exclusivity*. Access competition still placed enormous pressures on both sides to increase the scope of their network. The era of raw expansion was mostly over, however. The greatest potential for growth in the scope of the networks came from more intensive development of toll connectivity among established exchanges and from the growth of telephone penetration within exchanges. In that context dual service came to be perceived as a barrier to communication more often; users began to demand a complementary relationship between the networks rather than an exclusive one. In order to remain competitive, the telephone companies had to respond to that demand. If the scope of the telephone system was to continue to widen, the barriers between the two systems had to be breached. Unfortunately for the independents, their movement was far more prone to disintegration than Bell's. Bell's unified organization and policy made it impervious to fragmentation. The real basis of the Bell system triumph in that period came from maintaining its integrity as a system while relaxing its restrictions on allowing independents to interconnect with it. As a result, large numbers of independent exchanges connected with the Bell system and deserted the exclusive access universe of the organized independent movement.

The relationship between interconnection and network competition was the central preoccupation of that period. There were two distinct aspects to the issue. One was the strategic use of interconnection in the Bell-independent rivalry. The other was the attempt of courts, legislatures and regulatory commissions to find an appropriate public policy regarding interconnection. Should competing networks be compelled to connect or not? Did interconnection preserve or destroy competition? Was the strategic use of interconnection rights an anticompetitive practice or a legitimate exercise of the right of contract? Was it necessary to eliminate competition to bring about universal interconnection? Those questions moved to center stage but only succeeded in producing a welter of contradictory decisions.

The Development of regional independent operating companies

From 1898 to 1906 the story of independent development was largely one of building exchanges and short-haul toll lines. After 1906, the independents began to exploit their control of exchange access to develop competitive intercity long-distance lines. While independent exchange development peaked around 1904, their long- distance activity flourished from 1906 to 1911. Large regional independent operating companies, formed through mergers of several smaller companies, started long-distance subsidiaries and went about constructing access universes comparable in scope to that of a Bell licensee company. The independents, too, began to speak of “universality.” In 1908 A. C. Lindemuth, the proprietor of the Richmond, Virginia, independent exchange, proclaimed “for ten years we have been building exchanges. Let us now build systems.” Dual service could only survive, he knew, if the independents matched the growing scope of the Bell system:

I have adopted...the motto... ‘the Integrity of the Independent System and its Universal Extension.’ That motto implies the continuing of the present independent telephone system as a separate and distinct system, extended into all undeveloped territory whether in city or country, reorganized and strengthened into a complete and effective whole.²⁴⁵

That was more than rhetoric. Numerous regional independents grew up in that period, belying the stereotype of small, exclusively local operations. A typical independent operating company owned exchanges in ten to thirty key cities and signed long-term, exclusive connecting contracts with independent exchanges they did not own. On the borders of their territories, they entered into agreements with the neighboring independent regionals for the interchange of traffic. A sampling of some of those systems follows.

In Missouri and Kansas, *the Kansas City Home Telephone Co.* was the centerpiece of a regional independent network. It served 20,000 of Kansas City, Missouri’s 40,000 subscribers. Its long-distance subsidiary owned 10,000 miles of toll wire in 1909 and offered connections to Topeka, Lawrence, Omaha, and many smaller exchanges in the vicinity. The Kansas City Co. was connected to the competing exchanges in St. Louis and St. Joseph over the lines of two neighboring independent regionals, the Kinloch Telephone Co. and the St. Joseph Home Telephone Co. The Kinloch Co. was another well-established, high quality, and long-lasting independent regional. In 1907 the Kinloch Co. had 21,000 subscribers in St. Louis, about 36 percent of the total, and owned fourteen exchanges in eastern Missouri and central Illinois. Its toll lines covered an area bounded by Sedalia, Missouri, Springfield, Illinois, Terre Haute, Indiana, and Farmington, Illinois.²⁴⁶ The St. Joseph Home Co. had connecting contracts with forty-eight companies in the area, giving it access to 40,000 telephones.²⁴⁷

²⁴⁵ 15 TELEPHONY 267-8 (April 1908).

²⁴⁶ 1910 ANNUAL REPORT OF THE DIRECTORS OF THE KINLOCH LONG DISTANCE TELEPHONE COMPANY OF MISSOURI. Box 16, AT&T-BLA.

²⁴⁷ St. Joseph Home Telephone Co. and the St. Joseph Home Long Distance Co., Boxes 17 and 18, AT&T-BLA.

In Pennsylvania, Maryland, and West Virginia, several large independent regionals competed with the Bell system. The *American Union Telephone Co.*, centered in Harrisburg, Pennsylvania, was formed in 1906 through the merger of twelve independent companies, including the competing exchanges in Harrisburg, Altoona, Lancaster, Williamsport, and Chester. The Keystone Telephone Co. owned exchanges in and around Philadelphia, including Trenton and Camden. The *Consolidated Telephone Company* covered the territory to the north and west of Philadelphia, operating exchanges and toll lines connecting Allentown, Scranton, Wilkes-Barre, and Reading. The Pittsburgh and Allegheny system connected independent exchanges in the western parts of the state. The National Telephone Co. owned exchanges in Wheeling, Steubenville, and other towns in West Virginia. Each of those systems were connected to each other through an organization known as the “Eastern Traffic Association,” a clearing house which accounted for and divided joint toll revenues and coordinated maintenance and operations.²⁴⁸

Headquartered in Aurora, Illinois, The *Inter-state Independent Telephone and Telegraph Co.* owned twenty-nine exchanges in Illinois, including the cities of Peoria, Springfield, Joliet, and Elgin. In 1911 it reached an agreement with the Illinois Tunnel Co. that gave it access to independent subscribers in the city of Chicago. Its lines connected with the Kinloch system to the west and with the Indiana’s New Long Distance Co. to the east.

Centered in Ohio, the *United States Telephone Company* was one of the largest and strongest independent regional systems. It owned twenty-two independent operating companies, including exchanges in Cleveland, Columbus, Akron, and Youngstown, Ohio. Its long-distance lines covered the state of Ohio. After 1906, the financial syndicate controlling U.S. Telephone acquired control of the Home Telephone Co. of Detroit, the Indianapolis independent exchange, and the New Long Distance Telephone Co. The latter connected all of the sizable independent exchanges in the state of Indiana. In 1908 it furnished long-distance service to 800 independent exchanges in Ohio, Indiana, and Michigan, reaching 325,000 telephones.²⁴⁹ The U.S. Telephone Co. required its connecting exchanges to sign a contract that guaranteed the long-distance company exclusive access to the local company’s toll business. The contract was an attempt to secure the same kind of control over interconnection rights embodied in the Bell system’s license contract. It stipulated that the local exchange was not allowed to make connecting arrangements with any other long-distance company for a term of ninety-nine years.

Comparably sized independent regionals existed in New York state,²⁵⁰ Kentucky,²⁵¹ Southern California,²⁵² Washington and Oregon,²⁵³ and Minnesota.²⁵⁴ By 1910, independent systems extended in an unbroken line from New York to Kansas along the east-west axis. On the north-south axis, they ran from Tennessee to Minnesota. With the exception of isolated systems in

²⁴⁸ Independent Telephone Cos-Financial History, Box 65, AT&T-BLA.

²⁴⁹ 1908 Annual Report of the United States Telephone Co., Dec. 31, 1908. Box 36, AT&T-BLA.

²⁵⁰ Federal Telephone Co. Box 25, AT&T-BLA.

²⁵¹ Cumberland Telephone and Telegraph, acquisition of Central Home T & T, Kentucky, Box 39, AT&T-BLA.

²⁵² Pacific Tel. & Tel., Los Angeles Consolidation, Box 18, AT&T-BLA.

²⁵³ Acquisition of Pacific Independents, Box 30, AT&T-BLA.

²⁵⁴ Northwestern Exchange Co. Connection with Toll Lines of Tri-State, Box 39, AT&T-BLA.

Dallas, Atlanta, Mobile, and Shreveport, they were all physically connected. The independents did not have the technology or the organization to offer talking circuits over 300 miles in length. Nevertheless, it was clear by the time of Vail's return that the independent regionals were viable competitors for toll traffic as well as exchange subscribers.

Independent toll service was usually lower priced than Bell's and their lines often connected into exchanges where Bell had only a public toll station.²⁵⁵ Independent toll systems had seized a substantial amount of traffic because of their lower rates and sometimes superior exchange access. The incursions into toll business "not only assist the revenue of the opposition but greatly increase its prestige with the more important telephone customers," noted AT&T's Pickernell.²⁵⁶ In upstate New York, the effect of independent toll line competition was so severe that the Bell toll earnings had fallen to 1 to 2 percent. There was a "pronounced loss of business" in AT&T service from Buffalo to Cleveland, Pittsburgh, and Jamestown.²⁵⁷

Bell's war on independent connectivity

With the return of Vail, Bell had a clearly defined goal: the elimination of dual service and the creation of a nationally interconnected monopoly administered by Bell but supervised by regulators. Monopoly would bring about universal service and relief from the low rates locked into place by the fierce competitive struggle. Universal interconnection was not the sole object; Bell also wanted to make sure that it controlled the system. In order to do so, it had to prevent physical connection with overlapping systems and maintain absolute control of interexchange connections. There was a place for independent companies in that scheme, but only as local feeders to the Bell system. In the major cities, dual service was to be eliminated by buying out the independent and physically consolidating the exchanges. If the independent was dominant, Bell would sell out and enter into a connecting contract with the surviving exchange. Consolidation would demonstrate the benefits of a unified service while permitting the companies to raise rates to their "proper level." In the smaller cities and the country, competition would be eliminated by an aggressive new sublicensing effort. Any overlapping, competing telephone systems that remained were to be isolated and squeezed out as all others were absorbed into the system.

Liberalization of sublicensing

Vail's competitive tactics were directly aimed at the growth of connectedness among the independents. One of his most important countermoves was to revitalize Bell's sublicensing efforts. The independent companies who directly overlapped and competed with Bell accounted for only 40 to 45 percent of all independent telephones. The rest of the independent subscribers were in areas unoccupied by Bell. Those noncompeting independents, Vail understood, held the balance of power in the competition for universal coverage. If they could be tied into the Bell system, Bell could broaden its coverage without investing in facilities or engaging in local competition. In many areas, whoever won connecting rights with the majority of the noncompeting independents would have access to the largest number of subscribers.

²⁵⁵ Pickernell, AT&T to E.J. Hall, AT&T, May 12, 1909. Box 1376, AT&T- BLA.

²⁵⁶ Pickernell, AT&T, to E.J. Hall, AT&T, May 12, 1909. Box 1376, AT&T- BLA.

²⁵⁷ Pickernell, AT&T, to E.J. Hall, AT&T, May 21, 1909. Box 1376, AT&T-BLA.

Bell's first sublicense contract had limited the exchange to Bell connections and required the use of Bell telephones. That tactic prevented the independents from running away with the business in the central states, but by the beginning of 1907 it had induced just 14 percent of the independent telephones to be connected to the Bell system. In order to gain access to more independent systems, Vail dramatically liberalized the Bell interconnection conditions. Starting in October 1907, independent exchanges connecting with Bell no longer had to use Western Electric instruments but could keep using independently manufactured telephones as long as they were of "first class" construction and would not impair the quality of service offered over joint lines.²⁵⁸ Letters urged the licensee companies to "pursue vigorously the policy of sublicensing" in the part of their territory which was "more or less unremunerative" or "not yet occupied."²⁵⁹ Managers were warned to make sure that Bell controlled all the toll lines connecting the sublicensed exchanges.²⁶⁰ Vail also allowed Western Electric to begin selling telephones to independent companies for the first time.²⁶¹

Exclusive connecting contracts

Bell went on to liberalize its interconnection policy in a more radical fashion. In an attempt to pry more independent subscribers away from the exclusive control of competing independents, Bell began to interconnect with independent exchanges even when they already maintained connections with competing long-distance lines. In a few cases, it was even willing to connect its toll lines to an independent exchange that was directly competing with one of its own if the independent had a commanding lead in the number of subscribers. Such was the case in Richmond, Indiana, where the independent exchange in 1908 had 2,400 subscribers to the Bell exchange's 100. In lieu of consolidation, L. G. Richardson, President of the Central Union Co., proposed an interconnection agreement that would connect AT&T and Central Union Co. toll lines to the independent exchange in the city. Vail disapproved of the idea but Richardson went ahead with it anyway.²⁶² That tactic was used in Ohio and Indiana, where hundreds of independent exchanges had signed exclusive connecting contracts with the United States Telephone Company (UST). The new policy amounted to soliciting the exchanges to break their contract with UST. Nevertheless, it was an attractive option for the local exchanges, as it gave their customers access to the subscribers and cities controlled by both systems.²⁶³ In 1908 sixteen local independent companies in Ohio and Indiana entered into connecting agreements with Bell in violation of their exclusive contract with UST.²⁶⁴ UST's attempts to block those actions in the courts were unsuccessful (see section below entitled Exclusive Connecting Contracts and the Courts).

²⁵⁸ Vail Circular Letter, Oct. 9, 1907. Box 1376, AT&T-BLA.

²⁵⁹ Vail Circular Letter, Feb. 10, 1908. Box 1376, AT&T-BLA.

²⁶⁰ Vail Circular Letter, Sept. 10, 1908. Box 1376, AT&T-BLA.

²⁶¹ FCC TELEPHONE INVESTIGATION 138(GPO, 1939).

²⁶² Richardson to Vail, July 3, 1908. Vail to Richardson, July 7, 1908. Box 1357, AT&T-BLA.

²⁶³ "Our plan of having all toll lines entering our city on one switchboard has been so pleasant and satisfactory to our patrons that I think that when the court order requiring us to remove them becomes known to our patrons, I would not be surprised if some demonstrations on their part would take place expressing their disapproval of being compelled to go back to the old and unsatisfactory way of having more than one toll station in the city." William Shumaker, President, Butler (Indiana) Telephone Co. to L.N. Whitney, Central Union Co., Dec. 1, 1908. Box 1357, AT&T- BLA.

²⁶⁴ J.B. Smith to J.D. Ellsworth, Dec. 5, 1908. Box 1357, AT&T-BLA.

Armed with its new interconnection policies, Bell licensees made great efforts to attract farmer and mutual company lines. “The opposition Bell has shown more activity than ever before in establishing and encouraging rural mutual companies to connect up with its system,” wrote Telephony in 1909. Bell promised rural telephone users service at one-fifth the rate of the independent companies.²⁶⁵ The importance of sublicensing as a form of enlarging the Bell system’s scope was particularly evident in the areas where strong independent toll systems were developing. In the Missouri and Kansas Co.’s territory in mid-1909, sublicensed toll lines outnumbered the Bell licensee’s in mileage, and sublicensed telephones outnumbered Bell-owned telephones by two to one.²⁶⁶ The Bell licensee in the territory around St. Louis was so dependent on sublicensing for toll connections that an AT&T agent speculated that if the sublicensees should happen to break with Bell “the Bell toll business and the Bell development would disappear, and the opposition would absolutely control most of the territory outside of St. Louis.”²⁶⁷

Tables 9-1 and 9-2 show in statistical terms the devastating impact Vail’s policy of absorbing competition through interconnection had upon the independents’ attempt to build a rival system. The number of Bell-connecting independent telephones jumped from 297,218 at the beginning of 1907 to 1.2 million in only two years. By 1914, two-thirds of all independent telephones were connected to the Bell system. The competitive impact of the new policy becomes clear when those numbers are expressed as a proportion of the independent telephones not in direct competition with Bell (see table 9-2); that is, all of the independents not in dual service territories. At the beginning of 1907, only 25 percent of the noncompeting independents were connected to Bell. A year later, 46 percent of them were so connected. By October 1909, 79 percent were connected to Bell.²⁶⁸ By the time of the Kingsbury commitment, 89 percent of all noncompeting independents were embraced by the Bell system’s access universe.

Price war in toll service

Bell’s cooptation of noncompeting independents was supplemented by a price war against selected independent toll lines. The independent long-distance companies were able to charge lower rates because they had lower fixed costs. Unlike Bell, they did not attempt to provide complete toll coverage of an area but concentrated their resources on high volume routes. Bell toll lines served both “fat” and “lean” districts and installed enough capacity to handle most of the traffic. By constructing a simple economic model of those conditions, Pickernell discovered that cutting Bell rates in half to secure a larger share of the traffic would hurt the independent more than it would hurt Bell. The independent’s profit would be “enormously impaired,” while Bell’s would fall only slightly.²⁶⁹ Rate cuts proposed by Pickernell went into effect in May in selected cities of Ohio, the target being the U.S. Telephone Co. The Ohio rate cuts succeeded in increasing Central Union’s toll traffic by 53 percent, while reducing its revenue by only 12 percent.²⁷⁰ In New York state, where strong independent systems in Buffalo, Syracuse, Rochester, and Erie, Pennsylvania existed, cuts went into effect in July.

²⁶⁵ 17 TELEPHONY (Mar. 27 1909).

²⁶⁶ Pickernell to Hall, *supra* note 11.

²⁶⁷ *Id.*

²⁶⁸ Chappelka (1956), 1912 Telephone Census.

²⁶⁹ Pickernell to Vail, Box 1376.

²⁷⁰ Thayer to Vail, Nov. 18, 1909. Box 1376, AT&T-BLA.

TABLE 9-1
INDEPENDENT TELEPHONES CONNECTING WITH BELL, 1907-1914

As of January 1,	1907	1908	1909	1910	1911	1912	1913	1914
#Independent phones	2.16	3.11	3.31	3.47	3.70	4.00	3.93	4.29
#Bell connecting (millions)	0.30	0.83	1.19	1.62	1.95	2.28	2.50	2.88
Percent connecting (%)	14	27	36	47	53	57	64	67
Growth Rate (%)	-	178	44	36	20	17	9	15

Source: Chappelka, 1956; FCC, 1939; Telephone Censuses, 1907, 1912.

TABLE 9-2
NON-COMPETING INDEPENDENT TELEPHONES
CONNECTING WITH BELL, 1907-1914

As of January 1,	1907	1908	1909	1910	1911	1912	1913	1914
#Non-competing Independent phones	1.19	1.80	1.86	2.00	2.35	2.68	2.87	3.23
#Bell connecting (millions)	0.30	0.83	1.19	1.62	1.95	2.28	2.50	2.88
Percent connecting (%)	25	46	64	81	83	85	87	89

Source: Chappelka, 1956; FCC, 1939; Telephone Censuses, 1907, 1912.

The price war made major inroads into the toll business of the United States Telephone Company. In an attempt to stop the loss of its long-distance business, UST tried to get both companies to restore their rates to their original levels. It approached the Central Union Company through the state independent association, which had come into much closer contact with the Bell licensee due to the growing number of sublicensed independent companies. At the instigation of James Brailey, president of UST, a committee of the Ohio Independent Telephone Association met with the Central Union and argued that the lower rates injured the local sublicensees by reducing their commissions from toll traffic. That argument was merely a cover for the real concern, which was that Bell's price war was hurting UST severely. They asked that the state independent

association be given the right to approve or disapprove of any change in toll rates made in the state of Ohio. That price-fixing offer was refused.²⁷¹ As a result, Brailey took steps to sell off the United States Co. property. The United States Co. ended up in the hands of J.P. Morgan & Co.

Acquisitions of competing exchanges

The most direct blows against dual service came from Bell buyouts of competing exchanges. The policy of eliminating dual service in the larger cities through acquisition or sale progressed rapidly during that period. At the beginning of 1907, 59 percent of the Bell exchanges in cities with a population of 5,000 or more had dual telephone exchanges. By October 1913, the number of those cities with competition had been reduced to 37 percent. In smaller cities, mergers of competing exchanges were often followed by the franchising and construction of a new competing exchange. In Marshalltown, Iowa, for example, a new franchise was issued within a month of the takeover.²⁷² In the larger cities, however, the losses were irreversible.

Independent companies were particularly susceptible to divide-and-conquer acquisitions. Their decentralization made it difficult to weather extended bouts of competition or to adhere to a common policy. Selling out to Bell offered an appealing way to escape from a variety of financial pressures: the diseconomies of growth, price wars with a competitor who was willing and able to sustain losses for an extended period of time, rate restrictions in municipal franchises, and a constant need to raise more capital. Those problems had always existed, however. What precipitated the surge of independent sell-outs between 1910 and 1913 was the failure of independent attempts to build regionally interconnected systems capable of matching the scope of the Bell system. *That failure was primarily the result of Bell's liberalized interconnection policy.* The financial panic of 1907, which made investors less willing to put scarce capital into dual systems, also contributed. The stampede of noncompeting independents into connecting arrangements with Bell between 1907 and 1910 prompted many of the more profit-oriented independent system owners to get out while the getting was good. In 1912 the consolidation trend began to chip away at the urban strongholds of the independents. Competition was eliminated in ten of the sixty-eight cities over 50,000 in population that had had dual service. In that year alone, Bell purchased 136,000 telephone stations and sold 42,650.²⁷³

Early on, Bell takeovers led to the severance of independent toll line connections.²⁷⁴ After 1910, the mediation of utility commissions made the mergers more orderly and protected the interests of the other independent exchanges in the state whose users were dependent upon access to the city. In order to ensure that public reactions against severed connections did not threaten the policy of achieving a universal service monopoly through buyouts, Bell announced the "Vail Commitment" in January 1912. The Vail Commitment was a promise that Bell would leave all

²⁷¹ Richardson to Vail. June 21, 1909. Box 65, AT&T-BLA.

²⁷² 17 TELEPHONY (Feb. 20, 1909).

²⁷³ FCC TELEPHONE INVESTIGATION 140 Table 35 (GPO: 1939).

²⁷⁴ In 1910 and 1911, independents in Adrian, Michigan, Memphis Tennessee, and Clarksville, Tennessee all suffered from severed connections after Bell acquired independently-owned toll lines in the vicinity. The practice was not as common as it has been made out to be, however, as the independents nearly always countered with lawsuits and were fairly influential politically at the state and local levels.

long-distance connections intact when an exchange changed hands. Acquisition would neither enlarge nor restrict the toll access of the exchanges involved.²⁷⁵

Vail made his consolidation overtures explicit beginning in the Fall, 1910. During a national independent association meeting in Chicago, Vail and H. P. Davison of J. P. Morgan & Co. invited independent leaders to meet with them at the Blackstone Hotel. About twenty-five prominent independent representatives responded to the invitation. At the meeting, Vail offered to cooperate with the independents in thoroughly eliminating competition in the telephone business. He told the independents that the destructive warfare between them was costing the Bell Companies millions. He wanted to effect a merger that would end those losses and leave AT&T in control of most of the large cities and long-distance lines, while ceding the smaller places to the independents, where, he admitted, they operated more efficiently than Bell. The specific places to be controlled by AT&T or the independents would be settled through negotiations later. With a representative of the Morgan Co. at his side, Vail said that the merged companies could be capitalized liberally to cover the losses that had been sustained.²⁷⁶

At Vail's suggestion, a committee of seven independent leaders was appointed to conduct the negotiations. What became known as the Committee of Seven met with Vail and Davison several times over the next four months.²⁷⁷ That group became the nucleus of the major mergers that helped create a telephone monopoly. Negotiations concerning the purchase of almost every important independent property were initiated between 1910 and 1913. Though some of those deals were not consummated until a decade later, they represented the beginnings of Bell-independent cooperation in the control of the industry.

Interconnection in law and public policy

The law and public policy regarding interconnection, competition, and monopoly took two divergent and ultimately incompatible paths after 1907. The disturbingly rapid acquisition of competing exchanges by Bell set off antitrust alarms all over the country. Antimonopoly sentiment was at fever pitch; public fears that big businesses were strangling the market economy had led to successful prosecutions of the Northern Securities Company and to the dissolution of Standard Oil and the American Tobacco Company in 1911. Congress passed a new, broader antitrust law, the Clayton Act, in 1913. Other institutional responses at the state and local level, however, pointed in an altogether different direction. Municipalities weary with dual service began to favor consolidation or connection of competing exchanges. State governments began to create utility commissions with the authority to regulate telephone companies, or empowered existing railroad commissions to do so. The majority of them also passed laws authorizing the commissions to

²⁷⁵ For a glimpse of how the Vail Commitment affected consolidations see J.M.B. Hoxsey, Southern Bell, to N.C. Kingsbury, AT&T, Dec. 17, 1912. Box 39, AT&T-BLA. The independent in Louisville claimed that connections to hundreds of cities in Ohio, Indiana, and Illinois had been possible prior to consolidation. Bell suspected that the connections, while physically possible, had never actually been made before and that the independent was exploiting the terms of the Vail commitment to acquire long-distance service over Bell lines. Box 39, AT&T-BLA.

²⁷⁶ 65 TELEPHONY 19-23 (Nov. 29, 1913).

²⁷⁷ The "Committee of Seven" consisted of Frank Woods of Lincoln, Nebraska, E.H. Moulton of Minneapolis, Theodore Gary of Missouri, H.D. Critchfield of Chicago, Arnold Kalman of St. Louis, and B.G. Hubbell of Buffalo. All were owners of large independent systems.

compel the telephone companies to connect their lines. The commissions upheld regulation as a substitute for competition and often encouraged monopoly. The desire to preserve market competition mingled uncomfortably with an impulse to unify the system. As the courts, commissions, cities, and telephone companies groped for a solution to the “telephone situation,” it did not become evident that those two approaches worked at cross purposes to each other until the Kingsbury commitment, made at the end of 1913, transfigured the contradiction into a national policy.

Antitrust Law

The organized independents knew that competition could not be sustained without dual exchanges in as many cities as possible. The weapons they used to fight Bell acquisitions were state and national antitrust laws.²⁷⁸ When the national independent association gained wind of Bell’s intentions to merge independent and Bell properties in 1908, it formed a litigation committee and raised thousands of dollars from independent companies and associations.²⁷⁹ The litigation committee prodded the Attorneys General of Michigan, Nebraska, Kansas, and Missouri to block Bell purchases of independent companies.²⁸⁰ A merger in Marion, Ohio, in 1908 was also countered by a lawsuit under the Valentine Act, a state antitrust law. In Kentucky, merger negotiations between Bell and the Louisville-based independent were called off because the state constitution prohibited the consolidation of competing common carriers. Prodded by complaints from the Postal Telegraph Company, the state of Mississippi sued AT&T for integrating its operations with Western Union, charging that it was trying to monopolize the telegraph business.²⁸¹

Federal antitrust proceedings were initiated in July 1912, when the U.S. Attorney General in the Portland, Oregon district filed a suit under the Sherman Act, charging Bell with an attempt to monopolize the telephone business in the Pacific northwest. For the next six months special agents of the Justice Department took depositions from people involved in the telephone industry around the country. As the new administration of Woodrow Wilson took over the Justice Department in January 1913, the outgoing Attorney General turned over the completed investigation amidst widespread rumors that AT&T would be prosecuted.²⁸²

At the local level, consolidations were opposed by those who feared they would lead to a rate increase or a deterioration of service. Advocates of that position had no trouble finding evidence that Bell rates in noncompetitive cities were higher than those in cities with competition. As Bell and independent plans to consolidate in Kansas City began to be floated, the Kansas City Post waged an effective newspaper war against the merger, noting that while Bell had promised residential rates of \$36 a year, the residential rate in monopolized cities of comparable size was \$42 or \$48 a year. “If the Bell Company charges from \$42 to \$48 a year for residence phones in other cities, won’t it find excuses to do the same thing here if competition is removed?” the paper

²⁷⁸ A.C. Lindemuth, 15 TELEPHONY (June, 1908).

²⁷⁹ Minutes of the Executive Committee of the International Independent Telephone Association, May 7, 1908. AT&T-BLA.

²⁸⁰ MacMeal 187 (1934).

²⁸¹ 64 TELEPHONY 32 (1913).

²⁸² 64 TELEPHONY 41 (1913).

asked.²⁸³ In many quarters there was still a willingness to rely on the traditional method of competition to control rates and service.

Exclusive connecting contracts and the courts

The dispute over exclusive connecting contracts brings out the complexity of the relationship between interconnection, competition and monopoly. From the viewpoint of the local exchange, an exclusive connecting contract prevented competition by tying all of its long-distance traffic to one carrier. From the viewpoint of the subscriber, exclusivity destroyed their ability to choose long-distance carriers, and made them accept a system with less than universal coverage. To the embattled independent regional systems, however, exclusive access to independent exchanges was its chief competitive advantage against Bell. Opening up its connecting exchanges to Bell subscribers destroyed their ability to compete with a much larger system. Protecting consumers' and local exchanges' right to choose toll carriers would accomplish little if enforcing that right left only one carrier in the field.

The United States Telephone Company lawsuit against Bell for connecting with its contracting exchanges was the testing ground for those issues. It went first to the Common Pleas Court, which treated the case as a simple breach of contract. The court upheld the independent long distance company and ordered the exchanges to sever their connections with Bell toll lines. Bell continued the practice, however, and UST was forced to litigate the case on broader grounds. It sued Bell under the state antitrust laws, charging that its new policy was an attempt to drive UST out of business and monopolize the trade.²⁸⁴ The 1909 decision of the Ohio Supreme Court, however, found not Bell but the United States Company guilty of monopolistic practices. The court invalidated its ninety-nine-year exclusive contracts because they gave the independent long distance company a "monopoly" of the local exchange's long distance business.

In a lively and incisive review of the application of common carrier principles to the telephone, Judge Taylor of the Court dismissed the precedent of the railroad express cases, which for the preceding fifteen years had shielded telephone companies from interconnecting with other companies. The practical demands of railroad operation were completely different from those attending the making of telephone connections, the Judge wrote. While it was physically impossible and unsafe to allow railroad companies to run trains over another company's tracks without the second company's cooperation and consent, the interconnection of telephone companies did not pose the same problems. A long distance company need not be treated differently than any other individual subscriber:

Conceivably, 20 long-distance companies might be connected with the local exchange with the same simplicity and with the same absence of confusion which we find in relation to the local subscriber's lines, and there is no more physical difficulty,...in connecting a subscriber with one of the 20 long-distance lines than in

²⁸³ *Kansas City Post*, Oct. 21 and 22, 1911. Box 17, AT&T-BLA.

²⁸⁴ *United States Tel. Co. v. Central Union Co.*, 171 F.130 (1909).

connecting a subscriber with another local subscriber served by the same exchange.²⁸⁵

As common carriers, telephone companies were required to provide service to all who applied without discrimination. Since the operations required to link subscribers to the lines of a long-distance company were no different from those required to set up a connection with any other subscriber, the company's common carrier obligation could and should be extended to long-distance companies. The U.S. Supreme Court's earlier doctrine that "common carriers" had no obligation to be "common carriers of common carriers" was no longer valid.

The pro-competitive intent of the decision is clear from its basis in antitrust law and its reference to the possibility of "20 long-distance companies" serving a single exchange. Indeed, its reasoning was exactly the same as that underlying the "equal access" provisions of the 1982 Modified Final Judgment, which paved the way for long-distance competition in the 1980s. In theory and in the received version of telephone history, larger networks are supposed to benefit from the refusal to connect and smaller competitors are supposed to favor joining their system to the larger one. In 1909, however, the dominant network was seeking to interconnect with companies bound to its competitors. The Ohio Supreme Court decision allowing it to do so was correctly seen as a setback to the cause of independent long distance competition.

Competition suffered because the court decision interfered with the competing independents' ability to coalesce a critical mass of subscribers and exchanges outside of the Bell system. Joseph Ware, secretary of the national association, expressed the prevailing view among independents:

Judge Tayler fails to grasp the first great principle in the telephone struggle and business, that, excepting the Independent companies are connected together into one system there can be no competition in the telephone business.²⁸⁶

Competition in the telephone business revolved around the scope of access. A few large independent companies were attempting to construct regional access universes that would be competitive with Bell's. In any given region of the country, Bell controlled a far greater number of exchanges than any individual rival. Thus, the many small, scattered independent exchanges held the balance of power. Bell had guaranteed access to a larger number of exchanges to begin with; allowing it to break exclusive contracts binding the small independents to competitive long distance networks would place "50 percent of the Independent force in the doubtful column," a Nebraska independent wrote.²⁸⁷ If all independents did not hold together as a system, Bell would easily dominate the industry by virtue of its nationwide presence and extensive network facilities:

²⁸⁵ *Id.* at 143.

²⁸⁶ Joseph B. Ware, Secretary, International Independent Telephone Association, 17 TELEPHONY (May 29, 1909).

²⁸⁷ "The Necessity of Independent Long Distance Service to Independent Local Companies," 17 TELEPHONY 98 (Jan. 23, 1909).

If our faction [the Independents] were made up of one organization some uniformity of methods could be followed, but to compel an interchange of service under present conditions means elimination of competition in favor of the larger organization and nothing else.²⁸⁸

Ostensibly, nondiscriminatory interconnection would also open Bell exchanges to UST, but the independents expressed doubts about whether that would lead to a truly competitive situation:

The second point which the judge fails to grasp is, that there is no competition where long distance lines are connected into one exchange-where one operator can put messages over all lines. The benefits to the public which come from competition...can only be obtained successfully by having competitive systems, rather than variously owned lines into each exchange, with one long-distance company-the Bell. He overlooks the fact that the Bell company has, or had, a competing local exchange in each of the towns where connection was made with a local company having contract relations with the U.S. Telephone Co., and that, coincident with the connection of the Bell toll lines to the local independent exchange, local competition was eliminated.²⁸⁹

The independents were asserting that nondiscriminatory interconnection was fundamentally incompatible with competition. If Bell could gain access to local subscribers through an independent exchange it would not operate a competitive exchange. If there were competing long-distance lines terminating in a monopoly local exchange, the operators of the exchange would route long-distance calls over their own company's lines rather than those of a competitor.

The tendency to apply concepts of nondiscrimination to the telephone business in such a way as to require competing companies to exchange traffic appeared in other important legal decisions of the period, and represented one strand of thinking.²⁹⁰ The Supreme Court of New York, on the other hand, upheld the validity of exclusive contracts on the grounds that it preserved competition.²⁹¹

²⁸⁸ *Id.*

²⁸⁹ *Id.*

²⁹⁰ The Supreme Court of Indiana required two competing exchanges in West Lebanon to restore their connections after one of the companies discontinued them. *State ex rel Goodwine v. Cadwallader* 172 Ind. 619, 87 N.E. 644 (1909), 89 N.E.

319 (1909). The court rejected the claim that the notion of common carriage as applied to a telephone company required indiscriminate service to competitors. In doing so it restated the rationale of the express cases, noting that the effect of such interconnection would be parasitic or confiscatory (p.648). But the opinion went on to hold that a telephone exchange that agreed to interconnect with one system in its area was obliged to offer the same privileges and terms to all other exchanges-a departure from, if not a direct contradiction of, the railroad precedents. See also *Medina County Farmers Tel. Co. v. Medina Tel. Co.*, 30 Ohio Dec.Rep. 500 (1911), which relies on the nondiscrimination precedent of *Cadwallader* and cites *U.S. Tel. Co. v. Central Union*.

²⁹¹ Supreme Court of New York, *Wayne Monroe Tel Co. v. Ontario Tel. Co.*, 112 N.Y. Sup. 424: "There is no stronger inducement to the managers of a public service corporation to serve the public well than a healthy apprehension that a rival concern will do so. It is sometimes argued that the presence of two telephone systems in a given district is a disadvantage to the community, which is best served by one system reaching all subscribers; but one system will never be made to reach all subscribers as cheaply as would otherwise be the case if the possibility of

Physical Connection Laws

A different approach to the problem was taking shape at the state level. Twenty eight states passed laws creating regulatory commissions or giving existing railroad commissions jurisdiction over the telephone companies between 1909 and 1913.²⁹² Twenty-six states passed laws authorizing some form of compulsory physical connection between telephone companies from 1907 to 1913, inclusive.²⁹³ In 1910 the Interstate Commerce Commission was given the authority to regulate telephone companies as common carriers. Armed with their new powers to regulate entry, mergers and connections, the utility commissions began to push the telephone system toward a monopolistic structure.

Compulsory physical connection legislation was the most important arena for working out the public policy regarding dual systems. Contrary to common assumptions, the passage of those laws did not end access competition, but merely empowered a utility commission to order connections when petitioned to do so by the telephone users of a specific locality. Rulings required hearings and a finding of public interest, convenience and necessity by the commission, and thus could only be applied on a case-by-case basis. The laws were almost never used to connect urban exchanges engaged in direct competition with each other; more often, they were applied to broaden interexchange access. The restricted scope of their application was attributable to the widespread belief that merging the subscriber sets of the telephone companies would eliminate competition and/or do economic harm one of the two telephone systems. Because there was as yet was no public consensus on the issue of monopoly, the commissions concentrated on cases where dual service restricted communication between different cities.

The flood of physical connection legislation from 1910 to 1913 reflected a change of heart among some of the independents. There had always been public demands for connecting the separate networks, but the combination of Bell and independent opposition had prevented action. By 1910 some independents were beginning to back away from access competition. Those who embraced that view did not see interconnection as a means of preserving competition, but were generally the same independents who worked out consolidations or divisions of territory with Bell. Others saw interconnection as a way to minimize Bell competition at the local level by giving their exchanges access to Bell toll lines.

The physical connection provision of Wisconsin's state utility law was defeated in 1907, when the independents opposed it, but passed in 1911, after they had given up hope of establishing

competition is destroyed.”

²⁹² Jeffrey Cohen, *The Telephone Problem and the Road to Telephone Regulation in the United States, 1876-1917*, 3 J. PoL. HIS. 42 (1991).

²⁹³ South Carolina, 1904* Georgia, 1907* Oklahoma, 1907* Texas, 1907* Maryland, 1910* Kansas, 1911* Michigan, 1911* Ohio, 1911* South Dakota, 1911* Washington, 1911* Wisconsin, 1911* Arizona, 1912* California, 1912* Kentucky, 1912* New Mexico, 1912* Oregon, 1912* Colorado, 1913* Florida, 1913* Idaho, 1913* Illinois, 1913* Indiana, 1913* Maine, 1913* Missouri, 1913* Montana, 1913* Nebraska, 1913* Pennsylvania, 1913* New Jersey, 1914* Virginia, 1914* Minnesota, 1915* North Dakota, 1915* Utah, 1917* New York, 1919.

an exchange in Milwaukee and the state association had become dormant.²⁹⁴ Frank Woods, the president of the National Independent Telephone Association, openly embraced the “universal service” concept and advocated laws compelling the interchange of service between all companies under the supervision of the Interstate Commerce Commission.²⁹⁵ Two years later, Woods worked out a consolidation with Bell that eliminated dual service in most of southeastern Nebraska. In 1911, the NITA national convention followed Woods’s lead and passed a resolution for compulsory connection and state and national regulation.²⁹⁶

The issue of interconnection and cooperation with Bell split the independents, however. A splinter independent association led by the owners of the competing systems in New York, Pennsylvania, and West Virginia was formed in January 1913. One of its leaders, Burt Hubbell, explained that the new association “shall be composed of members who represent telephone companies not owned or controlled by the AT&T, directly or indirectly.”²⁹⁷

Municipal governments also were agitating for the elimination of fragmentation locally. A Cleveland city council resolution of January 1908 declared dual service a “nuisance” and instructed its committee on telephones and telegraphs to investigate the feasibility of compelling the Bell and Cuyahoga exchanges to interconnect. A civic committee in another former independent stronghold, Indianapolis, also recommended a return to one system after an investigation of the telephone situation. Kansas City and Los Angeles both experienced political agitation to connect or consolidated their systems.²⁹⁸ In all cities, however, support for the elimination of dual service was tempered by fears that it would lead to a rate increase.²⁹⁹

Compulsory interconnection laws were vociferously opposed by Bell and by the hard-core independents led by Hubbell. Although their motives were different, their arguments about the competitive effects often paralleled each other. Physical interconnection posed a problem for Bell in that it publicly advocated universal service but was unwilling to bring that goal about by connecting with competing systems. It had to argue that universal service could be achieved best under the administration of one system. A detailed memo outlining its argument was prepared in 1907.³⁰⁰ Its arguments were reflected in Vail’s attack on interconnection of competing systems in the *Annual Reports*.

The Bell memo contrasted the standardization, coordination, and high quality that could be achieved under a monopoly with the chaotic and uncontrolled conditions that would result from nondiscriminatory connection with a multiplicity of independently owned, overlapping systems. It

²⁹⁴ D. Gabel 349 (1987).

²⁹⁵ MacMeal 183 (1934).

²⁹⁶ MacMeal 186 (1934).

²⁹⁷ MacMeal 196 (1934).

²⁹⁸ *Bells may talk to Homes*, KANSAS CITY STAR, Mar. 6, 1911. For more information about the Los Angeles situation, see chapter 10.

²⁹⁹ CLEVELAND PLAIN DEALER, Oct. 2, 1911. After passing several resolutions urging the telephone companies to consolidate, the city council passed a resolution on that date stating its opposition to any rate increase following a merger.

³⁰⁰ Physical Connection, a syllabus and brief on the question of statutorily compelled connection of telephone lines owned by different companies. Memo dated Apr. 25, 1907. AT&T-BLA.

also attempted to argue that independently manufactured telephones would not work with the Bell system as well as Bell telephones, although that point was easily discredited as Bell went about sublicensing thousands of non-Bell systems.

A more significant argument was that competition between connected networks was inherently imperfect and even parasitic. If a Bell exchange in a dual service city had fewer subscribers than its opponent and Bell was forced to connect its toll lines with it, the independent subscribers could benefit from Bell toll access without subscribing to Bell. Bell would lose all of its exchange subscribers to the larger local company:

“If toll lines were forced to connect with competitors, any fellow who feels aggrieved because his call did not reach him promptly when his mother-in-law had cramp colic...can and probably will build a competing line between your most profitable points, hitch onto you at each end, and make you take his calls to all other points on your lines. [If exchanges were forced to connect with competitors,] if a handful of businessmen are hostile to you for any reason,...they will build a co-operative exchange in the business section of the town-hire an operator or two-install telephones for themselves at a cost of only a collar or a little over a month, take out your telephones, connect to your exchange,...and you will hold the bag, and eventually lose out entirely.”³⁰¹

In economic terms, that can be summarized as an argument that interconnection made networks complements rather than competitors. Bell’s defenders also made an appropriability argument: Bell laid out telephone facilities to cover an entire district, including what it called the “fat” and the “lean” areas. Even though some parts of the system were not profitable in isolation, connecting everyone could make the system as a whole profitable. Interconnection laws would allow another company to serve only the profitable areas while benefitting from Bell’s access to the “lean” areas.

The independents’ motive in opposing compulsory interconnection was to preserve dual systems rather than to eliminate them. A unified, fully interconnected telephone system, they believed, could not possibly be a truly competitive one. They advanced two reasons for that view: first, there was a tension, if not an outright contradiction, between competitive rivalry and the kind of interfirm cooperation needed to set up telephone connections jointly; second, the whole competitive process in telephony was driven by access differentials which would disappear once the systems were interconnected.

Establishing a telephone connection over the facilities of two or more companies involved linking their lines at the same time to form an unbroken channel for voice communication. The workers of the two companies had to cooperate rapidly and efficiently, and their methods had to be compatible. The independents did not deny that this was possible. They did point out that the level of cooperation required was so intricate that two companies involved in it could hardly maintain their status as competitors.

³⁰¹ 17 TELEPHONY 129 (Jan. 30, 1909).

Business firms sufficiently cooperative to exchange traffic could just as easily divide the market, fix prices, and cease to compete. By the same token, integrating their operations involved a degree of mutual trust and openness that hardly seemed compatible with business rivalry. Whoever controlled the local exchange, for example, would be in a position to discriminate between the toll lines of the long-distance companies when it routed the traffic or could engage in preferential treatment of one's own subscribers at the expense of the other's. A columnist in the independent trade journal *Telephony* said of making connections over Bell toll lines: "It would be easy to detect discrimination if Bell operators refused to record your calls. But the switchboard having lots of business, some calls will have to wait. Do you think the Bell calls would wait? No! But do you doubt that your calls would wait? They would wait."³⁰² The independent defenders of dual systems also believed, like Bell, that dissolving the access differences between the networks eliminated real competition.

There was at least one advocate of connecting with competing companies within the Bell system. B. E. Sunny, the head of the Chicago Telephone Co., believed that Bell would benefit from voluntarily entering into connecting arrangements. In February 1910, he wrote a memo proposing to operate lines connecting the independent exchanges in Indianapolis, Grand Rapids, Racine, and Aurora to the Bell system. The arrangement would give independent subscribers in those cities access to Chicago, Cincinnati, and Milwaukee. Sunny pointed out that the proposal would have numerous advantages—it would preempt the growing demand for physical connection legislation, allowing Bell to connect on its own terms; it would eliminate the need to grant a franchise to competing companies in cities currently monopolized by Bell; it would greatly increase Bell's toll business, or at least allow them to find out what effects interconnection would have on its traffic; it would reveal the identity of independent long-distance users to Bell, allowing Bell to solicit them to take its own service and save time and money by doing away with the costs of transferring calls between two systems. The only disadvantage Sunny recognized was that it might lead to the loss of exchange subscribers in cities where Bell rates were higher.³⁰³ The proposal was not implemented, however, because the national Bell management feared that interconnection would perpetuate dual systems and ease the pressure for consolidation.

Sunny's arguments tend to support the independents' contention that interconnection would lead to a single system rather than continued competition. A particularly shrewd aspect of Sunny's proposal was that all long-distance calls from independent to Bell points would have to go over Bell lines the whole way. If an independent user in Peoria wanted to call Chicago, for example, he would not be allowed to use independent toll lines between Peoria and Aurora and then transfer to Bell lines; Bell would have to carry the traffic between both cities. The independents knew that those kinds of problems were not only possible but likely when interconnecting competing networks, which is why they viewed the prospect with suspicion. Sunny's proposal is also significant because it may have been used as a model for the interconnection arrangements of the Kingsbury commitment (see chapter 10).

³⁰² 13 *TELEPHONY* 98 (Feb. 1907).

³⁰³ Memo dated approximately February 1910. B.E. Sunny collection, Manuscripts, 1879-1920. Copy in AT&T-L&R.

Case Studies in the Application of Interconnection Laws

Three landmark cases in California, Wisconsin, and Oregon highlight the different facets of the interconnection issue—the attitudes of users toward nonconnected networks, the effects that the telephone companies believed connection would have on their economic viability, and the attitudes of regulators toward competition.

Glen and Tehama Counties, California

In April 1912 complaints calling for physical connection were filed with the state railroad commission by two rural independent telephone systems in northern California.³⁰⁴ The Glen and Tehama County Telephone companies started operation five years earlier in the predominantly rural counties. Prior to their formation, the Bell system had established exchanges only in the cities, had minimal toll lines, and used obsolete equipment. The new companies built exchanges and toll lines throughout their counties using modern independent apparatus. Following the standard pattern of access competition, Bell was forced to install modern switchboards, construct extensive toll lines, and sublicense farmer lines in order to remain competitive. Competition had produced a high level of duplicate subscriptions. At the time of the proceeding the subscriber breakdown was as follows:

TABLE 9.3
TELEPHONE COMPETITION IN GLEN AND TEHAMA COUNTIES, CA, 1912

	Tehama County	Glen County
Bell-connected users:	629	674
Independent users:	457	570
Duplicate users (%):	241 (28%)	329 (36%)

Bell held the majority of users, but only 30 percent of the Bell-connected telephones were leased from Bell; the rest were sublicensed phones owned by farmers. The commission considered connecting the two systems an appropriate solution because the independents offered superior local service while the Bell system had more extensive toll access.

From the text of the decision it is clear that the local telephone companies viewed interconnection as a way to overcome the competitive advantages given to Bell by its toll lines. They believed that once the two systems were connected they would win the majority of the local exchange subscribers. The utility commissioners also saw interconnection as a means of eliminating duplicate subscriptions and overlapping exchanges. Its ruling pointedly did not disagree with Bell’s contention that it would lose most of its exchange subscribers if telephone users could gain access to its toll lines without subscribing to its local exchanges. Like Bell, the commissioners thought of the telephone as a natural monopoly. That Bell had been forced to extend and improve its service by the new entrants was interpreted by the commission not as evidence for the benefits of competition but as an indication that a monopoly could and should have been doing better.³⁰⁵

³⁰⁴ The commission’s decision is reprinted in 64 TELEPHONY (Mar. 1, 1913).

³⁰⁵ “A reduction of rates...and improvement of service under competition is an indication of one of two things, either that the rates are too high and the service not good enough before the competition arose, or that the rates

Wisconsin

In the city of LaCrosse, Wisconsin (pop. 30,000), Frank Winter, a subscriber to the independent company, petitioned the Wisconsin Railroad Commission to connect the toll lines of the two competing systems in 1912. LaCrosse was the largest city to undertake a physical connection proceeding at that time. The Wisconsin Telephone Co. (Bell) had 1,400 subscribers in the city; the LaCrosse Telephone Co. had 4,200. Both companies had toll facilities offering connections throughout the state, but Wisconsin Telephone lines extended to many places not reached by the local independent. Only 8 percent of the telephone users had duplicate subscriptions, and twelve to fifteen large businesses had PBXs connected to the toll lines of both companies. The petitioner's business required almost daily use of Bell toll facilities. When calls for local people not on the Bell exchange came into the city, messengers had to be dispatched to bring the desired party to a Bell station. Winter requested connecting only the toll lines of the two systems, leaving the division of local exchange service intact. The petitioners argued that the arrangement would be more convenient and would benefit the Bell company by increasing its toll business.³⁰⁶

Wisconsin Telephone opposed the request with its usual arguments. Interconnection would result in the loss of most of its exchange subscribers. If users could obtain access to Bell toll lines without a subscription to Bell's exchange, they would migrate to the larger independent exchange in order to obtain universal local service in addition to Bell's widespread toll line service. To support its contention it introduced evidence from Canada, where interconnection had been ordered in eight cities and Bell's growth in subscribers had been reversed while its local competitors grew.³⁰⁷

The Wisconsin regulators ordered the connection made. Unlike the California Commission, however, they took seriously the question of confiscation of property. "It is evident that the only inducement to subscribe to the Bell system is the fact that thereby the subscriber is connected with a telephone system covering like net work the entire country." In order to compensate for economic damage to Bell's exchange, the commission imposed a surcharge on users of Bell toll lines who did not subscribe to the Bell exchange. "A subscriber who has not installed the telephones of both exchanges is not entitled to the toll service of both exchanges without paying an additional charge," it said.³⁰⁸ A surcharge had also been imposed in Canada, however, where it had failed to stop the desertion of the Bell system. In June 1914 the Wisconsin Commission issued another physical connection order pertaining to the city of Janesville, Wisconsin. In that case the connection order included both local exchange and toll service.³⁰⁹ In LaCrosse, Bell's fears proved to be true-local subscribers gradually deserted the Bell exchange over the next four years until the exchange was closed. In Janesville, however, market shares stabilized, but the exchanges were eventually consolidated anyway.

are made too low and the service too good for the price under the stress of the competition. The former result could and should have been brought about without competition; the second result cannot be permanently maintained even under competition unless the utility according too low a rate is charging too high a rate elsewhere." *Id.*

³⁰⁶ 64 TELEPHONY 25-29 (May 17, 1913). See also D. Gabel 360-68 (1987).

³⁰⁷ D. Gabel 632-63 (1987).

³⁰⁸ 64 TELEPHONY (May 17, 1913).

³⁰⁹ D. Gabel 369 (1987).

Portland, Oregon

Portland, Oregon, in 1913 was a dual service city with about 40,000 Bell telephones, 13,600 Home Co. telephones and 7,000 duplicate subscribers. The Hotel Oregon had Home Co. telephones in its 400 rooms and forty-five Bell system phones in the public places throughout the hotel. The hotel's customers objected to the inconvenience of having to walk to the lobby or hallways to call Bell subscribers in the city. When incoming calls came into the hotel over the Bell system, the hotel staff had to contact the patrons and bring them to a Bell station. The switchboards of the two systems were in the same room in the hotel. The Home Co. was willing to set up a connection between the two, but Bell refused to do so. The only remedy Bell offered was to install duplicate Bell telephones in all the hotel rooms, an expensive proposition for the hotel management. On the motion of the hotel owners, the case was brought to the Oregon Railroad Commission. The commission ordered the telephone companies to connect their hotel switchboards and exchange traffic and charge three and a half cents for each transferred call.

There were other important physical connection cases in Hamilton, Ohio, and Grand Ledge, Michigan. The commission ordered connections, but in each case the decision was appealed. As in the exclusive connecting contract cases, the state supreme courts decisions conflicted with each other. Indiana's Supreme Court ruled against compulsory physical connection in August 1909.³¹⁰ California's Supreme Court overturned the railroad commission's interconnection order in 1913, calling it "confiscatory." The Wisconsin Supreme Court upheld its commission in 1916.³¹¹

Regulation as a substitute for competition

Regulatory commissions often promoted consolidations as well as interconnection. In September 1911, only three months after the bill creating the Ohio utility commission became law, state officials were meeting with representatives of the Bell company to discuss plans for the elimination of dual service throughout the state. In 1912 the Bell and independent telephone companies in southeastern Nebraska worked out a consolidation in which Bell achieved a monopoly in some territories and the independent a monopoly in the others. The deal was made with the aid and approval of the state commission. The Michigan commission presided over the consolidation of the competing exchanges in Detroit in 1912 and helped to assure the remaining independent companies that the change would not impair their access to the city.³¹² When the regulators and their supporters attempted to push for legislation against dual service, however, they were rarely successful. Bills which explicitly prevented competition or permitted mergers between competing companies were defeated in Wisconsin, Illinois, and Ohio in 1909 and 1910. Another merger bill with the support of both Bell and the Morgan interests (which controlled the big independent system in the state) was introduced in Ohio in 1911 but failed to pass again. A similar bill was vetoed by the governor of Nebraska in 1911. While the creation of one system had the support of regulators, it was still controversial with the general public.

The vitality and novelty of the issue of interconnection can be measured by the contradictory nature of the responses it evoked. Exclusive connecting contracts had been declared

³¹⁰ 18 TELEPHONY 159 (Aug. 7. 1909).

³¹¹ Wisconsin Telephone Co. v. Railroad Commission of Wisconsin, 162 W.R. 383 (1916).

³¹² MacMeal 194 (1934).

to be both anti-competitive and the salvation of competition. Their legality had been upheld by one state supreme court and overturned by others. Consolidation of competing telephone companies was being prosecuted under state and federal antitrust laws but actively encouraged by state utility commissions. The commissions could bring about consolidations, but bills explicitly authorizing them were usually defeated. Physical interconnection was the desirable goal, but so was competition and the two did not seem to be compatible. Compelling physical connection was authorized by law in many states but had been declared confiscatory and illegal by some state courts.

10

SAVING DUAL SERVICE? THE KINGSBURY COMMITMENT

BY THE END OF 1913, Vail's attempt to unify the telephone system had reaped a whirlwind of controversy. AT&T was mired in lawsuits regarding rates or antitrust issues in almost every state. The federal government, too, had initiated antitrust litigation against Bell in the Pacific Northwest. A stockholder of the Central Union company was suing AT&T for conspiring to bankrupt the licensee company in order to subject it to an inexpensive takeover by AT&T. More threatening still, AT&T's pursuit of a single system had fueled agitation for government ownership of the telephone system. Postmaster General Burleson's annual report for 1912 had advocated government ownership of all forms of interstate communication. Burleson was cooperating with two powerful congressmen, Representative Moon of Tennessee, Chairman of the House Committee on Post Offices and Post Roads, and Representative David J. Lewis of Maryland, in the drafting of a bill to nationalize long-distance telephone lines.

Bell's attempt to acquire and consolidate the Morgan-owned independent properties in Ohio brought matters to a head. After extensive negotiations with state and federal authorities, it learned that the consolidations would be considered a violation of the Sherman Act. In order to extract itself from litigation and abate the threat of government ownership, Bell was forced to back away from its pursuit of a unified system. Its vehicle for doing so was the "Kingsbury commitment" of December 19, 1913, so named because it was expressed in a letter from AT&T Vice President Nathan C. Kingsbury to Attorney General McReynolds and Assistant Attorney General G. Carroll Todd of the Department of Justice. The letter eliminated, for the time being, the threat of federal antitrust prosecution and stilled some of the demands for government ownership.

The Kingsbury letter committed AT&T to three things:

1) AT&T agreed to divest itself of its controlling stock holdings in its Western Union telegraph company, despite the important economies of scope gained from joint operation of telephone and telegraph lines;

2) AT&T agreed to stop acquiring competing independent exchanges, thus preserving dual service in the 1,234 cities and towns where Bell and an independent divided the market;

3) AT&T offered to open up its long-distance lines to independent exchanges under certain conditions. The interconnection provisions of the commitment only applied to exchanges that were more than fifty miles apart. Thus, the agreement appeared to preserve a divided, competitive service at the local level while depriving AT&T of the competitive advantage it obtained by tying long-distance access to local exchange service.³¹³

Contemporaries viewed the Kingsbury commitment as a near-complete victory for the view that competition rather than monopoly should be the norm in the telephone industry. The independents referred to the commitment as a “gift from Santa Claus Bell”³¹⁴ and congratulated themselves on what seemed to be “the acceptance of the principle of competition in the conduct of [the telephone] business.”³¹⁵ Indeed, to this day the Kingsbury commitment is reknowned within the telecommunications industry as a historical milestone. But it is hard to understand why. The agreement proved to be completely ineffectual at preserving a competitive market structure. Although the spinoff of Western Union was accomplished, the commitment had no impact whatsoever on toll interconnection. Within three years of its ban on acquisitions, Bell, the independents, and state and federal governments were engaged in a mutually agreeable process of consolidating their properties. Only seven years later, its restrictions on buyouts were officially eliminated by a new federal law. The Kingsbury commitment was neither a milestone nor a turning point but a brief pause on the road to regulated monopoly.

The Kingsbury Commitment and Toll Interconnection

The Kingsbury commitment is often misinterpreted as a sweeping interconnection agreement that effectively ended the fragmentation brought about by Bell and independent competition. It was nothing of the kind. Its primary intention was to leave dual service competition intact at the exchange level. Thus, it did not permit connection of Bell and independent exchanges that were sited within a fifty mile radius of each other. As noted before, 95 percent of all telephone calls at that time were to points within fifty miles. More importantly, there is no evidence that any sizable independent company availed itself of the opportunity to establish long-distance connections with AT&T under its terms. Bell’s own statistics on the number of telephone subscribers connected to itself through independent companies show no quantum leaps in 1914 or 1915. On the contrary, the rate of increase in the number of connecting stations, which advanced rapidly during Vail’s sublicensing craze of 1908 to 1912, declined steadily from 1913 to 1916. The

³¹³ The complete text of the Kingsbury commitment is published in the 1913 AT&T ANNUAL REPORT 24-26.

³¹⁴ 65 TELEPHONY 1 (Dec. 27, 1913).

³¹⁵ Comments of E. B. Fisher, President. Independent Telephone Association of America, 65 TELEPHONY 20 (Dec. 27, 1913).

number of independent stations connected to the Bell system increased by 8 percent from 1912 to 1913, by 4 percent from 1914 to 1915, and by only 3 percent from 1915 to 1916.³¹⁶ Additional sublicensing of small exchanges in outlying areas, rather than the Kingsbury commitment, accounts for that growth.

The reason for the commitment's lack of impact on interconnection becomes apparent as soon as its actual provisions are examined. The commitment was carefully crafted to preserve Bell's competitive advantage, and its terms were far from generous. To make long-distance connections over the Bell system, an independent had to build its own lines to the nearest Bell exchange and pay the regular toll charges, plus a ten cent fee for every call handled. The idea of imposing a surcharge on the exchange of traffic between competing systems had been employed by many utility commissions as a way around the appropriability argument and court restrictions on confiscation. But the physical connection agreements ordered by utility commissions usually established a surcharge *one-half to one-third* that size! The agreement also stipulated that the entire toll circuit should be over Bell facilities and under the control of Bell operators. Independent long-distance lines, in other words, could not be used to make up any part of the circuit, except to get the call to the nearest Bell switchboard in cases where there were no Bell lines. That excluded independent long-distance companies from the entire market for long-distance traffic flowing from independent to Bell telephones. More restrictive still, the agreement only permitted independent subscribers to terminate calls in Bell exchanges; it did not allow Bell subscribers to place calls to users on independent systems.

Those terms of trade benefitted only Bell. The terms of the commitment were so disadvantageous to the independents that they were immediately dismissed by them as "absurd" and "insane."³¹⁷ Most independents still viewed the commitment as a victory, however, because they thought the Kingsbury commitment would be the first step in a bargaining process that would eventually lead to acceptable terms. But there were a few dissenting voices.

J.C. Kelsey, a columnist in *Telephony*, correctly characterized the commitment as the last in a series of three steps taken by Bell to deprive the independents of their exclusive control of portions of the telephone business. The sublicensing contracts had opened up a significant number of independent exchanges to Bell connections without allowing competing independents access to Bell exchanges. The decision to sell Bell-manufactured telephones to independent companies had eroded the independent manufacturers' exclusive control of independent operating company purchases without permitting any Bell companies to buy independently-manufactured equipment. Now the Kingsbury commitment opened up to Bell parts of the long-distance business heretofore exclusively controlled by independents, without any reciprocal concessions:

The Bell company throws open its long-distance lines... Does it involve any loss to Bell? Does it involve any gain to you? ... [Bell] retains its long-distance business. You can't get any of that. But it puts the large independent centers on the clock. It

³¹⁶ FCC TELEPHONE INVESTIGATION (GPO, 1939) Table 32, 129.

³¹⁷ 66 TELEPHONY 29-30 (Jan. 17, 1914).

has offered to share your exclusive customers' business with you. Surely, another typically generous act.³¹⁸

In a letter to Assistant Attorney General G. Carroll Todd, Kingsbury made clear the non-reciprocal nature of the commitment: "the Bell system cannot, under the terms of that contract, open up an independent system to its subscribers."³¹⁹

The independent's optimism about improving the toll interconnection arrangements was dashed when major independents entered into post-Kingsbury negotiations. In October 1914 President Hubbell of Buffalo's independent Federal Telephone Co. made an inquiry about interconnecting with Bell toll lines. In his correspondence with AT&T Vice President Kingsbury, he quickly discovered that AT&T would make no concessions to reciprocity.³²⁰ Hubbell complained to the Department of Justice to no avail. Late in 1916 the Independent's national association charged that Bell had failed to live up to the spirit of the interconnection agreement.³²¹ The protests had no effect.

The Ban on Acquisitions

The Kingsbury commitment's moratorium on acquisitions was far more important than its lopsided, ineffectual interconnection proposal. Hundreds of ongoing negotiations for Bell purchases of major independent properties were suddenly suspended. The suspension left intact many large independent operating companies, rooted in major cities and possessed of significant levels of toll interconnection. At the time of the agreement, there were 1,234 communities in which Bell competed with an independent exchange and 630 communities in which a Bell-connecting independent competed with other independent exchanges. Dual service thus remained in 1,864 places, 13 percent of the total number of communities with exchanges in the United States.³²²

The moratorium on consolidations, however, was at odds with other forces propelling the telephone system towards monopoly. The growing desire of users for universal access, state utility commissions' determination to supplant competition with regulation, and World War I-induced centralization all pointed towards the unification of the network. The Kingsbury commitment thus created a temporary hiatus in the march toward monopoly rather than a victory for the competitive principle. For the next five years, the commitment impeded consolidations while the political, economic, and social forces favoring them continued to build.

The forces undermining the commitment are evident in a host of Bell archives files pertaining to acquisitions of independents after 1912.³²³ In many cases, the commitment was the

³¹⁸ J. C. Kelsey, Some New Year Thoughts, 66 TELEPHONY (Jan. 10, 1914).

³¹⁹ N. C. Kingsbury to G. Carroll Todd, Oct. I, 1914, Section 7, Papers of the Attorney General, National Archives.

³²⁰ N. C. Kingsbury to B.G. Hubbell, Oct. I, 1914. B.G. Hubbell to N.C. Kingsbury, Oct. 8, 1914. AT&T-L&R.

³²¹ MacMeal 221 (1934).

³²² MacMeal 208 (1934).

³²³ N. C. Kingsbury, AT&T, to Geo. W. Wickersham, U.S. Attorney General, Mar. 3, 1913, Box 32, AT&T-BLA. Attached memo contains a list of 29 acquisitions in Nebraska, Iowa, and Minnesota which "have been postponed or abandoned on account of Mr. Vail's letter of August 6th [1912]." For other postponed acquisitions, see Continental,

only obstacle in the path of a proposed merger in which the independents were willing to sell, Bell wanted to buy, the city and state authorities approved of the deal, and voters had expressed their desire to unify the service by large majorities. Faced with that situation, the independent telephone interests and/or local government officials approached the federal government and asked the antitrust authorities to sanction the deal. In a delicate process of negotiations, the Attorney General's office let it be known that they would raise no objections to widely supported consolidations as long as dual service was eliminated by swapping territories rather than via simple takeovers. Although that option left Bell in exclusive control of one territory and the independent in exclusive control of the other (and thus eliminated competition) Bell and the independents stayed in control of roughly the same number of telephones as before. Invariably, the key argument used to justify the consolidation-not only by Bell, but by independents, government officials, and users-was that unification of the telephone service was more desirable than a divided service. Thus, within a few years of the Kingsbury Commitment a number of major consolidations of telephone service took place. Kansas City, Los Angeles, Memphis, and many smaller places traded dual service for universal service. Three of those consolidations are examined in detail in the next chapter.

The government's explicit acquiescence in the piecemeal elimination of dual service is a critical element in understanding why the United States ended up with a telephone monopoly. Historical interpretations which stress economic predation by the Bell system (and/or Bell-inspired manipulations of the political process) ignore the fact that at that critical juncture in telephone history, major independent operating companies had survived, and both federal and state governments possessed all the tools they needed to prevent monopolization of the industry. Antitrust laws, at both state and federal levels, could have prevented consolidation had they been applied. Opposition from any well-organized and reasonably influential interest group could have stopped the process of waiving the Kingsbury Commitment.³²⁴ But that opposition rarely materialized. More often than not, voters, city councils, and statewide referenda weighed in on the side of universal service and consolidation.

The antitrust-inspired Kingsbury commitment was a shrewd tactical move by AT&T, in that it deflected antitrust pressures but did not undermine its superior position in the access competition. The erosion of the ban on acquisitions was the product of a legal and regulatory system that had not yet come to grips with the fact that its desire for an integrated telephone system was completely at odds with its commitment to the preservation of normal market competition. The only positive accomplishment of the Kingsbury commitment was to bring Bell's accelerating acquisition of independent systems to a halt for four years, giving the telephone companies, utility commissions, city and state governments, and federal antitrust officials the breathing room needed to work out a coherent policy regarding telephone monopoly, competition, and interconnection.

1910, Box 65, AT&T-BLA; Indianapolis, 1907-1915, Box 36, AT&T-BLA; St. Louis, Missouri, Box 16; Missouri and Kansas, 1909-1919, Boxes 17, 18.

³²⁴ In Kansas City, for example, the newspapers waged a successful editorial campaign against consolidation in 1911, (Box 17, AT&T-BLA) while in Shreveport, Louisiana, labor interests coalesced to defeat a resolution favoring consolidation.

11

THE SUBTLE POLITICS & ECONOMICS OF UNIFICATION, 1914-1921

THE PERIOD BETWEEN the Kingsbury commitment of December, 1913, and the 1934 Communications Act is something of an empty space in telephone historiography. Accounts of the Bell-independent competition tend to trail off after the Kingsbury commitment. Noting the rise of state regulatory commissions and the Kingsbury commitment's alleged interconnection of the competitors, those accounts tend to imply that the regulated monopoly system was basically in place from 1914 on. The Kingsbury commitment, however, was actually intended to preserve dual service competition, as noted in the previous chapter. In the aftermath of its agreement to stop Bell acquisitions, more than 1,800 cities still had unconnected, competing exchanges. Major, urban-based independent regionals still thrived in places like Buffalo, Minneapolis-St. Paul, Los Angeles, St. Louis, Indianapolis, Columbus, Cleveland, and Kansas City. Those systems had weathered the storm of acquisitions and interconnection from 1908 to 1913 and showed no signs of going out of business. Dual service was still an important factor in the American telephone industry.

Nevertheless, within three years of the Kingsbury commitment a series of great unifications of independent and Bell telephone systems in major cities began. Many were concluded by 1918, well before a 1921 federal law nullified the Kingsbury commitment. Clearly, an important change in attitudes toward telephone competition took place during those years. From a historical standpoint, it is important to examine the ideas which motivated that process. It is also important to examine the unification of service from an economic standpoint in order to evaluate the sources of efficiency in telephone monopoly. This chapter examines three of those unifications: in Los Angeles, California, Buffalo, New York, and the state of Kentucky.

The unification of telephone service could be accomplished in essentially two ways. One would be to interconnect the competing systems so that they could exchange traffic. Physical interconnection could take place with or without a merger of ownership. The other alternative was

for one system to buy out the other and gradually migrate all of its customers to the remaining system. At the time, that option was called “consolidation.” (A third, rarely selected option was a municipal takeover of the telephone system.) As we shall see, the process of unification ultimately took the form of consolidation rather than interconnection.

Consolidation in Buffalo, New York

The Buffalo-based Federal Telephone Co. was run by Burt G. Hubbell, a prominent national independent leader and one of the ablest and most sincere supporters of telephone competition. Hubbell’s company had an ownership interest in thirty-five independent exchanges in western New York, including the systems of Buffalo, Rochester, and Jamestown. The James-town independent exchange had more subscribers than its rival Bell exchange; the Rochester exchange was roughly equal to its competitor, while Bell’s subscriber list in Buffalo outnumbered the independent by nearly three to one.

In 1916 Hubbell observed a tendency among subscribers served by two exchanges to gravitate toward the larger of the two systems. His Buffalo exchange was having a harder and harder time attracting new subscribers, and the size of its list was decreasing. Thus, continued access competition in Buffalo was culminating in convergence as users gradually realized the benefits of joint consumption. But convergence at the local level was leading to greater fragmentation at the interexchange level. According to Hubbell, “the natural tendency of the public to patronize the company with the largest number of subscribers...has led to a segregation into telephone districts in each of which one of the two competitors has usually acquired a great predominance of subscribers.” As a result, large numbers of users in western New York were unable to communicate with each other by telephone.³²⁵

That this process of convergence was driven by demand-side economies of scope, rather than by the superiority of Bell’s service, is clear. In a memo to the U.S. Attorney General seeking his approval for a consolidation, Hubbell pointed out that the Federal Company had used every means at its disposal to reverse the downward trend in Buffalo. It had waged an advertising campaign touting competition, local control, and lower rates. It had financed, purchased, and installed an automatic switching system in Buffalo. Automation resulted in rapid and efficient service but failed to reverse the migration of subscribers to the Bell system. On the other hand, in Jamestown, where the Federal system had the most subscribers, the independent exchange was increasing its share. Hubbell concluded:

A careful and painstaking analysis of this situation has brought the company to the conclusion that through a change in sentiment (entirely beyond the control of this company to direct or influence) the public, in the territory occupied by the company, now feels that its best interests can be served through a unified telephone system under state Public Service Commission control, rather than through the support of two companies giving a divided service.³²⁶

³²⁵ B. G. Hubbell to U.S. Attorney General, Aug. 30, 1916. Box 25, AT&T-BLA.

³²⁶ *Id.*

Bell's New York Telephone Company pursued the consolidation in the manner characteristic of the Bell companies at that time. During the consolidation, it worked closely with the Buffalo Chamber of Commerce to secure its approval of the rate changes it wanted to make. It insisted that the majority of telephone users express their approval of the consolidation by petition or a local referendum before the companies applied to the Attorney General for a waiver of the Kingsbury commitment.³²⁷ As in many other localities in that period, Bell skirted the prohibition of the Kingsbury commitment against the acquisition of competing independents by proposing to trade territories with its former competitor. In that case, Bell acquired control of the Buffalo area while the independents gained a monopoly over Rochester and Jamestown and vicinity.

The Buffalo Chamber of Commerce approved the consolidation after a special committee conducted a detailed investigation of telephone rates in the city. The first of the committee's conclusions:

No permanent and satisfactory telephone situation can be established which contemplates the division of our people into two separate groups. General inter-communication is the essential requirement for adequate and complete telephone service, especially for business men.³²⁸

Fragmentation of the subscriber universe was always a critical factor in driving consolidations forward. What is equally interesting, however, is how the unification process affected and reflected the interests of people located in different levels of the communications hierarchy. The issue was not merely whether the public wanted universal service or not, but also who would gain and who would lose because of the transition. That issue comes out most clearly by examining the way rates were adjusted following the consolidation.

The Chamber of Commerce report proposed to completely overhaul the telephone rate structure upon consolidation. The report claimed that neither telephone company was making an adequate return under present conditions and could, if they so requested, obtain approval for a rate increase from the Public Service Commission. That, it claimed, "would prove an added burden to the telephone users of this city, and particularly to those who use both services." As an alternative to rate increases under continued dual service, the report proposed a system of measured rates and a move away from party line service. Consolidation would result in reduced operating expenses, while the proposed rate changes, the committee asserted, would reduce rates for most subscriber groups while justly assigning a larger share of the costs to those who used the telephone the most. In its assessment of the impact of the rate change, the committee relied almost entirely on information provided by New York Telephone.

The structure of the proposed rates yields important clues about who wanted universal service and who was expected to pay for it. One effect of the new rates was to dramatically increase

³²⁷ Federal Tel. & Tel. Co., Rochester Tel. Co., Home Telephone Co. of James- town, New York Telephone Co., "An Analysis of the Present Unsatisfactory Telephone Conditions now Existing in Western New York and a Plan for Remediating Them." Oct. 5, 1917. Box 25, AT&T-BLA.

³²⁸ Buffalo Chamber of Commerce, Telephone Committee's Report, May 5, 1916, 10.

the charges of the 1,000 or so large business users at the top of the hierarchy. One such user, the Postal Telegraph-Cable Co., entered an emphatic protest with the city council, pointing out that its payments for telephone service would triple under the proposed rates.³²⁹ The Postal Company circulated its own petition for continued competition to counter the Bell-Chamber of Commerce petition favoring merger. The leaflet carried a list contrasting the rates of cities with and without competition.³³⁰

The Chamber of Commerce report tried hard to make it look as if residential and small user rates would be unaffected by the change. But it is fairly certain that the rates of users on the bottom of the hierarchy were also being subtly increased. All business party lines were to be eliminated, and half the business subscribers of both companies were served on a party line basis. The lowest of the new measured service rates allowed a business subscriber to make only about two calls a day without incurring extra charges. Four-party residential lines, formerly priced at \$24 per year, were to be put on a measured basis, while individual and two-party residential lines were to be offered on a flat-rate basis at much higher rates. Although the four-party residential line preserved the old monthly rate, it now came with a limit of 600 messages, beyond which there would be an additional charge of four cents per call. If each person on a four-party line made only one call a day, they would exceed that limit by 840 calls, leading to extra charges of \$33 per year.

The discouragement of party lines was a predictable characteristic of a telephone system that no longer had to compete on the dimension of access. Party lines had flourished during the competitive period because each network wanted to get as many subscribers as possible onto its system at the lowest possible cost. As competition waned, the telephone companies took access for granted and concentrated on maximizing their revenues from usage.

If the consolidation increased rates for users at the top and bottom of the hierarchy, it probably saved money for business users located somewhere in the middle, assuming that they were single-line users before. Savings would be especially pronounced for businesses with a moderate level of calling who had paid for two subscriptions before. Consolidation gave them universal access at a price about the same (and possibly lower) than the price of a subscription to a single system before the change.

Consolidation in Southern California

The political response to dual service in Southern California was particularly revealing. By 1916 the Bell and independent systems had split the telephone business of the region almost exactly in half. Bell's Pacific Telephone and Telegraph Co. had eleven exchanges serving 67,000 stations in the area. Its toll lines offered connections to most of the Bell exchanges west of the Rockies and AT&T connections to the rest of the United States. The independent Home Telephone and Telegraph Co. operated fourteen local exchanges and one toll exchange using automatic switching

³²⁹ Postal Telegraph-Cable Co., *Telephone Merger*, Pamphlet dated Aug. 28, 1916 addressed to the City Council of Buffalo, New York.

³³⁰ The Postal Telegraph Company had been an opponent of AT&T ever since the latter's acquisition of Western Union in 1909. It opposed consolidations because it feared that the telephone giant would use its market power in the telephone arena to dominate the telegraph industry.

equipment. In 1916 the Home Co. had 60,300 subscribers and toll connections to many other independent exchanges in Southern California, although it offered no interstate connections. Despite the fact that the Los Angeles city council had imposed artificially low rates on both companies, forcing them to operate at a loss, both systems were financially sound and in good physical condition.³³¹ The unremunerative rates harmed the credit of the independent company and made it difficult for it to raise money for expansion, but its effect on the Bell company was equally severe; only its financial ties to AT&T and the rest of the Bell system kept it solvent. Assuming reasonable rates, then, dual service could have been maintained indefinitely in Southern California.

Yet as the telephone saturated the area, political agitation against dual service and for some form of unification took hold. Organized demands for change began around 1910, when the city created its own municipal Public Utilities Board. Three remedies were discussed: 1) compulsory interconnection of the competing exchanges, 2) municipal ownership of the telephone system, and 3) consolidation into a privately owned but publicly regulated monopoly. The first option, which appeared to leave both competition and the existing companies intact, was the most popular. In April 1910 the Municipal League of Los Angeles asked the Board of Public Utilities to investigate the feasibility of establishing a method of interconnecting the two rival telephone systems.

As the Board prepared its report, agitation against dual service by the business community grew. In 1912 the Southern California Hotel Men's Association created a committee to prepare a plan to eliminate the use of both telephones in hotels.³³² The Hotel Association's approach to the problem boiled down to an attempt to coordinate users to select one telephone system over the other as a bloc. The same year a group calling itself the Telephone Reform Association initiated a campaign against dual service and for consolidation.³³³ By 1914 the Association had changed its name to the "One Phone League" and claimed 1200 members. There was no doubt that the policy of interconnecting the two companies enjoyed wide-spread public support. A municipal referendum of June 1, 1915, saw 63,194 voters express their preference for compulsory interchange of service, while only 14,921 voted against it. Also in 1915, the Socialist Party put a referendum on the ballot authorizing the city to take over and operate the telephone system. The proposition was defeated with 20,000 votes in favor and 30,000 votes against.

If the opposition to dual service is broken down by subscriber group, a familiar pattern emerges. Earlier in chapter 6 the correlation between telephone users' duplication rate and their position in the calling hierarchy was demonstrated. Organizations at the top of the hierarchy-i.e., those whose usage was large both in volume and in geographic scope-had high duplication rates. Telephone users at the bottom of the hierarchy tended not to duplicate. In the political reaction to dual service the same hierarchy appears. A survey taken by an economics student at the University of Southern California in 1916 asked telephone users, "Are you ever troubled about not being able

³³¹ A letter from Henry Robinson to N.C. Kingsbury, July 27, 1915, notes the improved financial condition of the Home company and urges Kingsbury to consummate a merger before the market value of the independent company's shares improved and its stockholders began to oppose a merger. Box 18, AT&T-BLA.

³³² LOS ANGELES TIMES, June 22, 1912.

³³³ For a complete chronology of the political opposition to dual service in Los Angeles, see *Summary of Information Furnished to the Department of Justice in Connection with Los Angeles Telephone Consolidation Case*, Mar. 23, 1917, Box 18, AT&T Bell Labs archives.

to get people by telephone because they have the other service?" The survey interviewed fifty "business men," fifty "professional men," and fifty "housewives." The answers are shown below.³³⁴

	Yes %	No %	N =
Business Men	100	0	50
Professional Men	96	4	50
Housewives	66	34	50

The data as reported here contain a measure of ambiguity. The surveyed population is small,-we do not know how the samples were selected, nor do we know what the economic status of the housewives was. Still, the unanimity with which business users opposed dual service is striking. It is reasonable to assume that most of the businessmen were "troubled" not because they were unable to get people by telephone – many of them would have been duplicate subscribers, after all – but because they objected to the additional expense of subscribing to both systems. As noted before, telephone rates had been a volatile political issue in the city since 1907, with the voting public demanding (and politicians supplying) rates that could not recover the companies' costs. Business and professional users of the telephone provided the political constituency for those actions.

The corresponding lack of unanimity among housewives is equally striking. Although a large majority of them answered "Yes" to the question, one in every three of them was willing to say that she was not troubled at all by an inability to reach half the telephone subscribers in the region. That is even more remarkable when we keep in mind that very few residential users were duplicate subscribers, so that they, unlike the business and professional users, really were unable to reach subscribers on the other system. The demand for homogenization was widespread, but the most vigorous calls for it came from the upper and middle levels of the communications hierarchy.

The Los Angeles Board of Public Utilities issued its report on the subject of interconnection on April 28, 1914.³³⁵ The report had been conducted by the Utility Department's Chief Engineer, James Barker, and was viewed by all concerned as an objective and impartial study. The Barker report effectively destroyed compulsory interconnection as an option by showing how expensive it would be to build and operate the facilities required to transmit, switch, and record calls between the two systems.

Although Barker concluded that interconnection was "physically possible," the expense of joint service was increased by the technical incompatibility of the two systems. Bell relied on manual and the Home Co. on machine switching, and both operated at different voltages. The main problem, however, was the sheer size of the two systems. Compulsory interconnection had never been carried out on a scale involving more than 100,000 telephone subscribers before. The places

³³⁴ Lloyd Heck Marvin, *The Telephone Situation in Los Angeles*, Master's Thesis, Department of Economics, University of Southern California, Jan. 7, 1916, Plate II.

³³⁵ The text of the Barker Report, Apr. 1914. is printed in the 1914 ANNUAL REPORT OF THE CALIFORNIA RAILROAD COMMISSION 62. AT&T-L&R.

in which it had been tried, such as Janesville and La Crosse in Wisconsin, or Pasadena in California, had only a few thousand subscribers and one central office for each company.

To connect the two large regional systems in Southern California, Barker observed, required one of two methods. One could, first, build direct trunk lines between all of the Home Co.'s central offices and all of the Pacific Co.'s central offices. While that was the most technically desirable method, Barker concluded that:

The expense in connection with this plan is so great as to preclude its adoption. The initial investment and fixed charges on the necessary equipment are prohibitive. Under this plan it would be necessary to practically duplicate the present trunking equipment of the companies and make extensive changes in the switchboards. In order to carry out this plan it would be necessary in some instances to enlarge the quarters in which the switchboards themselves are contained. In view of these difficulties, and the enormous expense involved, this plan presents so many obstacles that it appears commercially impracticable.³³⁶

The other method of interconnecting the two exchanges was to establish what would now be called a tandem switching center, an exchange office where calls between the two systems would converge to be switched. Barker estimated that such a switching center would have to be able to handle a peak load of 20,000 calls an hour and calculated that building and operating it would require about \$400,000 in capital investment and another \$500,000 to \$600,000 per year in expenses. The latter figure represented about one-third of the total annual operating revenues of both companies combined. Barker concluded by saying:

By far the best plan for obtaining the desired results is, in my opinion, through a consolidation of the two systems. By this means all duplication and unnecessary investments are avoided and operating and overhead costs are reduced to a minimum, and in the end the patrons will be given a better service and at the lowest rates commensurate with the necessary investment.³³⁷

After the Barker report, consolidation became the most popular strategy for unification, as municipal acquisition had been repudiated by the voters. The Bell Company's franchise expired in November 1916, and the city seized on that opportunity to require a consolidation by refusing to grant its request for a renewal. The product of the merger, the Southern California Telephone Company, was Bell-owned. It began operation on the first of May, 1917. The three-sided struggle over rates between the city's telephone users, the regulators, and telephone companies continued, but the question of dual vs. universal service had been settled.

The Los Angeles case indicates that, as in Buffalo, the economies to be realized from unification came from the demand side rather than the supply side. Here again, dual service seemed more efficient from the standpoint of a smaller user than for business users. However, the Barker

³³⁶ *Id.*

³³⁷ *Id.*

report showed that supply-side considerations played a significant role in the choice of consolidation, rather than interconnection, as the method of providing a unified service. The cost of establishing complete interconnection between competing, large-scope telephone systems was prohibitive.

Consolidation in the State of Kentucky

Bell's principal competitor in Kentucky was the Central Home Telephone Company. Central Home owned nineteen exchanges in the state in 1910, as well as its own long-distance company. After a financial failure in 1907, the system was successfully rehabilitated by the committee of bankers who assumed control of it. As they were not interested in remaining in the telephone business, the bankers approached Bell about selling out near the end of 1910. When Central Home initiated its negotiations, its facilities were generally in better shape than Bell's and its exchanges had more subscribers.³³⁸ In Louisville and its suburbs, for example, the independent had gained over 3,000 subscribers while Bell had lost 1,200 since 1907. The company claimed that this growth had been achieved without any extraordinary promotional measures but suggested that they would become more aggressive if Bell did not buy them out.

Bell, however, was only mildly interested in acquiring Central Home in 1911. There were two serious obstacles to a merger from its point of view. Already embroiled in controversy and litigation in Kentucky, Bell was not interested in acquiring a major telephone property unless it could be done openly and legally, and the Kentucky constitution contained a flat prohibition of mergers of competing common carriers.³³⁹ The other problem was a city ordinance in Louisville fixing the rates for telephone service. Bell was already involved in litigation against rate controls in two Kentucky cities. The president of Bell's Cumberland Company advised Kingsbury that the rates imposed by the city would preclude any possibility of making a profit on a consolidated investment. He went on to say:

I am of the opinion that the two companies will be compelled to operate for several years, until the people there get tired of two systems and join with us in formulating a plan by which the two companies can be consolidated and fair rates charged.³⁴⁰

That comment illuminates both the nature of Bell's commitment to universal service and its antipathy toward physical interconnection in that period. Bell was confident of the ultimate victory of the universal service idea and expected it to come about through a process of public negotiation in which reasonable regulators balanced the interests of the telephone users and the telephone companies. Until that happened, the benefits of a unified service were to be withheld, and used as leverage for bringing the interested parties around to a merger that would allow the surviving telephone company to increase its rates. There would be no universal service without a rate

³³⁸ Thomas Tracy to UN Bethell, AT&T, Feb. 3, 1913. Box 39, AT&T-BLA.

³³⁹ Section 201 of the Constitution of Kentucky read: "No...telegraph, telephone...company shall consolidate its capital stock, franchises, or property, or pool its earnings, in whole or in part, with any other...telegraph, telephone...company, owning a parallel or competing line...or acquire by purchase, lease or otherwise, any parallel or competing line or structure, or operate the same."

³⁴⁰ W. T. Gentry, Cumberland Co. to Kingsbury, Oct. 8, 1912. Box 39, AT&T-BLA.

increase. Given that policy, pressures to interconnect with competing exchanges in major cities had to be rebuffed because they would deprive Bell of its bargaining power over the unification process.

In an internal letter, Kingsbury admitted that the only reason he was interested in buying Central Home was the possibility that independent subscribers in Louisville and other parts of Kentucky would begin to demand a connection to Cincinnati.³⁴¹ A major metropolis only 100 miles from Louisville, Cincinnati attracted a substantial part of Kentucky's commerce and communication, yet had always been a Bell monopoly town. If a substantial number of telephone users in Kentucky remained on independent systems, especially one as politically well-connected as the Central Home, there was a danger that Bell could be ordered to supply long-distance connections to its exchange there or that a competing exchange would be established there. Late in 1911, in fact, the Postal Telegraph Company, which had an outlet in Cincinnati, offered to provide four heavy copper long-distance circuits between the Louisville independent exchange and Cincinnati.³⁴²

If the Central Home Co. knew definitely that it was not going to be purchased by Bell, it would either adopt more competitive tactics or, worse, cause legal and political trouble for Bell throughout the state. Kingsbury advised his local operatives to keep them mollified so as to avoid potentially "embarrassing" and "annoying" actions on their part. While he was not able or willing to buy out the independent, he had to convince them that a Bell purchase was imminent or possible.³⁴³ Kingsbury bided his time for two years, conducting an appraisal of the property and encouraging its owners to be patient, but negotiations were broken off in November 1912. The Kingsbury commitment, made about a year later, laid the matter of a sale to rest.

During the lull created by the antitrust agreement, Bell and its allies addressed themselves to the political situation in Kentucky. The company's unpopular litigation against municipal rate regulation in Louisville was settled in 1914, with the company accepting the city's dictates. Its rate litigation with the city of Paducah, which had led to the massive boycott of 1911, was settled by the U.S. Supreme Court in 1915. In the meantime, support for one telephone system had been growing. A new utility bill was passed in 1912, giving the railroad commission the power to compel toll connections. It also contained a provision allowing the railroad commission to authorize consolidations of telephone companies when they were supported by the municipalities involved. The part of the law legalizing mergers was an attempt to skirt the constitutional prohibition on consolidations.

A few months after its passage, the railroad commission approved a merger of the competing systems in Christian and Todd counties³⁴⁴ but expressed doubts about the

³⁴¹ N. C. Kingsbury to George W. Leverett, AT&T General Counsel, Dec. 1, 1911. Box 39, AT&T-BLA.

³⁴² Thomas Tracy to N. C. Kingsbury, Nov. 21, 1911. Box 39, AT&T-BLA.

³⁴³ Kingsbury to W. T. Gentry, Oct. 10, 1912. Box 39, AT&T-BLA.

³⁴⁴ The Kentucky Railroad Commission, Opinion and Resolution, "Application of the Christian-Todd Telephone Co., the Cumberland Telephone and Telegraph Co., the Hopkinsville Home Telephone Co., and the Todd County Home Telephone Co. to Consolidate." July 22, 1912. Box 39, AT&T-BLA.

constitutionality of the ruling. Pending test litigation, neither the commission nor Bell felt ready to proceed with any further consolidations.

Dual service reached its numerical peak in Kentucky in 1914, when there were competing exchanges in sixty-three of the 159 cities with exchanges. Public support for it, however, was rapidly waning. Having extracted itself from its unpopular rate litigation and repaired its relations with the state officials, Bell was in a position to promote the final step needed to eliminate it. In 1916 the legislature passed a constitutional amendment specifically exempting telephone consolidations from the merger prohibition. To become law, the amendment had to be ratified by the state's voters. The vote was scheduled for the November, 1917 elections. Hunt Chipley of Southern Bell, who had been instrumental in building up political support for the move, wrote to Kingsbury that the passage of the bill reflected a major change in public attitudes toward Bell since the Kingsbury commitment:

The legislature passed this bill because it was made plain to them, from all quarters of the state, that the public were tired of supporting dual systems of telephones and that the companies should be put in a position, under proper regulations, to remedy this situation.

The proposed amendment passed with 63 percent of the vote. It was supported by every major newspaper and board of trade in the state and passed through the legislature almost unanimously. In singling out the telephone for a special exemption from laws intended to preserve competition, Kentucky anticipated the federal Willis-Graham Act of 1921. Even the political composition of the coalition that brought the change about-an alliance of Bell and independents who claimed that they needed to be able to consolidate to maintain their economic viability-was reproduced at the national level four years later. Although the legal prerequisites of a monopoly telephone system had been supplied, Bell did not actually acquire the Central Home system until 1924.

Analysis of Consolidations

In retrospect, it is clear that telephone consolidations were not motivated by Bell's ability to achieve supply-side economies of scale or scope, nor did they result in rate decreases. Pressures for mergers came from both the demand and the supply side, but the cases of Los Angeles, Buffalo, and Kentucky make it clear that no change could have been affected without users.

From the demand side, consolidations were supported because they unified the service. Users in the middle of the communications hierarchy-businesses and professionals-wanted the benefits of unified telephone access without the expense of a duplicate subscription. In the rate changes that accompanied a consolidation, they typically succeeded in raising the telephone costs of both smaller and larger users. The case of Buffalo shows that even without consolidation, users were showing a tendency to converge on a single network.

From the supply side, the mergers were motivated by a desire to eliminate competition and clear the way for a rate increase. Both Bell and the independents had engaged in ferocious access

competition for the preceding fifteen to twenty years. Access competition demanded constant expansion of facilities, which tended to increase costs, while placing severe restraint on rates. Rate pressure came from both the market and municipal franchises and regulations. In competing cities, Bell openly held its rates below its costs in order to hold on to subscribers, even though its cost of providing exchange service was often higher than the independents, subsidizing its losing exchanges with profits from monopolized operations. Bell looked upon the elimination of dual service as an opportunity to recover those losses.

Pressures for a rate increase also came from the fact that consolidation increased the telephone company's short-term expenses.³⁴⁵ The Bell exchange was often unable to use much of the physical plant it had purchased, yet the costs of buying it had to be recovered. The placement of the wires and switchboards of the formerly competing systems usually did not facilitate their combination into one system. If some parts of the telephone exchanges could be combined, money had to be spent on connecting facilities, and in general operations became more complicated as the system grew. The revenue of a combined system was less than the sum of the revenue of both systems because of the loss of duplicate subscribers. Whatever operating economies were achieved by merging were offset by the increased expenses and proportionally less revenue.³⁴⁶

While the user public and the municipal government generally looked favorably upon unification of the service, support for it could evaporate if it was accompanied by a rate increase. A rate increase, of course, was the primary motive of the suppliers. Thus the politics of the transition had to be handled carefully. Bell had a distinct method and agenda to its approach to the consolidations. The promise of universal service was used to develop public support for the change, but the company had to make sure that this came about through consolidation rather than interconnection of competing exchanges. Bell promoted consolidations cautiously, making sure that it had the support or at least tacit consent of telephone users and all relevant government authorities. Technically, new acquisitions violated the Kingsbury commitment, but Bell had learned that it could obtain the Justice Department's approval if the merger had the support of the public and the approval of state and local officials. The only form of restraint imposed on Bell was that it could not come out of the transaction with control of a larger share of the nation's telephones. That made it possible for Bell and the independents to merge by trading territories. The independent would assume control wherever it was dominant or firmly entrenched, while Bell would take over the territories where it had a commanding lead. The Attorney General would then be presented with a list of the exchange territories being swapped, which showed that Bell was losing control over as many telephones as it was gaining. The antitrust officials generally granted their approval to those trades.

During World War I, when the Post Office took over the operation of the telephone system, pressures for consolidation and unification increased. There were still 1,450 competing points

³⁴⁵ The economics of consolidation in Madison, Wisconsin are discussed in 17 TELEPHONY 375 (Mar. 27, 1909).

³⁴⁶ *Id.* See also "Memorandum Regarding Ohio Mergers," Feb. 1912. Box 36, AT&T-BLA. This document contains a detailed analysis of the Bell system's approach to the economics and politics of consolidation in the state of Ohio.

remaining.³⁴⁷ Postmaster General Burleson received numerous letters from the city governments of dual service cities urging his approval of telephone consolidation.³⁴⁸ Several unions, including the Commercial Telegraphers' Union of America and the International Brotherhood of Electrical Workers, sent open letters to the Secretary of War advocating consolidation of telephone and telegraph industries as a means of economizing on technical people who might be used in the Army Signal Corps.³⁴⁹ That type of public support made it even easier for the Justice Department to waive the Kingsbury commitment's restrictions on mergers.

Completing the Transition

In large cities such as Buffalo, Louisville, and Los Angeles, public policy was consumed with the problem of what to do with established competitors. Given the heavy capital requirements and the entrenched position of the existing firms, there was little threat that a new company would enter. That was not true of the small towns and rural areas, however. There telephone competition continued with the vigor of the early 1900s until the state utility commissions actively suppressed it.³⁵⁰

The state of Ohio affords a revealing case study. The state law authorized the PUC to prevent telephone companies from "invading the territory" of another company without a certificate of public interest, convenience, and necessity from the commission. When numerous farmer and small town telephone companies came to the commission to obtain permission to compete with an existing company, showing that they could supply better service or offer lower rates, the commission refused whenever it had the authority to do so. In a case involving the Village of New Washington, the PUC denied permission to set up a new phone system even though the proposed service was at lower rates and the application was supported by a pleading filed by the Village government.³⁵¹ Entry was suppressed because prevention of a "multiplicity of telephone systems" and the confinement of telephone service to "one well regulated company" was "the whole intention of the [utilities] Act," a judge ruled.³⁵²

When another small town company attempted to enter the territory of a neighboring company because of the latter's failure to maintain its facilities in proper working condition, the PUC's opinion denied that this was a legitimate reason for competition. The filing of a complaint before the PUC, it said, could compel any company to improve its facilities. In other words, the commission was determined to substitute regulatory remedies for problems of service and rates formerly addressed by means of competition.

³⁴⁷ Memorandum, Acting Statistician, AT&T, Jan. 9, 1918, Box 13, AT&T-BLA.

³⁴⁸ See, for example, resolutions from the city council of Toledo, Canton, and Findlay, Ohio, dated, respectively, Nov. 22, Oct. 9th, and Oct. 21st, 1918; Box 27, AT&T-BLA.

³⁴⁹ Consolidation of Telephone and Telegaraph Cos to Aid WWI War Effort-1918, Box 13, AT&T-BLA.

³⁵⁰ The April 24, 1909 TELEPHONY reported that the independent telephone companies of New York opposed commission regulation "because of the prejudice of that body against competition in public utilities."

³⁵¹ In the matter of the application of the Cranberry Horne Telephone Co. for authority to construct a Telephone System in the Village of New Washington. Ohio, Ohio Public Utilities Commission Case #204, (July 11, 1912). AT&T-L&R.

³⁵² Clinton Telephone Co. v. New Burlington Telephone Co., Ohio Public Utilities Commission, Sept. 1912.

That evidence suggests that while dual service was still economically viable in many parts of the country, its elimination was mandated politically by the victory of the regulated monopoly paradigm. That adamant reliance on regulatory solutions reflected a movement that embraced all utilities. Once the telephone industry had been classified as a natural monopoly, regulatory commissions insisted on applying to it the techniques of regulatory control as a substitute for the market.

After the end of World War I there were still competing exchanges in 1,000 locations, including twelve major cities. Further consolidations were blocked by the Kingsbury commitment and more importantly by the Clayton antitrust act.³⁵³ The telephone companies' inability to consolidate, they claimed, made it impossible for them to raise money to rebuild their systems. In a movement that had the active support of both Bell and independent interests, Congress amended the Transportation Act to permit the consolidation of dual telephone systems with the approval of the Interstate Commerce Commission. In introducing the Willis-Graham Act of 1921, Senator Graham stated:

I think I am stating the opinion of most men who have considered the matter, that it is believed to be better policy to have one telephone system in a community that serves all the people, even though it may be at an advanced rate, properly regulated by State boards or commissions, than it is to have two competing telephone systems. There is nothing more exasperating, nothing that annoys the ordinary business man or the ordinary person more than to have two competing local telephone systems, so that he must have in his house and in his office two telephones, on neither one of which he can get all the people he wants to be in communication with.³⁵⁴

The passage of the Willis-Graham Act gave the imprimatur of the U.S. Congress to the elimination of the last vestiges of competition. It cleared the way for major consolidations in Ohio, Kentucky, and elsewhere, although such consolidations had been taking place gradually since 1916.

³⁵³ Section 7 of the Clayton antitrust act prohibited mergers which created a monopoly.

³⁵⁴ CONG. REC., June 1, 1921, p. 1966.

12

THE LEGACY OF ACCESS COMPETITION

BY THE MID-1920s, the remnants of access competition had been completely eliminated. The political and ideological victory of the regulated monopoly paradigm, advanced under the banner of universal service, has been so complete that the accomplishments of that period have been eclipsed. Nevertheless, the twenty-five year bout of dual service competition left an indelible impression on the American telephone network. The geographic scope of the network and popular adoption of telephones had been pushed to surprisingly modern levels.

Our picture of the popularization of the telephone by 1920 has been distorted somewhat by the modern emphasis on telephone penetration ratios as the indicator of telephone development. At the end of the dual service era, household penetration was about 30 percent and the simple penetration ratio (i.e., the number of telephones in service per 100 population) was only 13 percent. In most developed countries with universal service today, the penetration ratio is about 45 to 55 percent. Those bare numbers overlook two important facts about the dual service era, however. One is that by 1920 the U.S. telephone network was geographically universal; that is, it reached virtually all settled areas with public exchanges and lines. The other is that there were major regional variations in penetration. Many parts of the United States-particularly those where independent competition was strongest-had already achieved household penetration levels above 50 percent.

The Geographic Scope of the Telephone Network by 1920

Access competition did not put a telephone in every home, but as far we can determine from the available statistical sources, it did put a telephone exchange or line in practically every community. By 1920, the physical infrastructure for supporting universal telephone service was essentially in place. By “physical infrastructure,” I mean public telephone exchanges linked by trunk lines to the national network. The presence of an exchange is the best indicator of

geographical coverage, because it is the most important factor determining whether access was available in a given location. Table 12-1 shows the number of public exchanges, the number of Bell and independent exchanges, the growth rate of exchanges, and the number of places with dual service competition.

The 1920 census documents 15,692 incorporated places of all sizes in the United States.³⁵⁵ According to AT&T records, there were 19,550 places with a telephone exchange in November 1917.³⁵⁶ The 1917 telephone census counted 12,294 telephone exchanges with annual incomes over \$5,000. The remaining 3,858 exchanges were probably serving small rural communities. For the 40 percent of the U.S. population who in 1920 still lived in unincorporated areas, there also were 30,317 rural lines as of 1912.³⁵⁷

Undoubtedly, some remote parts of the country were unreached by telephone lines or exchanges, but an impressive level of coverage had been attained. No other country or region achieved a comparable degree of continent-wide coverage so rapidly. Indeed, the number of public telephone exchanges in the United States has changed only marginally since 1917. (In fact, growth in exchanges slowed noticeably after 1907, when the phase of system overlap ended.) Fifteen years later, in 1932, the number of exchanges had increased by only 3 percent. In 1990 15,227 telephone central offices in the continental United States reported to the Federal Communications Commission. That is significantly less than the 19,550 total counted by AT&T in 1917, but about 3,000 more than the 12,294 exchanges with an income greater than \$5,000 reported in the 1917 Telephone Census. The comparison between 1917 and 1990 statistics is of necessity rough and imprecise. Telephone companies under a certain size do not report to the FCC, but the reporting criteria have changed since the 1920s. Some of the additional exchanges counted in 1990 may have existed in 1917 but were owned by companies too small to count. The lack of precision does not detract much from the essential observation: *despite the huge growth in population, users, penetration levels, and traffic between 1920 and 1990, the number of telephone central offices has changed relatively little.* The geographic extension of the American telephone network came during the years of access competition.

Telephone Penetration by 1920

Access competition also produced major changes in the quantity and type of users. The telephone became a rural as well as an urban device, a household item as well as a business tool. Penetration expanded at a rapid pace to the highest levels in the world, although here the picture becomes more complex. Some parts of the country actually began to approach the ideal of universal household penetration; for other regions, notably the South, that goal remained a long ways off.

During the Bell monopoly, telephony had developed almost exclusively as an urban service. Access competition turned that situation on its head. In 1920 38.7 percent of American farms reported telephones, whereas the average of all American households was 30 percent. In other

³⁵⁵ Bureau of the Census, POPULATION 1920, 50, Table 31, *Distribution of population in groups of cities classified according to size, and in rural territory: 1890-1920.*

³⁵⁶ Memorandum, Acting Statistician, Jan. 9, 1918, Box 13, AT&T-BLA.

³⁵⁷ Telephone Census of 1912, Table 18, 29 (1915).

words, rural areas on average had higher levels of penetration than urban areas. The disproportionate rural adoption of the telephone occurred because geographic isolation made expanded communication more valuable to rural inhabitants. The social density of urban environments made it easier to rely on public telephone stations or other forms of communication. Telephone service was also more expensive in the cities because of the larger scope of local exchange service. And large cities had a greater proportion of poorer, immigrant populations. The main point, however, is that no one contemplating the development of the telephone business in the 1880s or 1890s would have predicted that. The telephone was supposed to be an urban-oriented tool. Only the spontaneous, “disorderly” phenomenon of access competition allowed the full scope of rural demand to emerge.

Table 12-2 is a state-by-state breakdown of farm telephone penetration in 1920. The statistics show surprising levels of telephone diffusion in the North Central states. They also reveal extremely wide regional variations in penetration. In the North Central states, farm households stood on the brink of achieving universal penetration. Ohio, Indiana, Illinois, Kansas, and Nebraska reported subscription rates between 60 and 80 percent. The most surprising statistic relates to Iowa, where 86 percent of the 213,439 farms reported telephones in 1920. One can hardly fail to notice that of the ten states with the lowest farm penetration, eight are Southern. The four lowest states—South Carolina, Louisiana, Florida, and Georgia—have levels of telephone penetration scarcely one-tenth that of the North Central states.

That result can be explained only partly by variations in wealth. A linear regression between average farm value by state and the state’s telephone penetration among farmers yields a moderate but statistically significant correlation coefficient (R^2) of .29.³⁵⁸ Independent competition is a weaker but also statistically significant factor. States with higher levels of rural telephone penetration tend also to be those in which a high proportion of the users were served by independents in 1907 ($R^2=13$).³⁵⁹ The huge size of the regional disparity, however, suggests that other important cultural and socioeconomic differences were at work. Statistical analysis of telephone penetration in the 1980s and 1990s yields a much stronger correlation between wealth and variation in penetration levels. Further consideration of that puzzle is outside the scope of this work.

Another sense in which access competition pushed the United States toward universal service is the extension of telephone service to homes. The telephone had been primarily a business tool prior to independent entry. The ratio of business to residential subscriptions was about 9 to 1. The years between 1900 and 1910 saw the number of residential telephone subscriptions surpass the number of business telephones in most cities with an exchange. The growth of residential subscribership reflected access competition’s relentless drive to increase the value of networks by increasing their scope, as well as falling prices for equipment.

³⁵⁸ $R^2=.29044$, $F=17.6$, Significance of $F=.0001$.

³⁵⁹ $R^2=.13148$, $F=6.5$, Significance of $F=.0144$.

TABLE 12.1
TELEPHONE EXCHANGE GROWTH AND ACCESS COMPETITION,
1888-1918 (In cities over 5,000 in population)

Jan.1	Bell Exchanges	Independ. Exchanges	Total Exchanges	Growth rate %	# Dual Service cities
1888	1160	0	1160		0
1889	1194	0	1194	3	0
1890	1228	0	1228	3	0
1891	1241	0	1241	1	0
1892	1297	0	1298	5	0
1893	1351	18	1369	5	3
1894	1409	98	1507	10	28
1895	1439	300	1739	15	98
1896	1613	520	2133	23	187
1897	1799	800	2599	22	220
1898	1962	1250	3212	24	244
1899	2134	1700	3834	19	286
1900	2426	2220	4646	21	342
1901	2773	2780	5553	20	408
1902	3005	3400	4605	15	449
1903	3365	3900	7265	13	466
1904	3740	4400	7140	12	483
1905	4080	4800	8880	9	478
1906	4532	5200	9732	10	471
1907	4889	5400	10,289	6	466
1908	5108	5505	10,613	3	458
1909	5043	5680	10,723	1	451
1910	4968	5850	10,818	1	443
1911	4933	6010	10,943	1	408
1912	5014	6170	11,184	2	342
1913	5182	6333	11,515	3	310
1914	5245	6433	11,678	1	293
1915	5289	6500	11,789	1	277
1916	5300	6560	11,860	1	261
1917	5397	6590	11,987	1	179
1918	5676	6618	12,294	3	147

TABLE 12.2
TELEPHONE PENETRATION IN FARM HOUSEHOLDS, 1920

(Rank)	State	Rate %	(Rank)	State	Rate
(1)	Iowa	86	(25)	Colorado	37
(2)	Kansas	78	(26)	Nevada	36
(3)	Nebraska	77	(27)	Idaho	33
(4)	Illinois	73	(28)	Texas	32
(5)	Indiana	66	(29)	NJ	32
(6)	Missouri	62	(30)	California	32
(7)	Ohio	62	(31)	Wyoming	28
(8)	Minnesota	62	(32)	Delaware	27
(9)	S. Dakota	59	(33)	Kentucky	27
(10)	Wisconsin	59	(34)	Maryland	25
(11)	Vermont	58	(35)	Utah	25
(12)	Conn.	52	(36)	Arkansas	23
(13)	Mass.	52	(37)	Tennessee	23
(14)	Oregon	51	(38)	Virginia	18
(15)	Michigan	50	(39)	Montana	17
(16)	N. Hamp.	50	(40)	Arizona	16
(17)	Maine	49	(41)	Alabama	15
(18)	NY	48	(42)	NCarolina	12
(19)	N. Dakota	47	(43)	NM	11
(20)	Penn.	44	(44)	Miss.	10
(21)	W. VA	43	(45)	Georgia	9
(22)	Wash.	42	(46)	Florida	8
(23)	R. Island	31	(47)	Louisiana	6
(24)	Oklahoma	37	(48)	SCarolina	6

Sources: 1920 Farm Census, Table 62, p.50.

TABLE 12-3
TELEPHONE PENETRATION AND WEALTH IN FARM HOUSEHOLDS, 1920

State	Rank in \$\$	Rank in Farm tels	Ind Tel %, 1907
Iowa	1	1	84
Kansas	10	2	81
Nebraska	4	3	69
Illinois	6	4	51
Indiana	20	5	75
Missouri	24	6	71
Ohio	22	7	63
Minnesota	11	8	67
S. Dakota	5	9	93
Wisconsin	15	10	56
Vermont	33	11	45
Conn.	19	12	02
Mass.	25	13	03
Oregon	12	14	33
Michigan	29	15	51
N. Hamp.	37	16	22
Maine	38	17	30
NY	23	18	26
N. Dakota	8	19	78
Penn.	18	20	39
W. VA	39	21	75
Wash.	16	22	36
R. Island	27	23	02
Oklahoma	35	24	56
Colorado	13	1	84
Nevada	2	2	81
Idaho	4	3	69
Texas	6	4	51
NJ	20	5	75
California	24	6	71
Wyoming	22	7	63
Delaware	11	8	67
Kentucky	5	9	93
Maryland	15	10	56
Utah	33	11	45
Arkansas	19	12	02
Tenn.	25	13	03
Virginia	12	14	33
Montana	29	15	51
Arizona	37	16	22

Alabama	38	17	0.30
NCarolina	23	18	0.26
NM	8	19	0.78
Miss.	18	20	0.39
Georgia	39	21	0.75
Florida	16	22	0.36
Louisiana	27	23	0.02
Scarolina	35	24	0.56

\$\$ rankings taken from Average Value per Farm, 1925, Agric. Census, Table 14, p.60.
Independent share of telephones taken from 1907 Telephone Census.

The large exchange in Louisville, Kentucky, serves as a typical example. In 1902, the first year of dual service competition in Louisville, the subscriber breakdown was as follows:

TABLE 12.4
SUBSCRIBER BREAKDOWN, LOUISVILLE, KY, 1902

	Bell Co	Home Co	Duplics	Totals
Bus. lines	3,293	3081	(1,376)	4,998 (54%)
Res. lines	3169	1851	(741)	4,629 (46%)
Totals	6462	4932	(2,117)	9,277

From 1902 to 1910, residential users increased from 46 percent to 59 percent of all users in Louisville. Of the 6,746 net new users added during the period, 5,151 of them (76 percent) were residences. For the Bell exchange, residential subscribers were the only source of growth during that period.

TABLE 12.4, CONT'D
SUBSCRIBER BREAKDOWN, LOUISVILLE, KY, 1910

	Bell Co	Home Co	Duplics	Totals
Bus. lines	3,230	5,396	(2,023)	6,603 (41%)
Res. lines	4,421	5,899	(900)	9,420 (59%)
Totals	7,651	11,295	(2,923)	16,023

Household diffusion of the telephone was more extensive in smaller cities. Statistics for five medium-sized Illinois towns (pop.10,000 to 50,000) between 1909 and 1912, for example, show that residential subscribers often accounted for more than 70 percent of the users.

TABLE 12.5
RES/BUS SUBSCRIBER BREAKDOWN,
ILLINOIS EXCHANGES, 1909-12

Decatur IL, 1912 (pop. 31,000)				
	Bell Co	Indep Co	Duplicates	Totals
Bus. lines	1,161	850	(551)	1,460 (24%)
Res. lines	3,307	1,308	(460)	4,155 (69%)
Farm lines	198	192	N/A	390 (06%)
Totals	4,666	2,350	(1,011)	6,005
Freeport, IL, 1909 (pop. 18,000)				
	Bell Co	Indep Co	Duplicates	Totals
Bus. lines	281	788	(142)	927 (19%)
Res. lines	1,094	2,903	(101)	3896 (81%)
Totals	1,375	3,691	(243)	4, 823
Galesburg, IL, 1909 (pop. 22,000)				
	Bell Co	Indep Co	Duplicates	Totals
Bus. lines	333	601	(194)	740 (18%)
Res. lines	598	2,943	(57)	3,484 (82%)
Totals	931	3,544	(251)	4,224
Champaign/Urbana, IL, 1912 (pop. 30,000)				
	Bell Co	Indep Co	Duplicates	Totals
Bus. lines	575	542	(300)*	817(25%)
Res. lines	1,364	1,315	(710)	2,509(75%)
Totals	1,939	1,857	(470)	3,326
Aurora, IL, 1909 (pop. 30,000)				
	Bell Co	Indep Co	Duplicates	Totals
Bus. lines	568	694	(394)	868(20%)
Res. lines	2,100	1,549	(93)	3,556(80%)
Totals	2,668	2,243	(487)	4,424

Source: 1909 statistics: 17 TELEPHONY 688 (May 1909); 1912 statistics: AT&T Legal and Regulatory Library, State of Illinois.

The distribution of residential and business subscribers looks very similar to what one would see today. The levels of household penetration achieved in those cities also is not as far from the current pattern as one might think. According to the 1910 Census, the average number of persons per household in the United States was about 4.5. Using the conservative figure of 4.0, we can estimate how many households there were in those communities by dividing the total population by 4.0. The total number of residential telephones (corrected for duplication) can then be used to derive a household penetration figure. The results, at least for that limited sample of the country, are impressive:

TABLE 12.6
ESTIMATED HOUSEHOLD PENETRATION RATES, ILUNOIS, 1909-12

City	1910 Pop.	Households(pop/4)	Residential Telephones	Household Penetration %
Decatur	31,000	7,750	4,155	54
Freeport	18,000	4,500	2,400	53
Galesburg	22,000	5,500	3,283	60
Cham/Urb	30,000	7,500	2,509	33
Aurora	30,000	7,500	3,556	47

Thus, while the average for the country as a whole in 1920 was about one telephone for every three households, there were many communities in the United States that had telephones in more than half of their households as early as 1910.

If telephone development in the United States by 1920 is contrasted with Europe, the uniqueness of the U.S. experience is even more evident. With the exception of Sweden, there was no significant episode of independent competition in Europe (not coincidentally, Sweden has achieved the highest telephone development levels in Europe). The U.S. development trajectory diverges sharply from the European one during that period. Table 12-6 shows how widely the U.S. and European growth rates diverged. The historical precociousness of U.S. telephone development becomes even clearer if the U.S. penetration rate for 1920 is compared to the European rate forty years later. If the seven major western European countries (West Germany, France, Spain, Italy, the United Kingdom, Switzerland, and Sweden) are combined, the ratio of telephones to population for Europe in 1961 (table 12-6) was still lower than the U.S. rate for 1920 (12.69).³⁶⁰

TABLE 12-7
US AND EUROPEAN PENETRATION GROWTH, 1895-1912

	USA	Europe
1895	0.36	0.25
1902	2.30	0.30
1912	8.80	0.70

Source: AT&T Co., Telephone Statistics of the World, 12 May, 1912.

The United States was still some distance from today's level of 94 percent household penetration, and large regional disparities existed. Nevertheless, the competitive period had by 1920 created the kind of geographic and social penetration capable of supporting the modern notion of universal-service-as-social-ubiquity. The social role of the telephone had been utterly transformed. Later, the policy expectations applied to the telephone by government legislators and regulators began to reflect that new social role. But it is important to understand the sequence: market processes made the telephone a popular and geographically ubiquitous item first; government policy to extend and support that notion came second.

³⁶⁰ THE WORLD'S TELEPHONES, 1961, New York, AT&T Co., at 2.

13

UNIVERSAL SERVICE REINCARNATED

THE UNIFICATION OF TELEPHONE SERVICE by the middle of the 1920s put an end to the first-generation debate over universal service. But the term made a highly visible comeback in the mid-1970s, sparking a debate which is still underway in the 1990s. The return of “universal service” as a policy touchstone gave the term a new meaning. As noted in chapter 2, an entire historical mythology has grown up around the new definition.

Accurate or not, that change in the popular meaning of the term is an important part of the history of telecommunications in the United States. This chapter analyzes that change and shows how it emerged from the debates over the introduction of competition in long-distance markets in the 1970s. The chapter retraces relevant developments in regulation from 1920 to the mid-1970s, including the development of separations by federal and state regulators and the passage of the 1934 Communications Act. In the process, it refutes the historical misconceptions created by the shift in the meaning of the term.

The Second-generation Universal Service Concept

Contemporary readers will have no difficulty recognizing the “new” definition of universal service; it is the one that prevails to this day. The new concept defines the goal of universal service as comprehensive household telephone penetration—a “telephone in every home.” A related change has occurred in the policy associated with the term. Universal service policy has become synonymous with the manipulation of rate regulation to make telephone service more affordable to consumers. A variety of cross-subsidies are employed to do that; one is to overcharge long-distance users in order to subsidize local service while another is to charge urban consumers higher rates in order to lower charges on rural users.

Whatever their merits as public policy, those concepts represent a departure from the original meaning of the term. As chapter 8 documented with citations from the early dialogue, the

first-generation universal service debate was a response to the conditions created by dual service. The goal of universal service then was technically unified, fully interconnected, geographically ubiquitous service. The policy required to bring it about was consolidation of local exchange service into a monopoly and the interconnection of Bell and independent exchanges. The older policy viewed regulation as a substitute for the price and service incentives of competition. It did not conceive of regulation as a mechanism for effecting cross- subsidies. Nor did government policy focus on household penetration as such.

If that shift in the meaning of the term represented nothing more than a change in government policy (made with full knowledge of the difference between the two alternatives) it would not be so problematical. The change has not been so innocent, however. The newly forged linkage between the term “universal service,” household penetration, and regulated monopoly was part of a politically-motivated attempt to salvage the fortunes of the regulated monopoly system in the 1970s. The new definition brought with it a sweeping revision of the history of the telephone system—a revisionism which fabricated the legislative origins of universal service policy and exaggerated the role of regulated monopoly in making telephone service affordable and available to most Americans.

In the historical mythology associated with the new conception, the competitive era’s contribution to the development of the infrastructure was ignored, and the earlier universal service debate was forgotten. The origins of universal service policy were instead traced to the 1934 Communications Act, specifically to the wording of the Act’s Preamble:

“...to make available, so far as possible, to all the people of the United States, a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges.”³⁶¹

In that view, regulators and telephone monopolies acting together exploited the characteristics of the regulated monopoly system to bring about widespread household access to telephone service. Generally, the separations and settlements process, which allocates part of the revenues generated by the long-distance network to the support of the local network, is identified as the mechanism by which that policy goal was accomplished. In its more romantic formulations, the modern construction of universal service implies that without such measures telephone service would never have been affordable to the bulk of the population.³⁶²

Of course, Vail was using the term “universal service” almost three decades before the passage of the Communications Act. That did not deter the revision of the term, however. Instead, those who bothered to read Vail’s pronouncements simply projected the new meaning into them. Thus, many historians, especially those directly associated with the Bell system, contend that

³⁶¹ 47 U.S.C. s. 151.

³⁶² See, for example, John Browning, *Universal Service, an idea whose time has past*, 3 WIRED 102 (Sept. 1994): “This is the story of the noblest idea in the history of technology: universal telecommunications service. Universal service brought America into the information age. It put telephones into every home (well, about 94 percent of them) and wove telephone lines through the fabric of American life....Universal service was made a guiding principle of American telecom regulation in 1934.”

universal service in the modern sense was an objective of AT&T from the very beginning.³⁶³ They view the gradual but steady increase in household penetration after 1920 as evidence of Bell's commitment to widespread household penetration. Those historians would refuse to recognize any qualitative distinction between the term's usage now and Vail's usage in the early 1900s.

With the new mythology of universal service sketched out, we can now review the post-regulation era developments to assess its historical accuracy. The narrative that follows will make three arguments: 1) that the separations process was not actively used to subsidize local service until the late 1960s and the 1970s, and that its impact on the growth of penetration was minor; 2) that the 1934 Communications Act did not articulate a national universal service policy; and 3) that the redefinition of universal service actually took place in the mid-1970s as part of the regulated monopoly system's attempt to defend itself against long-distance competition.

Universal service and the problem of separating the rate base

The initial application of rate regulation to the telephone industry in the 1920s posed complex problems in economics. Rate base regulation demands that the rates charged by a telephone company for a particular service be based on the book costs of the physical plant used, plus expenses and a reasonable rate of return. It assumes, in other words, that a scientific link between the cost of the facilities used and the price charged can be established. Applying that logic to telephone service is no simple matter. A telephone system supplies millions of possible connections to its users, some local, some to nearby areas, and others to long-distance points. In chapter 3 we argued that each connection is a separate service. But subscribers use the same telephone, local access line, and central office switch for all of those outputs. In the context of rate regulation, how should the costs of those facilities be apportioned among the different services so that regulators can determine what the "proper" rates should be?

The first-generation concept of universal service supported a holistic approach to that problem. It focused on sustaining the telephone network as a system and not as a collection of discrete components. A regional telephone system, it was often observed, covered both "fat" and "lean" territories. Access competition had forced the telephone companies to extend their networks into the "lean" territories in order to preserve the competitive value of their systems. With the pressures of competition gone, regulators wanted to ensure that service would not be withdrawn from less profitable or remote areas. Thus, the application of utility regulation to the telephone companies brought with it "obligation to serve" requirements, or restrictions on the firms' freedom to exit from markets.³⁶⁴ Naturally, the telephone companies wanted to ensure that the method of rate regulation allowed them to profitably sustain the scope of service regulators required of them. As a result, both regulators and the local telephone companies supported methods that based rates upon sustaining the telephone companies' system as a whole.

³⁶³ A. VON AUW, *HERITAGE AND DESTINY: REFLECTIONS ON THE BELL SYSTEM IN TRANSITION* (Praeger 1983); PETER TEMIN AND LOUIS GALAMBOS, *THE FALL OF THE BELL SYSTEM* 16 (Cambridge University Press 1987).

³⁶⁴ See, for example, some of the cases cited in ALAN STONE, *PUBLIC SERVICE LIBERALISM* 226 (Princeton University Press 1991).

A memorandum written by H. O. Seymour for the Chicago Telephone Company in 1912 (and widely distributed among the Bell operating companies) laid out those problems in a thorough fashion.³⁶⁵ The memo argued that “with the telephone stations and lines, all do not and cannot...pay their way, yet they must be continued as a necessary part of the whole system and the elimination of one, lessens the service and economic value of the part that remains.” The author argued that it was impossible to separate the investment and expenses associated with specific services.³⁶⁶ Seymour concluded that “in considering rates for any and all classes of service, the operation of the company as a whole must be taken into account, its total investment, total expense, and total revenue; and the reasonableness of a particular rate must depend upon the net earnings of the utility as a whole.”

Although the holistic approach to the rate base involved some averaging of costs, those were not perceived as subsidies but as a method of determining reasonable rates in a way that took into account the demand interdependence of telephone service. The principle that users paid rates not simply to recover the cost of the physical facilities they used, but rates which sustained the system as a whole, became known in the industry as “value of service” pricing. Value of service pricing is a logical expression of the first- generation universal service concept, because it attempts to recover the value of the network externality. Indeed, as evidence produced in chapter 6 showed, the pressures of access competition had induced the telephone companies to adopt similar policies on their own, prior to regulation. Seymour’s 1912 memo explicitly acknowledged that under competitive conditions, “intelligent selfishness” on the part of the telephone companies would “lead it to so distribute the [cost] load as to bring about the greatest development of the enterprise.”

The holistic approach, however, could only be applied uniformly within a single regulatory jurisdiction. Whenever telephone calls crossed state boundaries, the rate base had to be divided into separate parts in order to distinguish between federal and state regulatory authority. That became known as the problem of *jurisdictional separations*.

In the 1920s, debate over jurisdictional separations took the specific form of how to separate the costs and revenue requirements of the *local exchange* service and the *long-distance* service. There were two basic theories about how that should be done. One, the so-called “board-to-board” method, held that the rates for local service should recover all of the costs of the local exchange plant. Long-distance rates should recover only those additional costs required to supply facilities connecting the switchboards of local exchanges. The other principle was known as the “station-to-station” method. The station-to-station method held that because local exchange facilities were used in establishing a long-distance call, some of the costs of the local exchange plant and service should be recovered from long-distance rates. It traced costs from one telephone (station) to the other. That method was more complex in that the costs of the local network had to be divided or allocated among state and interstate services.

³⁶⁵ B. W. Trafford, Vice President, Chicago Telephone Company, to E.C. Bradley, Vice President, Pacific T&T Co., Jan. 26, 1912. Attached memo by H. O. Seymour, “A telephone property must be considered as a whole in determining the reasonableness of any rate.” In San Francisco Telephone Pioneers Archive.

³⁶⁶ “If we were asked to provide a subscriber with equipment designed for local service only, we could not serve him, as all equipment used is designed, built up and associated so as to make all classes of service possible.” *Id.*

The Bell system supported board-to-board accounting-and for a very good reason. At that time, state regulation of rates was fairly stringent, whereas rate regulation in the federal jurisdiction was practically nonexistent. The long-distance business was increasingly profitable, whereas the Bell system viewed the consolidation of local service as an opportunity to raise what it viewed as the unremunerative rates foisted upon it by fifteen years of competition.³⁶⁷ Brock has observed that “when there is differential regulation, the monopolist has an incentive to maximize the allocation of costs to the tightly regulated jurisdiction in order to justify higher regulated prices, while minimizing costs to the unregulated jurisdiction in order to capture [unregulated levels of] profit.”³⁶⁸ If AT&T could shift more of the allocated costs to the state jurisdiction, it could justify local rate increases and clear the way for higher long-distance profits. (That fact by itself calls into question the claim that AT&T was interested in promoting universal service in the modern sense at that time.) State regulators, of course, had quite different incentives. Ratifying unpopular local rate increases made them look bad before their constituents. They supported the station-to-station method.

For modern-day observers it is tempting to read a second-generation universal service promotion policy into that debate. Under the board-to-board method, local exchange access rates would be relatively higher and long-distance rates relatively lower. Under the station-to-station method, long-distance users pay more to support the local exchange plant. Station-to-station can thus be seen as a means of using long-distance revenues to make local service more affordable. In fact, the debate over separations principles did take that form starting in the early 1950s. But from the 1920s until the end of World War II, the debate had no such implications.

That is apparent from the Supreme Court decisions which sanctioned the station-to-station principle, *Smith v. Illinois* (1930) and *Smith v. Lindheimer* (1933).³⁶⁹ The issue before the Court was whether the rates imposed on the Chicago Telephone Company by the Illinois state commission were “confiscatory” under the Fourteenth Amendment. The Bell interests based their argument on board-to-board accounting methods. The Supreme Court rejected their method. It ruled that separation of interstate and intrastate plant “is essential to the appropriate recognition of the competent governmental authority in each field of regulation.” Some part of the local exchange plant should be “apportioned” to interstate service, the Court ruled, otherwise “the exchange property...will beat an undue burden.” There is no indication that regulators were attempting to keep exchange rates low to stimulate telephone penetration, or that the regulators or the Supreme Court recognized subsidization of exchange access to promote universal service as a valid criterion in ratemaking. In fact, such considerations would definitely have been considered illegal. The “just and reasonable” rates mandated by regulation required establishing a link, as scientific as possible, between actual costs and the rates charged to customers. Rates which did not adequately compensate the telephone companies, or which were designed to transfer wealth from one person to the other, could be challenged as confiscatory.

The courts and regulators were grappling with the issue of how to define the costs of a multiproduct firm, not pursuing a social welfare policy. Even if that had been their intention, the

³⁶⁷ See chapter 11 for evidence of this.

³⁶⁸ GERALD BROCK, ___67 (1994); see also TEMIN AND GALAMBOS, *supra* note 3, at 20-22.

³⁶⁹ *Smith et al v. Illinois Bell* 282 U.S. 133 (1930) and *Lindheimer v. Illinois Bell* 292 u.s. 151 (1933)

impact of separations practices on local rates would have been minimal. According to Gabel, the separations concepts prevailing in the 1920s and early 1930s would have relieved exchange property of only 2 or 3 percent of the investment burden.³⁷⁰ Even more important, the station-to-station principle, though sanctioned by the Supreme Court in 1930, was not actually implemented on a nationwide basis until 1949. Thus, the growth of telephone penetration from 1920 to 1950 cannot be attributed to the effects of that policy, whatever its motives. (That is discussed in greater detail in the section of this chapter entitled *Cross Subsidies and Local Telephone Service*).

The Communications Act of 1934

The Communications Act of 1934 was passed after the House Committee on Interstate and Foreign Commerce spent more than a year investigating the communications industry. The Congressional committee probed not only AT&T but also independent telephone holding companies, the telegraph industry, RCA, and the new broadcasting networks. There was a suspicion among the committee members that the large holding companies controlling communications were rife with financial abuses. AT&T attracted particular notice because, despite its status as a monopoly, it operated free of effective regulation, particularly at the interstate level. Its ability to move assets and accounts between the federal and state jurisdictions in a way that could manipulate the regulatory process was particularly troublesome to the Congress. “The American Telephone and Telegraph Company,” the committee’s special counsel wrote, “is more powerful and skilled than any State government with which it has to deal.”³⁷¹ The Interstate Commerce Commission should be relieved of regulatory authority over telephones, the Committee believed, because it was preoccupied with railroad regulation and lacked the resources to oversee the large and growing communications field at the same time. “Thus far regulation, particularly by the federal government, has been nominal largely because Congress had not made appropriations sufficient to enable the ICC to give effect to existing statutes.”³⁷²

The Committee report accompanying the draft bill described its objectives as follows:

The bill would accomplish three purposes: (a) codification of existing federal legislation regulating communications; (b) a transfer of jurisdictions from several departments, boards, and commissions to a new communications commission; and, (c), a postponement for further action after further study and observation of some of the more difficult and controversial subjects.³⁷³

From that it is clear that the Communications Act was essentially a consolidation of federal regulatory authority over the burgeoning new telecommunications field. It was not the starting point of a new policy or a new approach to regulation, but the beginning of real regulation at the

³⁷⁰ RICHARD GABEL, *THE DEVELOPMENT OF SEPARATIONS CONCEPTS IN THE TELEPHONE INDUSTRY* 17 (Michigan State University Public Utilities Studies 1967).

³⁷¹ 73rd Cong., H.R. No. 1273, *PRELIMINARY REPORT ON COMMUNICATION COMPANIES*, Submitted by Mr. Rayburn pursuant to H.R. 59, 72nd Cong., and House Joint Resolution 572, 72nd Cong., Apr. 18, 1934, xxx.

³⁷² *Id.* at xxxi.

³⁷³ *Id.* at xxxi.

federal level. As the report stated, the new law codified existing laws and regulations, and the report emphasized Congress's desire to make existing statutes effective. A new, specialized regulatory agency was perceived as the best means to carry out that task.

The subject of universal service, in either its modern or classical sense, did not appear in the deliberations. The records surrounding the passage of the law contain no mention of telephone penetration levels. There is no data in the reports purporting to show that an unacceptable number of people were unreached by the telephone network or unable to afford service. There is not even a discussion of the problem of jurisdictional separations. Instead, Congress amassed thousands of pages of materials analyzing the telephone and telegraph companies' capital structures, shareholders, ownership and voting control, and interlocking directorates.

What, then, are we to make of the Act's preamble, oft-cited as the mandate for the second-generation approach to universal service promotion? A complete citation of the preamble provides the basis for a more realistic understanding of its meaning:

For the purpose of regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges, for the purpose of the national defense, for the purpose of promoting safety of life and property through the use of wire and radio communication, and for centralizing authority heretofore granted by law to several agencies and by granting additional authority with respect to interstate and foreign commerce in wire and radio communication, there is hereby created a commission to be known as the "Federal Communications Commission," which shall be constituted as hereinafter provided, and which shall execute and enforce the provisions of the Act.

The preamble contains a grab-bag of extremely broad purposes, such as protecting national security and the safety of life and property, as well as the standard regulatory commission charge to ensure adequate facilities at reasonable charges. The absence of any concern with telephone penetration or separations principles in the record, or of any specific provisions addressing those issues in the statute itself, suggests that that aspect of the law is largely rhetorical—a list of all the good things that come about from telecommunications.

But the most direct refutation of those who see a cryptic universal service policy in those two little lines of the preamble comes from the behavior of the FCC itself. In the first two decades after the creation of the new federal commission, many state regulators opposed involving it in station-to-station separations, because they feared it would lead to encroachment on their regulatory authority.³⁷⁴ For its part, the FCC did not begin to shift revenues from the federal jurisdiction to the state jurisdiction in order to subsidize local service. On the contrary. Between 1935 and 1945, the FCC succeeded in extracting a series of long-distance rate reductions out of AT&T. The FCC had

³⁷⁴ GABEL, *supra* note 10, at 39.

no interest in reducing local service rates via separations because that would have jeopardized its ability to deliver rate decreases in its own jurisdiction.

As the FCC was reducing interstate long-distance rates, the Bell system and other telephone companies were asking for, and often receiving, increases in state exchange rates and intra-state long-distance rates. The resulting disparity between state and interstate telephone rate trends was embarrassing to state regulators. Federal regulators were perceived as being more effective, more able to “deliver the goods,” than state regulators.

In reaction to the FCC’s decreases in AT&T’s interstate long-distance rates, state regulators eventually unified in support of the station-to-station principle. The station-to-station method would shift some of the intra-state costs to the federal jurisdiction, thereby preventing another interstate rate decrease and eliminating the pressure for more state rate increases.³⁷⁵ At that time, AT&T also accepted the station-to-station principle because it could be used to counteract pressure for lower interstate long-distance rates.³⁷⁶ By 1944, AT&T, state regulators, and the FCC were working together to develop a common approach to separations.

A comprehensive agreement about how to divide up ex-change and toll plant did not come until 1947 with the adoption of the first uniform Separations Manual by the National Association of Regulatory Utility Commissioners and the FCC. The Bell companies did not actually file intrastate tariffs that reflected the new cost separations methods until 1950.³⁷⁷ Thus, the station-to-station method of separating costs was not fully operational at the national level until thirty years after the end of dual service. Despite the absence of any specific policy to promote or subsidize local service, household penetration grew steadily from 1920 to 1950, faltering only for a few years during the depths of the Great Depression.

Cross-subsidies and local telephone service

After 1950, the formula used by regulators to allocate part of the costs of the local network to the long-distance rate base was based on “subscriber line use” (SLU), or the average proportion of minutes a subscriber’s telephone line was used for state and interstate calls. In 1950 interstate SLU was less than 3 percent, so the impact of the station-to-station method on local rates was still minimal. Politicians and state regulators, however, were quick to realize the potential of separations to shift the cost burden among more or less favored constituencies. In 1951, as the FCC began a new inquiry into interstate rates, AT&T, with the support of the National Association of Regulatory Utility Commissioners (NARUC), proposed an alteration of the Separations Manual that would shift more of the local telephone plant into the interstate rate base.³⁷⁸ The FCC opposed that plan on the grounds that it would lead to a situation in which “services subject to Federal jurisdiction would, in effect, be subsidizing services beyond that jurisdiction.”³⁷⁹ The FCC’s resistance was

³⁷⁵ *Id.*, at 27-45.

³⁷⁶ TEMIN AND GALAMBOS, *supra* note 3, at 22-25.

³⁷⁷ See CAROL WEINHAUS & ANTHONY OETINGER, BEHIND THE TELEPHONE DEBATES (Ablex 1988) for a detailed history and description of separations and settlements procedures.

³⁷⁸ TEMIN AND GALAMBOS, *supra* note 3, at 24.

³⁷⁹ Paul A. Walker, FCC to Matt L. McWhorter, Oct. 18, 1950.

overcome, however, by the strenuous intervention of Senator Ernest W. McFarland of Arizona, the Chairman of the Senate subcommittee on communications. NARUC, citing the growing disparity between state rate increases and interstate rate reductions, had appealed to the Senator for support. Senator McFarland's correspondence with the FCC on separations raised explicitly the issue of cross-subsidization, scolding the FCC for its willingness to:

shift the load from the big user to the little user, from the large national corporations which are heavy users of long distance to the average housewife and business and professional man who do not indulge in a great deal of long distance.³⁸⁰

Thus in 1952 and 1953 the interstate (long-distance) contribution to local exchange plant increased from 3 percent to 5 percent. The first step towards the use of long-distance revenues to subsidize local service had been taken.

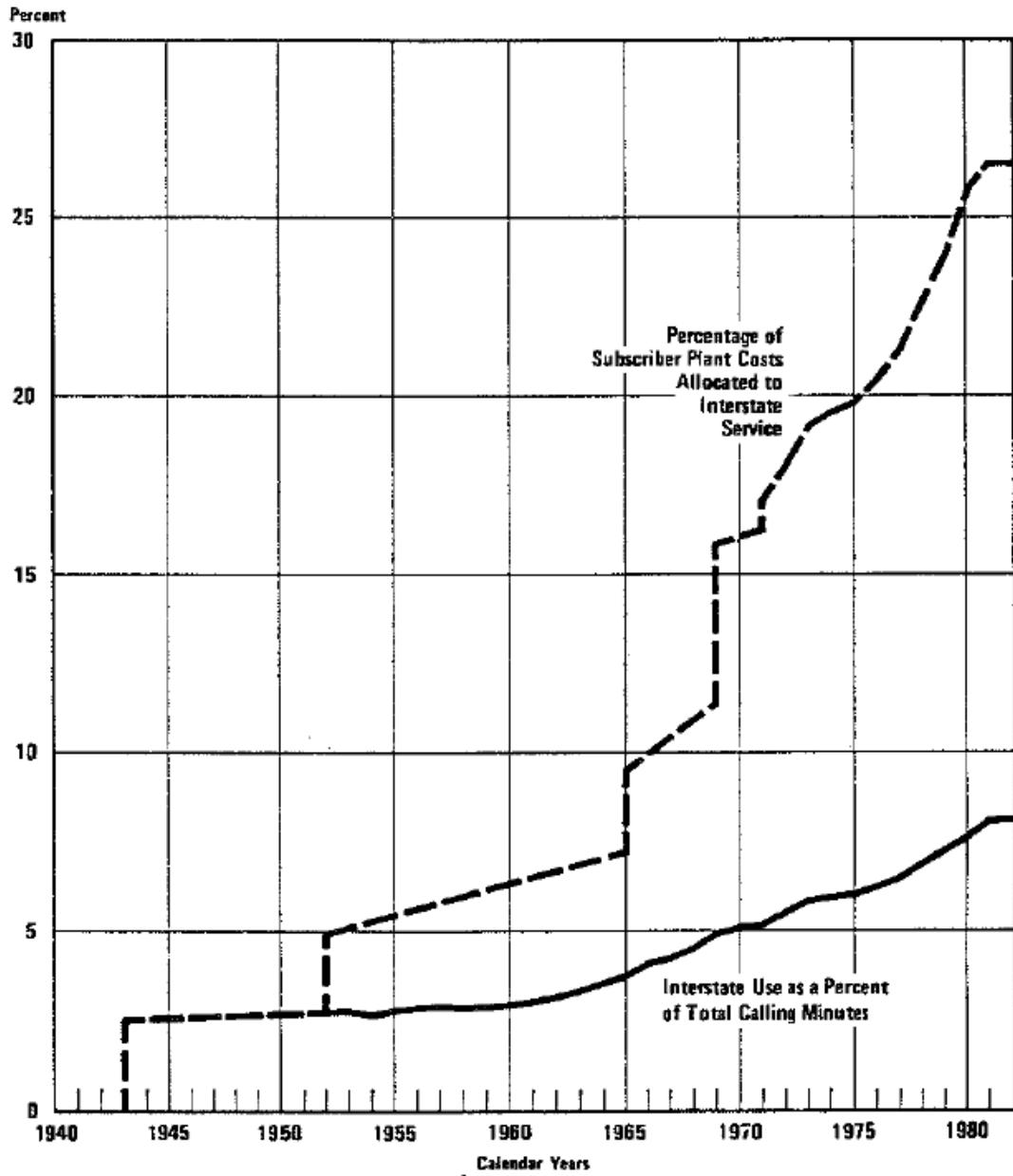
At that juncture, a number of interpretive issues regarding that incident must be underscored. First, the Federal Communications Commission, which had been created by the 1934 Communications Act and charged with its implementation, actively opposed the expansion of cross-subsidization. Second, neither NARUC nor Senator McFarland cited the preamble, or any other section of the Communications Act, in making their case for shifting the burden. Instead, NARUC was concerned about the growing state-interstate rate disparity. For the Senator, it was the obvious political advantage of lowering rates for the many by taxing the few that attracted attention. Indeed, the Senator's political calculus did not even assert that the "average housewife and business or professional man" would be unable to *afford* telephone service unless the burden was shifted. It was, rather, an argument that it would be more fair for large users to carry more of the load. In fact, household penetration was growing rapidly in the postwar period, with or without the departure from SLU.

Indeed, while the precedent was important, the impact of the 1952 separations change on local rates was still small. From 1952 to 1965, the percentage of local plant cost allocated to the interstate jurisdiction grew from 5 percent to 7 percent, while interstate SLU grew from 2.5 percent to 4 percent (see figure 13-1). As that occurred, the average monthly charge for residential telephone service, in constant 1980 dollars, actually increased from \$14.25 in 1952 to \$15.86 in 1955. In fact, average residential telephone service rates remained higher than their 1952 levels until 1965 (see table 13-1). While one could argue that rates would have gone up faster without the changes, it appears that no drastic subsidy was involved, particularly when compared to post-1970 changes. Despite that, household penetration grew rapidly.

Full-fledged exploitation of the separations process to subsidize local service did not really begin until 1965. From 1952 to 1965 only 3 percent of the costs over and above SLU were shifted from the state to the interstate jurisdiction. During the seventeen years from 1965 to 1982, an

³⁸⁰ Ernest W. McFarland to Paul A. Walker, Jan. 30, 1951, cited in TEMIN AND GALAMBOS, *supra* note 3, at 25.

FIGURE 13-1
PERCENTAGE OF SUBSCRIBER PLANT COSTS
ALLOCATED TO INTERSTATE SERVICE



additional 20 percent was so shifted.³⁸¹ From 1965 to 1969, the real average monthly charge for residential service dropped by \$2. By 1982, it was almost half of what it had been in 1965 (see table 13-1). The culmination of that process came with the adoption of the so-called Ozark Plan in 1970.³⁸² The Ozark plan's separations were still based in part on measures of relative use, but its formulas effectively multiplied interstate minutes by a factor of three in order to establish the amount of local plant to be recovered from the interstate revenues. That led to a continuous and automatic increase in the cross-subsidy from 1971 on.

TABLE 13-1
AVERAGE MONTHLY CHARGE FOR
RESIDENTIAL PHONE SERVICE, 1950-1980

Year	Current Dollars	Constant 1980 dollars
1950	4.29	14.58
1951	4.48	14.11
1952	4.62	14.25
1953	4.93	15.08
1954	5.10	15.53
1955	5.19	15.86
1956	5.24	15.78
1957	5.28	15.35
1958	5.36	15.17
1959	5.51	15.46
1960	5.55	15.33
1961	5.61	15.35
1962	5.62	15.21
1963	5.65	15.11
1964	5.66	14.93
1965	5.67	14.70

³⁸¹ In 1965, as part of the so-called "Denver" plan, state and federal regulators increased the interstate allocation by nearly 3 percent. Only four years later, a new separations plan put forth by the FCC increased the interstate allocation by another 5 percent.

³⁸² See Weinhaus and Oettinger 83-103 (1988) for a description and analysis of the Ozark plan.

TABLE 13-1, CONT'D
 AVERAGE MONTHLY CHARGE FOR
 RESIDENTIAL PHONE SERVICE, 1950-1980

Year	Current Dollars	Constant 1980 dollars
1966	5.64	14.22
1967	5.60	13.73
1968	5.61	13.20
1969	5.68	12.68
1970	5.76	12.14
1971	6.04	12.20
1972	6.38	12.48
1973	6.69	12.33
1974	7.08	11.77
1975	7.32	11.14
1976	7.81	11.24
1977	8.07	10.90
1978	8.31	10.43
1979	8.40	9.47
1980	8.61	8.60

Source: Federal Communications Commission, Common Carrier Dkt. No. 80-286, Comments of the National Telecommunications and Information Administration to the Federal-State Joint Board, Appendix B, Aug. 17, 1981, p. 11.

The pressures to do that were simultaneously ideological, political, and regulatory. Consumer groups in the activist 1960s were pressuring utility commissions for lower rates.³⁸³ Regulatory analysts were becoming aware of the social policy possibilities of the separations system. In 1967, for example, economist Richard Gabel published an influential monograph charging that the separations principles used by regulators penalized exchange ratepayers:

Alternative separations treatment could reduce the costs of local exchange service and, eventually, exchange rates, making possible a universal development of exchange services.³⁸⁴

Most important, perhaps, was the desire to avoid upheavals. Regulators and telephone companies were faced with a precipitous drop in long-distance costs and a steep increase in the costs of labor-intensive local services. By shifting costs from the state to the interstate jurisdiction, regulators would avoid the kind of rapid price dislocations that would undoubtedly create political headaches.

Ironically, that move to exploit the social policy possibilities of the separations and settlements process came at a time when the justification for such a subsidy was weak, as at least

³⁸³ Horwitz 235 (1989), notes that state regulators' support for the Ozark plan was partly a response to pressure from public interest groups to keep residential rates low.

³⁸⁴ GABEL, *supra* note 10, at 5.

85 percent of all American households already had telephone service.³⁸⁵ Telephones were becoming universal for much the same reason that television sets became universal-Americans wanted them and their increasing affluence made it possible for most of them to get them.

Simple chronology thus defeats any attempt to attribute the growth of household penetration to a universal service policy formulated by the Communications Act and implemented by regulators and telephone companies. The “universal service policy” that is commonly attributed to the 1934 Act was not fully in force until 1965. The use of rate regulation to lower the cost of local access was never part of the law but was a set of practices that evolved out of the debate over the proper way to separate the rate base into different regulatory jurisdictions. And the policy kicked in at a time when the vast majority of American households already had telephone service.

The retroactive redefinition of universal service

It is a deeply entrenched part of telephone industry folklore that the Communications Act of 1934 gave birth to a nationwide universal service policy. That belief is an important part of the history of universal service in the United States not because it is true, but because it is so obviously untrue. Despite the absence of any historical evidence for that notion, it persists. How did that myth take hold?

The answer is that a major redefinition of universal service occurred in the 1970s, when long-distance competition began to threaten the new separations practices adopted by federal and state regulators. By targeting long-distance routes for selective entry, competition struck at the heart of rate regulated monopoly. Long-distance services had been assigned higher costs due to the new separations methodology embodied in the Ozark plan. The alternative long-distance networks of companies such as MCI and Sprint had no requirement to allocate a portion of their costs to local service; they simply ordered local business lines from AT&T at the normal (subsidized) rates to gain access to local users. They therefore had a built-in cost advantage against AT&T. The political challenge that represented forced AT&T and state regulators to develop an explicit rationale for regulated monopoly and its system of separations and settlements. In that struggle, the concept of universal service was redefined in a way that linked it to the practices of regulated monopoly. Regulated monopoly and its separations practices were retroactively credited with making telephone service universally available and affordable.

Three milestones in that reconstruction can be clearly identified. One was a speech before NARUC in late 1973 by AT&T CEO John DeButts. The second was a report submitted to Congress by Eugene V. Rostow on behalf of AT&T in 1975. The third was the Bell system’s proposal in 1976 to reform the 1934 Communications Act to preserve regulated monopoly.

³⁸⁵ The FCC’s Statistics of Communications Common Carriers for the year ended Dec. 31, 1965 reported that 85 percent of all American households had telephone service; the Statistics for 1970 reported that 92 percent of all households had telephones. Because the method used to measure household penetration at that time is thought to have overstated the actual amount, I have deducted 5 percent from each estimate, which yields a household penetration percentage of 87 percent for 1970 and 80 percent for 1965. Federal Communications Commission, Statistics of Communications Common Carriers (1970), (1965).

By the early 1970s, the FCC's incremental opening of AT&T's markets to competition had provoked a crisis in telecommunications policy. The Bell system felt itself besieged on many fronts, confronted with an ambiguous and shifting set of rules. One alternative was to gradually accommodate itself to the new order. Another was to stand its ground and fight for the old order. In 1973 AT&T chief executive John B. DeButts chose the latter option. In a speech before the assembled state regulators of the National Association of Regulatory Utility Commissioners (NARUC), DeButts took a public stance against competition and in favor of traditional public service regulation. His speech, entitled "An Unusual Obligation," harked back to the earliest years of regulation in the 1920s and invoked the special social contract between the regulator and the regulated firm.

Debutts' attempt to provoke a public dialogue was next extended into the legislative arena. Bell began to promote congressional action to protect itself from new competition. Eugene V. Rostow was an influential figure in Washington. Having once served as the chair of President Johnson's 1968 Task Force on Communications Policy, he was retained by AT&T to support its legislative efforts. In 1975 he submitted testimony to Congress entitled, "The Case for Congressional Action to Safeguard the Telephone Network as a Universal and Optimized System."³⁸⁶ It was AT&T, via Rostow, that first aired the specious claim that a monopoly system devoted to universal service was part of the mandate of the 1934 Communications Act.

Bell's actions, however, indicated that it considered the existing Communications Act far too weak a reed on which to base its case. It prepared a new version of the Communications Act, The Consumer Communications Reform Act of 1976. According to Temin and Galambos,

The bill was cast as an amendment to the Communications Act of 1934. It reaffirmed the nation's commitment to universal service and went beyond existing law to state that a unified telephone network had been and continued to be essential for the achievement of that goal. The bill bluntly stated that the existing rate structure, by which it meant primarily separations, had promoted universal service.³⁸⁷

We have only to look at the context of those events to understand the function of the new universal service ideology. The fateful antitrust suit which eventually led to the breakup of AT&T was filed by the Department of Justice in 1974. MCI had invaded switched long distance with its *Execunet* service in 1975, a development which threatened to subvert the whole station-to-station approach to separations. The Bell company was in the thick of an all-out attempt to persuade Congress to pass a law to preserve the classical monopoly arrangements.

During the battle over the Bell bill and the ensuing years of antitrust proceedings, "universal service" became one of the key rallying cries of AT&T and the other defenders of regulated monopoly, especially state regulators. Just as Vail had used the term to fend off access competition from 1907 to 1920, so AT&T under DeButts attempted to use the same term-albeit with a different

³⁸⁶ Eugene V. Rostow, "The Case for Congressional Action to Safeguard the Telephone Network as a Universal and Optimized System." Paper based on the memorandum prepared for AT&T for use in the Nov. 1975 hearings before the Subcomm. on Communications of the House Comm. on Interstate and Foreign Commerce.

³⁸⁷ TEMIN AND GALAMBOS, *supra* note 3, at 119.

meaning and in a very different context-to renew the nation's commitment to the regulated monopoly structure Vail had helped to establish. The modern reconstruction of universal service, however, was not an accurate description of a historical policy, nor was it really intended to be. It was a political weapon in the battle for the preservation of an institution.³⁸⁸ Its political appeal-support for lower residential telephone rates and cross-subsidies to rural areas-proved to be remarkably powerful. Even Congressional leaders who opposed most of AT&T's legislative proposals could not resist taking advantage of the political capital to be made by invoking "universal service" in defense of low residential and rural rates. The so-called "Universal Telephone Service Preservation Act of 1983," an opportunistic attempt to maintain local rate subsidies after the divestiture, was drafted by two Senators-Dingell and Wirth-who had refused to support Bell's 1976 legislation.

AT&T's political objectives failed miserably. Its historical revisionism, however, was an overwhelming success. As a revised ideology of "universal service" was pressed into the service of telephone monopolies and other opponents of rate reform in the 1970s and 1980s, its meaning changed in ways that obscured what it had meant when it was coined in 1907. A confusion between its contemporary and historical usage has made it difficult for modern scholars and policymakers to appreciate the significance of the earlier universal service debate. And the universal service claims of regulated monopoly have unfairly eclipsed the earlier contribution of access competition to the development of a ubiquitous telephone infrastructure.

³⁸⁸ In the case of European PTTs, the retroactive nature of universal service claims is even clearer. European monopolies adopted the same averaging and cross subsidy practices as the American telephone companies without attaining anything near the penetration levels of the United States, but nevertheless made "universality" one of their defenses against the onslaught of new competition in the 1980s. As Gamham (1988) has shown, officially proclaimed universal service goals in Europe often coexist with low penetration and large regional disparities in access to the telephone.

14

UNIVERSAL SERVICE IN THE 1990S

UNIVERSAL SERVICE HAS REMAINED a focal point of telecommunications policy in the 1990s. That has happened not only in the United States but in every other country that has begun to liberalize or deregulate its telecommunications industry. The new policy dialogue is preoccupied with interconnection of competing networks and with the problem of financing universal service “subsidies” in a competitive environment. In the United States, it is also part of an attempt to extend second-generation universal service concepts to the new technologies of the National Information Infrastructure (NII).³⁸⁹ As that book goes to press, new legislation adding a new section to the Communications Act explicitly devoted to universal service is before the 104th Congress.³⁹⁰

That chapter establishes connections between the historical and current policy debates over universal service. The first section shows how current legislation has been powerfully influenced by historical myths. The second section provides a critique of current thinking about the relationship between universal service and competition. The third section argues that the historic choice between dual service and universal service offers a source of fresh insight into the policy problems posed by the growth of a new information infrastructure. The last section shows that the historical evidence also is pertinent to current controversies over access pricing and interconnection in telecommunications.

³⁸⁹ The NTIA Universal Service Working Group, chaired by Larry Irving, Assistant Secretary for Communications of the Commerce Department, held Universal Service hearings in Albuquerque, New Mexico, Dec. 13, 1993, Los Angeles, California, Feb. 16, 1994, and Indianapolis, Indiana, July 12, 1994.

³⁹⁰ 104th Cong., 1st Sess., *The Telecommunications Competition and Deregulation Act of 1995*, version seen by author dated Mar. 28, 1995.

Life imitates art

The first generation of universal service policy (1907-1920) aimed at the consolidation of service so that all telephone users could speak to each other. Since then, universal service was redefined as an industry-government policy focused on putting “a telephone in every home.” Although it was not implemented until the late 1960s, the second-generation universal service policy claimed a mandate from the 1934 Communications Act. And while more than 80 percent of American households already had telephones when it was begun, the second-generation policy claimed credit for making telephone service available and affordable.

While the old Bell system is gone, the universal service mythology it created continues to haunt us. Current policy discourse about universal service is dominated entirely by the second-generation concept. Noting that competing networks undermine the rate averaging and cross subsidies which allegedly produced widely affordable telephone service, it asks how the old subsidy system can be revised in order to make it sustainable in the new, competitive environment.³⁹¹

The historical mythology of universal service is shaping legislation as well as debate. The most recent draft of telecommunications reform law, the “Telecommunications Competition and Deregulation Act of 1995,” would add a new section to the Communications Act devoted exclusively to Universal Service. The goal of this section, according to a committee report accompanying the draft bill, is:

...to clearly articulate the policy of Congress that universal service is a cornerstone of the Nation’s communications system. This new section is intended to make explicit the current implicit authority of the FCC and the States to require common carriers to provide universal service.³⁹²

That statement is unusual in its direct admission that heretofore there has been no explicit legislative authority for the second-generation universal service policy. What is fascinating from a historical perspective is Congress’s determination to react to that fact by modifying the Act so that it conforms to the myth! A policy concept put forward by the Bell system as part of a last-ditch attempt to save regulated monopoly will now be enshrined in a law devoted to “Telecommunications Competition and Deregulation.” The old regulated monopoly system has exacted a posthumous revenge.

³⁹¹ Eli M. Noam, *NetTrans Accounts: Reforming the Financial Support System for Universal Service in Telecommunications*. Universal Service in the New Electronic Environment Symposium, Benton Foundation and Columbia University CITI (Oct.15, 1993). OPASTCO, KEEPING RURAL AMERICA CONNECTED: COSTS AND RATES IN THE COMPETITIVE ERA. (Organization for the Protection and Advancement of Small Telephone Companies 1993). KOICHIRO HAYASHI, UNIVERSAL SERVICE IN JAPAN (in Japanese), RC Publishers, 1994, ISBN4-12-101175-9.

³⁹² Committee Report on the Telecommunications Competition and Deregulation Act of 1995, Senator Larry Pressler, Chairman, Sen. Comm. on Commerce, Science, and Transportation, to Dr. June E. O’Neill, Director, Congressional Budget Office, Mar. 28, 1995.

The tragicomic character of those developments intensifies when one attempts to make sense of the new universal service mandate in the draft legislation. “Universal service” is defined therein as:

an evolving level of intrastate and interstate telecommunications services that the [Federal Communications] Commission, based on recommendations from the public, Congress, and the Federal State Joint Board...determines should be provided at just, reasonable, and affordable rates to all Americans, including those in rural and high-cost areas and those with disabilities, to enable them to participate effectively in the economic, academic, medical, and democratic processes of the Nation. At a minimum, universal service shall include any telecommunications services that the Commission determines have, through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers.³⁹³

The language is remarkably broad. If the law passes with that wording in place, the nation’s basic communications law will create universal service obligations whenever a “substantial majority” of Americans subscribe to a particular service. The mandate stretches beyond traditional telephony to include virtually any form of information transmission that might exist now or in the future. Presumably, those universal service obligations will continue to be funded via intra-industry price distortions. A process for progressively expanding universal service entitlement claims has been created in the form of a new Federal-State Joint Board, which, in response to political pressure from Congress or interest groups, can recommend subsidies in nearly any segment of the industry. Far from promoting a transition to a more normal, competitive marketplace, the proposed new law could institute a sweeping, permanent expansion of federal and state intervention in the industry.

Historical mythology is only a part of the problem here. The more fundamental factors are the vested interests created by the old system of subsidies: rural, high-cost telephone companies, consumer lobbying groups, educational and library interests, and other constituencies who might benefit from the continuation of non-market revenue flows and who see in the “universal service” concept a new system of entitlements in the information age. AT&T’s equation of universal service with regulatory cross-subsidies and its rallying of the constituencies who benefit from that system will have a lasting impact on the political economy of telecommunications regulation in the United States.

There is more to the problem than political interest, however. The purported conflict between competition and universal service also has some basis in the economic puzzles posed by our current approach to interconnection policy. Here, as before, a historical perspective is useful.

For the past fifteen years, advocates of telecommunications competition have made interconnection to the public network the basis of competitive entry. Economists and lawyers have argued that interconnection to the public network should be made available on a nondiscriminatory basis to competitors as well as end users. Moreover, they have argued that the prices charged for the interconnection of competing networks should reflect only the incremental costs of supplying it.

³⁹³ Draft legislation, at 40, lines 4-20; Section 253 (b).

In effect, they have equated the proper price of network access with the incremental cost of supplying the facilities enabling access.

Competing networks that are given special forms of low-cost access to the public network are able to target only the most profitable markets and leave the supply of access to more costly or less high-volume markets to the regulated carrier. As that happens, the financial surpluses used to finance the higher cost routes and components of the public network will be competed away. At best, each user will be required to bear the stand-alone cost of the particular set of facilities he or she uses. Or, what is more likely, prices will be lowered for competitive routes and raised in the less competitive or noncompetitive ones, regardless of their relative costs.

Faced with that scenario, policy analysts now propose to revamp some kind of subsidy scheme to recreate the effects of the one they have spent the last fifteen years tearing down. Indeed, an unresolved contradiction between the policy goal of promoting competition and the methods of universal service support has plagued common carrier telecommunications policy since the AT&T divestiture. The divestiture destroyed the old separations and settlements system, but recreated many of its economic effects with the National Exchange Carriers Association pool, weighted dial equipment minute (DEM) charges, and the Universal Service Fund. In a partially competitive environment, those measures encourage uneconomic bypass and other inefficiencies, just as their pre-divestiture forbears did.

In order to fix that problem, most economists are proposing some kind of value added tax applied specifically to the telecommunications industry (Noam, 1993; Egan and Wildman, 1993; Einhorn, 1993; Teleport, 1994). An industry-specific tax and subsidy scheme is proposed because support from general tax revenues is not supposed to be politically feasible. The tax would be applied not just to long-distance carriers but also to cellular, PCS, information service providers, and virtually everyone else in the industry. In other words, instead of eliminating the cross subsidies and associated inefficiencies that developed during decades of regulated monopoly, we are now supposed to make them more extensive and generally applicable than ever before.

Critique of the Prevailing View

There are ample grounds to question that approach to the problem. To begin with, the historical data make it clear that the importance of rate subsidies in the development of telephone service has been greatly exaggerated. Most of what happened in the regulatory arena between 1920 and 1970 were ways of sustaining or marginally expanding a level of coverage that was basically established by 1920. The progressive rise in telephone penetration after World War II had more to do with the doubling and tripling of household income during that period than with separations and settlement practices. Active utilization of the separations and settlements process to lower the price of local exchange service did not really begin until 1965. Household penetration was already growing rapidly, and hovered around 80 to 85 percent at that time. The importance of even those subsidies could be questioned. Household penetration has grown steadily since 1984 despite the major increases in local service rates made in the wake of the AT&T divestiture.³⁹⁴

³⁹⁴ Jorge R. Schement, Alan Belinfante & Lawrence Povich, *Telephone Penetration*, 1984-1994, Federal

If the historical impact of subsidies was much smaller than is generally supposed, the case for projecting them into the future can be questioned on the following grounds. The current preoccupation with universal service subsidies masks three serious problems.

First, intra-industry subsidies, regardless of how they are designed, may not be compatible with a free, open, and competitive marketplace. At best, they may create an inherently tilted playing field in which there must always be a designated “carrier of last resort” with special obligations and protections. At worst, they may require that telephone companies in certain areas be franchised monopolies. Panzar and Wildman (1993), for example, argue for leaving monopolies in place in rural areas, and show convincingly how a mixture of competitive entry and universal service subsidies could have unintended and counterproductive effects.

Second, under a subsidy mechanism it may not be possible to distinguish between “high costs” and obsolete or inefficient ways of doing things. Since the provision of service to high cost areas will be removed from marketplace competition, costs must be taken as a given and “covered” by the subsidy. It may be true that, given current applications of technology, factors of density and loop size make it more expensive to provide traditional telephone service in rural areas. But as long as the rural telephone companies are franchised monopolies collecting universal service subsidies, why should anyone bother to develop and deploy radically different, more efficient ways to serve those areas?

Third, the subsidy approach conceals an interesting contradiction. On the one hand, the need for subsidies is based on the assumption that a universal telecommunications network is a costly liability rather than a valuable asset. In virtually the next breath, however, universal access is discussed as if it were a resource so valuable that no competitor can survive without it. Competing networks-competitive access providers, long-distance carriers, and wireless networks-all claim that interconnection to the public network at reasonable rates and with equal technical conditions is essential to their success. Apparently, the ability to terminate calls to any and every telephone user, a capability which can only be supplied by the public network, is extremely valuable. How is it possible that something so valuable and so much in demand is also economically unsustainable? Something is wrong with that picture.

The basis of that contradiction lies in the current property structure, or perhaps we should say the absence of property structure, in the public telecommunications network.

The appropriability problem in network economics

A telecommunications network offers its customers an enormous bundle of services. Under the monopolistic structure, consumers purchased access to all or most of those services at rates which sustained the system as a whole. When competition is allowed, and the competing networks are interconnected, both can offer users the same access scope, despite what may be major differences in their actual scope. That is the source of an appropriability problem. A competitor

who buys only one unit of access into a universal network is technically able to resell access to all of the users connected by the incumbent, even though the competitor does not have to face the costs and risks of creating the entire network. The competitor is thus able to appropriate some of the economic value of the other network's bundle of access units.

As noted in chapters 3 and 5, the appropriability problem in telecommunications is similar in a number of ways to the problem of intellectual property in information markets. Just as the information reseller need not worry about the costs of producing information but only the cost of reproducing it, so the telephone access reseller need not worry about the cost of reconstructing the established network but only about the cost of acquiring enough access into it to handle the traffic between the two systems.

The salience of the appropriability problem hinges upon what the new networks pay for access to the incumbent. If the price of inter-network access compensates the incumbent adequately for its large scope, then interconnection with a competitor does not harm it. If the price a competing network pays is no different than that of any ordinary user, then parasitism may in fact occur. In the 1910s, as we have seen, utility commissions confronted that problem when engaged in the process of establishing toll connections between Bell and independent networks. Their solution was to impose a “surcharge” on inter-network traffic. A surcharge allowed users to overcome the barrier to communication represented by dual service, but the additional expense associated with communicating with members of the other network allowed each network to maintain some degree of exclusivity.

The modern approach to access pricing does not recognize the existence of an appropriability problem. It is more concerned with the survival of small competitors in the face of what it sees as the overwhelming advantages of larger, incumbent networks. Policies based on that view attempt to erase all discrimination between end users and intermediate users and prevent a network from deriving any competitive advantage from its larger scope. Thus, the modern policy tends to exacerbate the appropriability problem, with potentially dire consequences for universal service.

We have seen in earlier chapters that appropriability is not a purely theoretical construct. It played a major role in shaping the development of the American telephone system. Competition between the Bell system and the independents between 1894 and 1920 was structured as a system rivalry between unconnected local exchanges and toll networks. They were not interconnected because the prevailing interpretation of property rights gave competitors the option of deciding whether or not to interconnect with a competitor network. That type of property structure gave both competitors a powerful incentive to make their networks as universal as possible.

A different but related historical lesson is that under access competition, telephone networks often sustained their large scope by averaging rates and costs. Most economists believe that intra-network “cross-subsidies” or transfers of revenues would not exist in a competitive market. That belief is contradicted by the historical evidence. Intra-system averaging seemed to be sustainable as long as the competing systems were not interconnected. During the competitive era, the Bell system established many small exchanges in outlying areas and sustained them in part through toll usage

revenues. That is, it paid the competing networks to add remote exchanges even if the small exchanges did not sustain themselves with local exchange access revenues alone, because the presence of many additional termination points increased toll usage and revenues in other exchanges.

There are more recent indications that universality and rate averaging are not incompatible with competition, given the right property structure. Overnight delivery services such as DHL, FedEx, and UPS are competitive network businesses. The economics of those package delivery services are in some ways analogous to telecommunications networks. Though competitive, those businesses still maintain uniform rates for a broad bundle of services.

The price of sending an overnight DHL, FedEx, or UPS package is the same regardless of whether the package goes across town or across the country. Originally that was the case because (in the case of FedEx, the industry pioneer) all packages went to the Memphis hub regardless of their ultimate destination. But since that time regional sorting centers and package “bleed off” functions have been introduced, which undoubtedly lower the costs of regional or local distribution relative to national distribution. Yet the consumer prices have remained the same because consumers prefer uniform national pricing. Clearly, that kind of pricing system is sustainable in a competitive market.

It is also interesting to note that all of the package delivery services are constantly striving to improve and increase the universality of their distribution networks. Each one recognizes that it is in their direct business interest to provide service to as many places as possible. While service to points outside primary service areas may incur a surcharge or result in slower service, competition forces each network to continually attempt to increase the number of places to which they can provide overnight service at the regular price.

In the overnight express industry, each network competes on a stand-alone basis. There is no price regulation and no common carrier or universal service obligation. It is interesting, but of course inconclusive, to speculate about what the economic impact of a different property structure might be. Assume, for example, that federal regulators required DHL and FedEx to exchange packages; FedEx could require DHL to complete the delivery of FedEx packages if the destination was served by DHL and not FedEx, or vice versa. One suspects that uniform rates would end. Each courier service would serve only those areas which were most profitable for it and leave the rest to the others. One also suspects that the imputed costs each courier claimed to incur by serving the more remote regions would suddenly become very large, particularly if federal subsidies were made available to support them.

In conclusion, market competition and network universality can be reconciled if the telecommunications industry adopts a property structure that allows networks to appropriate the increased value created by enlarging a network’s scope. Since current policies prevent networks from doing that, it is not surprising that the growth of competition seems to corrode the economic foundations of universal service. With the right property structure, universality ceases to be a costly liability and instead becomes a valuable asset.

Why Vail's universal service is still relevant

As noted earlier, widespread acceptance of the second-generation universal service concept has literally buried the older concept. The telecommunications industry is almost entirely unaware of the earlier debate about dual service. Consequently, we have lost sight of why the United States ended up with a monopolistic telephone industry.

The first-generation debate about universal service, however, is far more relevant to the policy challenges of the next two decades than the current preoccupation with financing universal service subsidies. A better understanding of the basic policy choice faced in Vail's era is essential if we are to understand the implications of current developments in information technology.

The new information infrastructure that is under construction is characterized by competing, overlapping, and often incompatible or imperfectly integrated technologies. The typical business card today carries three or four different user addresses—one each for the voice telephone, the cellular phone, the fax line, the electronic mail address, or the pager. There may be additional information about internal, enterprise networks. Compared to that, the advertisements of the dual service era, in which businesses had to list two different telephone numbers, seem simple. Far from showing any signs of abating, the proliferation of communication devices continues with the development of new wireless telephone services, portable personal computers, enhanced pagers, and personal digital assistants. Aside from the efflorescence of devices and applications, the number of service providers is also growing. In fact, no less than four prospective categories of service provider are now contending for a role in developing the information infrastructure: telephone companies, cable television systems, terrestrial and satellite radiocommunications providers, and the internet. How those diverse providers will exchange traffic and achieve technical compatibility is anybody's guess.

Within that increasingly heterogeneous environment, technologists, policymakers, and businesses continue to hold out the promise of total, seamless integration. For more than two decades, we have been told that sometime in the near future a single device and an integrated network will deliver interactive voice, video, and data capabilities everywhere. That vision is, of course, a modern version of the first-generation universal service concept. It assumes that the full panoply of information technology will someday achieve the uniformity, compatibility, and ubiquity of the telephone system of the regulated monopoly era.

It is an appealing vision, and it may even happen, eventually. If we are envisioning a 21st century version of universal service, however, there is much we can learn from the earlier debate between dual service and universal service.

Integration is a Policy Choice, Not a Law of Nature

To begin with, universal integration of the information infrastructure really is a choice we face and not an inevitable product of technology or economics. Even in the era of the telephone, there was an alternative to complete integration—namely dual service. The replacement of dual service by universal service did not come about “naturally,” via routine market processes, but required major institutional innovations (the suspension of antitrust laws, the use of state regulatory

commissions to regulate rates, and later the creation of a new federal regulatory agency). The first-generation universal service debate took the better part of two decades. Those were simpler times, in that we were dealing with only one type of technology (voice telephony), and the policy choice was restricted to one national economy.

It is possible that technological and institutional differences between the past and the present have tilted the social optimum away from integration and towards more tolerance of heterogeneity, fragmentation, and competition. The expansion of telecommunications access can no longer be considered an unqualified good, as it may have been in the era of Vail. As fears about privacy and security grow, and technologies such as voicemail and caller ID gain popularity, one can only conclude that today's users are as interested controlling and restricting access as they are in broadening it. To many people, the indiscriminate intrusion of a universal "information superhighway" into their home or business is about as welcome as the presence of an eight-lane interstate highway in their backyard. We should not assume, as if by reflex, that the new information infrastructure will or should follow the trajectory of the telephone system. At the very least, our policy dialogue needs voices capable of articulating and defending a 21st century version of dual service.

Integration Has Costs as Well as Benefits

A historical perspective can make us more aware of the difficult trade-offs that must be made. Integration involves costs and well as benefits. History suggests that unification is driven by demand-side economies of scope. Compatibility and integration can benefit users by eliminating the need for duplicate investments in terminal equipment and access facilities and by eliminating the confusion and uncertainty caused by heterogeneous products and services. But the realization of demand-side economies of scope also creates market inertia. As the communications infrastructure matures and users converge on a single system or standard, it becomes increasingly difficult for new technologies or networks to gain a foothold in the market. In other words, there is an inherent trade-off between integration and competition.

Thus, it is likely that when the much-ballyhooed seamless integration of the information infrastructure actually arrives, many of us won't like it. The dominance of Microsoft in the software marketplace has already given us some inkling of the problems to be faced. Microsoft's Windows software has succeeded in establishing itself as the standard user interface for most IBM-compatible personal computers. Consumer acceptance of Windows has given the Microsoft Corporation a significant amount of market power in the software and computer industries. Just as AT&T was the perennial focus of antitrust activity from 1910 to 1980, so Microsoft (and more generally the interface between PC, user, and software applications) will become the focal point of competition policy controversies in the near future. In both cases, the economic forces contributing to market power are the same—demand-side economies of scope. The dominance of Windows in the marketplace is derived from users' unwillingness to make duplicate investments in time spent learning how to use different software procedures, just as the dominance of AT&T was derived from users' unwillingness to duplicate their investments in telecommunications access.

Microsoft's success has been achieved in what is really only a small subset of the overall market for telecommunications and information. One can scarcely imagine the amount of market

power that could be achieved by a company which succeeded in winning mass acceptance of a standardized software application and terminal for accessing and navigating a fully integrated, global information infrastructure. If and when that occurs, the tension between demand-side efficiencies and supply-side diversity may reach some kind of breaking point (as occurred between 1912 and 1920) and impose a policy choice upon us.

Unfortunately, the prevailing thinking about competition policy does not offer much help in making such a choice. The theoretical roots of antitrust policy are derived from natural monopoly theory. The natural monopoly doctrine, as we have seen, is only equipped to identify and remedy anti-competitive behavior based on supply side abuses such as predatory pricing. Current antitrust doctrine gives us little guidance as to how to handle monopolies that originate in demand-side economies of scope. That is why the relationship between communications monopoly and the antitrust laws has always been so ambiguous historically.

History Never Repeats Itself

There are three important structural differences between the first generation universal service debate and what might be called the “third-generation” confrontation with that issue in the future. Although the parallels are significant, the differences need to be kept in mind as well.

One important difference pertains to the globalization of information and telecommunications markets. The institution of telephone monopoly was a response to the problem of creating a comprehensive and uniform communications capability across political units known as nation-states. Historically, the response to that challenge in the telecommunications sector was surprisingly uniform across the globe. In practically every nation, post, telephone and telegraph (PTT) monopolies were created so as to make the telecommunications infrastructure an extension of the national state.³⁹⁵

The national PTT system lasted for eighty years, but is currently being eroded almost everywhere in the developed and developing world. As the PTT system breaks down, the old tradeoff between fragmentation and competition versus integration and monopoly is being faced once again. But the developmental process that took place at the national level in the industrializing nations of the late 19th and early 20th century is now taking place at the international level. The liberalization of the sector allows companies to enter multiple national markets. In response, telecommunications service providers and manufacturers are becoming horizontally integrated across nations. That gives the 21st-century equivalent of dual service competition an added level of complexity. At the global level, there is more room for competing systems and standards to take hold, and it is more difficult for user convergence to take place in a coordinated fashion. On the other hand, the stronger linkage between national markets and the transnational integration of firms makes it impossible for one country to ignore the systems and standards established in another.

Wireless personal communications hold the promise of the ultimate in universal service-two-way telecommunications that are available at any time in any part of the world. But the

³⁹⁵ Peter Cowhey. *The International Telecommunications Regime: the political roots of regimes for high technology*, 44 INTERNATIONAL ORGANIZATION 69-99 (Spring 1990).

promise of ubiquity is undermined by the development of competing, incompatible wireless telephone standards in Europe, the United States, and Japan. The same thing is happening with High Definition Television standards. The desire for and benefits of global compatibility are strong, but business competition, technological diversity and national industrial policies make unification elusive. As information technology matures and the international economy becomes more dependent upon its capabilities, is it not possible that some sort of universal service drama will be acted out once again, on a global scale? Of course, it is impossible to predict what kind of institutional form will result.

The nature of technology is another important difference between the past and the present. One of the key economic features of the first-generation dual service-universal service debate was the diseconomy of scope associated with the growth of networks. Both manual and electromechanical switching technologies became increasingly expensive to operate and maintain as the scope of a network grew. The older, analogue technology also made the achievement of compatibility between equipment and network more delicate and difficult to achieve. In that context, vertical integration and monopoly may have been the most efficient ways of bringing about the demand-side economies of scope that users wanted.

Electronic and digital switching systems have conquered the supply-side diseconomy of scope, however. The unit cost of serving a given number of access lines actually declines now with the new technologies. In addition, digital signal processing is more robust and more easily interconnected and standardized than analogue or manual systems. In the present environment, it is easier to achieve various levels or gradations of compatibility and interconnection. Thus, it is unlikely that users will be confronted with the stark, binary choice of interconnection/no interconnection as in the past. That does not mean, however, that the dual service-universal service debate is not relevant to current policy problems or that we can effortlessly have the best of both worlds. The dynamics of access competition still apply today. The impact of interconnection policy on competition and universal service in telecommunications are two areas in which historical parallels are extremely important and instructive. They will be discussed in the next section.

Last but not least, the political economy surrounding telecommunications policy is radically different now than it was in the early 1900s. After nearly thirty years of the second-generation universal service policy, strong vested interests in telecommunications subsidy schemes have been created. Small, rural independent telephone companies, for example, provide a well-organized and surprisingly influential lobbying presence on Washington. Activist organizations devoted to the special interests of the blind, the deaf, libraries, schools, and household consumers also are able to articulate subsidy claims and lobby for them in regulatory and legislative proceedings. The organized activity of those groups helps to explain why the cross-subsidies of regulated monopoly period have proven to be virtually ineradicable, despite the nominal dedication of regulators and Congress to competition and deregulation.

Interconnection of competing networks

The issue of access pricing between competing networks has emerged as the preeminent telecommunications policy problem of the present day.³⁹⁶ The prevailing view of telecommunications competition, however, turns the older viewpoint on its head. Where Bell and the independents actively competed on the basis of their scope, current policy strives to ensure that no network can derive a competitive advantage from its “bottleneck” control of access. Current regulatory practice stresses pricing based on incremental costs and goes to great lengths to impose equal technological conditions among competing networks.

That doctrine purports to give us the best of all possible worlds. “Open access” will foster competition but without the fragmentation of the dual service era. It will provide universal service, but without monopoly or even, perhaps, much regulation. Here again, the vision is appealing but its practicality is suspect. The prevailing doctrine of open access rests upon theoretical and historical assumptions which have been called into question in that book.

Historical Lessons

Historical evidence provides limited support for much of the prevailing wisdom concerning interconnection and competition. We assume that an incumbent network’s refusal to interconnect with a new competitor is intrinsically anti-competitive. But Bell’s refusal to deal with its competitors did not foreclose competition. Despite its seventeen-year head start and its superior capital resources, Bell’s total exclusion of the independents from its system did not deter, and may actually have stimulated, their explosive growth. (Of course, that growth occurred in a market with plenty of room for additional development.) Furthermore, the effects of access competition were not so negative-noninterconnection promoted universal service by rewarding systems for enlarging their scope.

Current doctrine also is strongly committed to unbundling and interconnection among competitors, assuming that it is always conducive to consumer choice. Historically, however, competition in the local exchange market was discouraged and sometimes eliminated by interconnection. Specifically, Bell’s sublicensing of independent exchanges was the most damaging blow to the independent movement, as it removed much of the incentive to develop an alternative system. That experience also suggests that the modern assumption that dominant incumbents have no incentive to interconnect with smaller competitors is incorrect. Without any prodding from regulators, Bell progressively liberalized its interconnection terms and conditions from 1901 to 1912 in order to prevent an alternative system from developing.

An understanding of those points, sometimes tacit, sometimes explicit, led early telephone regulators and users to reject a telephone industry structure based upon compulsory interconnection of competitors in the early 1900s. The industry and its early regulators did consider, and in some

³⁹⁶ Werner Neu & Karl-Heinz Neumarm. *Interconnection Agreements in Telecommunications*, in DISKUSSIONSBEITRAG NR. 106. (Wissenschaftliches Institut für Kommunikationsdienste April 1993); Milton Mueller, *New Zealand Telecommunications and the Problem of Interconnecting Competing Networks*, POLICY STUDY No.177 (Reason Foundation 1994); Martin Cave, *Interconnection, Separate Accounting, and the Development of Competition in UK Telecommunications*, Institute of Economic Affairs Lectures on Regulation (1993).

cases even experimented with, interconnection. But regulatory experience in the United States and Canada tended to confirm the observations made in the preceding paragraph. In addition, regulators were unwilling to accept the high costs associated with implementing interconnection.

That book has retrieved and elaborated on the older approach to interconnection policy in order to illuminate the current debate. The intention is not to argue that the older views are perfectly correct or that they are directly applicable to the current situation. They do, however, help us to understand some of the weaknesses and problems inherent in the modern approach to interconnection policy. We need to have a dialogue, not a monologue, about that vital aspect of telecommunications policy. Much can be learned by using the older approach as the point of departure for a critique of contemporary policies.

Nondiscriminatory Pricing and Appropriability

We have already discussed how the modern approach to interconnection creates an appropriability problem (see section entitled THE DEBATE OVER UNIVERSAL SERVICE “SUBSIDES”). Indeed, it is clear now that incremental cost-based interconnection pricing, while it has some legal and theoretical support from concepts of nondiscrimination and common carriage, has succeeded among regulators largely for political reasons. Politicians and regulators who introduce long-distance competition develop a vested interest in the viability of the new competitors and want to be able to deliver quick and visible price reductions to consumers. Incremental-price based interconnection readily supports that agenda. New competitors can provide substitute facilities only on a few long haul routes while benefiting from the universal access of the incumbent. Under those conditions it is easy to undercut the price of the incumbent, particularly when the incumbent is a government monopoly or has a long history of overpriced long-distance rates.

Quite apart from its political motives, that policy has several economic advantages—it eases the entry of new firms in the telecommunications market, thereby putting pressure on the incumbent to improve its service and rationalize its prices. Those advantages apply even if the new networks are not actually more efficient than the older one. In the long run, however, the appropriability and universal service problems inherent in such an approach cannot be ignored, particularly when competition enters local access as well as long-distance markets. Thus, the modern approach to interconnection really has not avoided or superseded the concerns about appropriability expressed in the early 1900s.

Recognition of that fact is indicated by the growing debate over “efficient component pricing” as the theoretical basis for access pricing. The efficient component pricing rule was developed by the economists William Baumol and Robert Willig, initially in the context of railroad regulation.³⁹⁷ In that pricing methodology, competing networks pay incremental costs plus an opportunity cost, representing the foregone profit that the incumbent loses by extending service to a competitor. Compensation for opportunity costs allows the incumbent to appropriate the value of its larger scope. Although its theoretical derivation is more precise, the principle of efficient

³⁹⁷ WILLIAM J. BAUMOL & J. GREGORY SIDAK, *TOWARD COMPETITION IN LOCAL TELEPHONY* (MIT Press & AEI Press 1994).

component pricing is similar to the surcharge concept employed by utility regulators eighty years ago. The Baumol-Willig pricing rule is still controversial,³⁹⁸ and its widespread adoption is by no means assured. Nevertheless, the regulatory climate is being nudged closer to the older position regarding appropriability than it was.

Whatever the specific merits and demerits of the Baumol-Willig proposal, a sustainable access pricing regime cannot require telephone companies to make access available to competitors at a price that reflects only the incremental costs of the facilities used. To do so would be as fallacious as requiring software producers to base the price of their product on the cost of producing and distributing the floppy discs that carry the software. In both types of markets, the marginal cost of extending access to an additional user is very low. But to make the product available to competitors or resellers at such a price is unsustainable. It is necessary and legitimate for the owners of the information resource to price discriminate depending on whether or not the user intends to resell it. That is true even though there is no difference in the incremental cost of supplying access to a reseller or an end user.

Unbundling

Unbundling is the mantra of current policy. Its hopes for a completely open, deregulated telecommunications marketplace are pinned to the process of separating out the components of the public network so that consumers can assemble the services they want and need, and no supplier can use its power in one service area to control another.

That book has provided the outline of a theoretical critique of that policy. As discussed in chapter 3, networks by their very nature are enormous bundles of heterogeneous access units. Consumers benefit from a service provider's ability to deliver multiple services over a single access facility. Economies of scope, on both the demand side and the supply side, are the very basis of network efficiencies. That theoretical groundwork has two important implications for contemporary policy.

First, if networks are bundles then a policy that equates bundling with restrictions on competition is bound to find anti-competitive behavior everywhere. Such a policy will be perpetually at war with the very basis of network efficiencies. We need a much clearer standard for determining when bundling constitutes a barrier to competition than is currently available. Moreover, such a standard needs to take into account the positive social value that can be derived when networks compete on the basis of the size of their service bundle, as the Bell system and the independents did in the early 1900s.

Second, although breaking apart the components of a network does give users more choice and control over the nature of the bundle, that shift of responsibility entails costs as well as benefits. Every act of unbundling creates additional transactions costs for users. A modem consumer of telecommunication network services and functions who must assemble various

³⁹⁸ 11 YALE J. REG. (1994), contains several articles supporting and critiquing the efficient component pricing rule.

elements himself is faced with decisions which require costly information and time. On the supply side, unbundling may also sacrifice economies of scope.

It is instructive to compare the economic effects of modern network unbundling with those of dual service competition. In the dual service era, the costs of integration were entirely shifted to users who had to buy duplicate access facilities. In the modern approach, those costs are internalized by the public network. Duplications of facilities still exist—they have just become invisible to the user and the costs are distributed among users in unaccounted for ways. For example, the existence of competing but interconnected local exchanges requires additional signal processing and transport facilities to handle traffic between the systems. Those facilities would not, in principle at least, be necessary in an optimized single system. The implementation of equal access arrangements and number portability also require heavy investments in transport-signal processing and switching capabilities that would not be necessary otherwise. Whether that regime is more efficient than an alternative such as dual service is outside the scope of this book. We do, however, need to pay closer attention to the trade-offs involved in mandated unbundling. The current doctrine may impose upon consumers and suppliers an economically inefficient level of unbundling.

Interconnection Policy, Regulation, and Property Rights

Open access was supposed to pave the way for market competition in telecommunications. But the current approach to interconnection has not done away with regulation. Far from implementing equal access and “fair” interconnection pricing have generally increased regulatory intervention in the industry. Increased regulation is an unavoidable byproduct of the basic assumptions of the policy. If incumbent networks hold insurmountable, “bottleneck” control over access, then unregulated market transactions cannot be relied upon to set prices. If regulators are to fill the gap, long and usually inconclusive deliberations about the identification of costs are required. The arcane debates about pricing pale in comparison to the complex forms of intervention in the technical structure of the network that have been necessitated by the open access policy. Interconnection of competing operators is seldom possible through the purchase of pre-existing types of service from the incumbent. It usually involves new forms of access and interoperability for which no established market or prices exist. Thus, regulators have been forced to reach deeply into the structure of the public network in order to create, by fiat, an intermediate market for telecommunications access. The implementation of equal access, for example, required the creation of artificially defined territories known as Local Access and Transport Areas (LATAs) and the restriction of local exchange telephone companies to those territories. At the local exchange level, equal access interconnection requires that regulators take control of numbering plans, mandate deployment schedules for certain kinds of switching and signaling technologies, and even regulate the number of seconds it takes to process a call.

True deregulation in telecommunications will never be possible without a competitive, unregulated market for interconnection and access. This book has shown that unregulated access competition is not an unthinkable option. The applicability of America’s historical episode of access competition to the present time increases as alternative infrastructures, such as cable television systems and wireless telephone companies, proliferate. The idea that no firm is capable of duplicating the local access network of the telephone company is looking increasingly dated. In

addition, the computer industry now provides a model (although not, of course, a perfect one) of how compatibility, interconnection, and unbundling can be achieved without pervasive regulation of terms and conditions.

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CONCLUSION

THIS BOOK HAS REEXAMINED America's early experience with telephone competition and the emergence of a policy of universal service. Its objectives were threefold: 1) to reformulate and test current economic theories regarding network competition; 2) to provide a more complete and accurate understanding of early telephone history, particularly the phenomenon of competition between unconnected telephone systems and the emergence of universal service as a policy prescription; and 3) to derive insight into current telecommunications policy from historical experience.

The historical argument presented here diverges sharply from the prevailing views of interconnection, competition, and universal service in telephone history. While in possession of patent monopoly, the Bell companies left the market for telephone service drastically underdeveloped. When the patents expired, independent competitors rushed into the developmental vacuums left by the Bell companies. In keeping with their organizational mandate to be an integrated, centrally managed, nationwide system, the Bell companies refused to connect with them. Bell's refusal to connect was not the devastating blow to competition it has often been made out to be. From 1894 to 1900, independent competition thrived despite its total exclusion from the Bell system. Independent telephone systems were able to establish thousands of new exchanges and attract hundreds of thousands of new telephone users. Far from being unwilling victims of Bell's refusal to connect, most of the independents reciprocated. They viewed themselves as a mutually exclusive, nationwide movement bent on displacing the Bell system's control of the telephone business. Both the Bell and independent interests opposed efforts by the courts and legislatures to compel interconnection of the rival systems. By 1898, with the support of both telephone interests and the acquiescence of the courts, the U.S. telephone industry had taken the path of access competition.

Access competition pushed both systems into a race to achieve universal geographic coverage and broader penetration. Neither telephone system could afford to leave any part of the country or any part of the population uncontested. The telephone network grew to embrace most of the country because the companies derived a direct competitive advantage from adding new users or locations to their systems. The absence of interconnection allowed the rival networks to appropriate the added value derived from expanding their scope. The legal and (non)regulatory environment of the time permitted and even encouraged that approach to competition.

The stereotype of the independent telephone movement as consisting largely of small, local, and technologically inferior systems is unfounded. By 1910, many commercial independents had grown into consolidated regional operating companies. They had their own long-distance companies and were able to offer connections to independent exchanges over a 150-mile area. It is true, however, that the lack of integrated financial and managerial control made it more difficult for the independents to achieve connectivity and to maintain system integrity against the Bell challenge. The independents' attempt to rely on long-term contracts providing for exclusive connection rights might have been a solution to that, but, ironically, that tactic was overruled by the courts as "anti-competitive."

The success of the Bell system in the competitive struggle cannot be attributed to superior technology, public relations, politics, predatory pricing, or financial acquisitions, although all of those tactics were employed. Bell's dominance came primarily from its decision to pursue comprehensive coverage of the country. Its decisions to accelerate exchange development in smaller towns, to systematically create toll connectivity among all of its exchanges, and to aggressively pursue interconnection with thousands of non-competing independents in the rural areas gave it the edge. Its incentive to expand was a natural product of access competition. The achievement of critical mass by an independent system of comparable scope was prevented not by Bell's refusal to connect *per se* but by sublicensing contracts which drew thousands of independent exchanges out of the independent movement and into the Bell system. Ironically, then, Bell's willingness to interconnect with independents was more "anti-competitive," in effect, than its policy of total exclusion had been. Bell's ability to attract independent exchanges into its orbit was in turn a product of its all-encompassing connectivity.

Bell achieved *dominance* in the competitive marketplace but not total victory. Dual service survived the return of Theodore Vail and the Morgan interests in 1907, the accelerated sublicensing policy of 1908, the buyouts and sellouts of 1910-12. By 1914, significant pockets of dual service were still in place in major urban areas. Federal and state antitrust laws and municipal anti-consolidation requirements prevented the consolidation of competing exchanges. While it is evident that AT&T wanted to achieve a monopoly (Vail was perfectly explicit about it), the Bell system alone was unable to achieve it.

The crucial additional ingredient needed to make the transition from competition to monopoly was public acceptance of the philosophy of universal service. Universal service at that time meant a unified and technically integrated telephone network - the end of user fragmentation into separate systems. Telephone users and state and local government officials came to see a divided telephone service as a public nuisance. The economic basis for monopoly, then, came from

demand-side economies of scope among influential user groups, not from supply-side efficiencies. Although business and household users were still suspicious of monopoly, they had become increasingly impatient with the inconveniences of a fragmented service. The presence of regulatory commissions seemed to offer the best of both worlds; it created the unified service of a monopoly but promised to control rates as effectively as competition.

AT&T spokesmen helped to formulate and publicize the concept of universal service, but to view a monopoly structure as something foisted upon the public by the Bell system is to give one actor in the historical process too much weight. The debate over unification of the service was explicit, public and extended over a period of fifteen years. Unification could be, and often was, held up when opposed by newspapers, state or federal antitrust laws, public referenda, independents unwilling to sell out, or hostile city councils. The passage of the 1921 Willis-Graham Act, which exempted the industry from federal antitrust laws, provided explicit national recognition of the importance of unifying telephone service. The law was preceded by many “mini Willis-Graham Acts” in various states, exempting the industry from state antitrust laws or the anti-consolidation provisions of municipal utility franchises.

Interconnection of competing exchanges made a tentative appearance on the historical stage but was not seen as a permanent solution to the problem of telephone competition. From 1907 to 1918 telephone companies, users, regulators, and the courts considered and sometimes experimented with a telephone industry structure based on interconnection of competitors. They rejected it for four reasons. Those can be summarized as the parasitism argument, the complementarity argument, the compatibility argument, and the cost argument.

The *parasitism* argument, which could also be termed an *appropriability* argument, held that interconnection undermined the ability of larger networks to derive economic benefits from their larger scope. Small, “parasitical” networks could benefit from the widespread access created by the “host” network without shouldering any of the costs or risks of creating the access.

The *complementarity* argument held that interconnection of competing networks produced a relationship of interdependence rather than one of competition and substitution. To interconnect competing exchanges was tantamount to ending real system competition. Early experiences with interconnection of competing networks in the United States and Canada tended to confirm that observation. Users tended to gravitate toward one local exchange network while enjoying the benefits of the Bell toll lines.

Compatibility and control was one of the Bell system’s main concerns about a telephone network made up of interconnected competitors. A heterogeneous mass of competing networks would work against coordination and compatibility by making standardization of practices and equipment more difficult.

The *cost* argument held that interconnecting competing exchanges was an expensive proposition and, given the other three points, represented a needless duplication of facilities and labor relative to the option of consolidation.

Thus, by the mid-1920s, the model of universal service under regulated monopoly had been adopted uniformly as the proper structure for the telephone industry. From 1920 to the late 1960s, universal service, insofar as the term was used, meant a telephone system that covered the country and sacrificed access competition for the sake of unification of the service. It did not mean rate regulations that subsidized local telephone rates by using long-distance revenues. Universal service policy was not mentioned in or mandated by the 1934 Communications Act. State and federal regulators in that period did not conceive of the jurisdictional separations process as a means of subsidizing household telephone penetration.

The modern concept of universal service, which uses rate regulation to effect cross subsidies between various services and user groups, is in fact a very recent invention. The first hard evidence of proposals to use the separations and settlements process to lower local service rates can be found in the late 1960s. Those ideas were not fully realized until the implementation of the Ozark Plan in 1971. By that time household telephone penetration already stood at 80 to 85 percent. The attempt to promulgate an ideological linkage between universal telephone service and the separations and settlement procedures of regulated monopoly did not come until the mid-1970s. That alleged linkage was put forward by AT&T as part of its efforts to fend off long distance competition. In other words, it was inspired by contemporary policy battles and not by historical evidence.

That reinterpretation of the history of universal service was shown to have significant contemporary policy implications. Those can be summarized as follows.

First, the earlier definition of universal service, which stressed integration and unification of the service in order to realize the benefits of the so-called “network externality” (actually, demand-side economies of scope), is in many ways more relevant to the policy challenges of the next two decades than the latter conception of universal service as subsidized household penetration. The developing global information infrastructure is characterized by competing and often incompatible or imperfectly integrated technologies. Mandating compatibility can improve the lot of telecommunications users by creating demand-side economies of scope or by otherwise eliminating the frustrations and inconveniences of fragmentation and heterogeneity. But such a policy can also limit competition and technological diversity. Thus, the policy choices to be faced in the next two decades are quite similar to the debate over the unification of telephone service in the second decade of the 20th century. The major differences are that the debate will take place on a global scale rather than a national scale and that the increasing sophistication of information technology may soften the nature of the choice somewhat. At any rate, current antitrust law and theory does not provide much of a basis for making such a choice because its roots in the theory of natural monopoly only equip policymakers to respond to supply-side phenomena. Current antitrust doctrine gives us little guidance as to how to handle monopolies that originate in demand-side economies of scope.

A second area of policy relevance concerns the relationship between interconnection and network competition. Today’s policy analysts and theorists have oversimplified the relationship between unbundling, interconnection, and competition in telecommunications. The unbundling of network components and the interconnection of competing networks to the incumbent on

nondiscriminatory terms have been portrayed as unqualifiedly good things. That view was challenged on both theoretical and historical-empirical grounds. Networks are very large bundles of different services; they derive their value to users and their supply-side efficiencies from integrating services and components together. If bundling is what networks are all about, a regulatory doctrine that equates competition with unbundling is bound to find anticompetitive behavior everywhere and will be perpetually at war with the very basis of network efficiencies. Moreover, the doctrine of charging only incremental costs for interconnection makes it difficult for networks to profit from enlarging their scope and may actually penalize them for doing so.

The historical evidence supports those theoretical critiques. It shows that the refusal of the competing telephone networks to connect in the early 1900s actually promoted the achievement of universal service by giving both networks a strong incentive to enlarge their scope. Competition over the size of the bundle is, then, not necessarily a bad thing. At the very least, that analysis lends support to proposals to base interconnection prices upon opportunity costs rather than incremental costs alone. More fundamentally, it indicates that the deregulation of telecommunications must be based upon a property rights regime that allows networks to appropriate some of the value added by enlarging the size of their service bundle.

A third policy application concerns the demystification of regulated monopoly's claims regarding universal service. The role of regulated monopoly and rate subsidies in creating a universal infrastructure has been greatly exaggerated and deliberately so. Those invalid claims have distorted the policy dialogue for many years. The rate subsidies which are alleged to be so central to the development and maintenance of universal service in the United States did not even exist until after 1965, when household penetration already exceeded 80 percent. Access competition provided the real stimulus to create a geographically ubiquitous network. It also had created, by 1920, startlingly modern levels of telephone penetration in many parts of the country. If nothing else, this book should discredit, once and for all, the idea that competition and universality are fundamentally inimical.

The universality of communications access will always be a salient public policy issue. Debate over the nature of the telecommunications infrastructure – whether it should be fragmented or integrated, competitive or monopolistic, more or less subsidized – can only increase in importance as information technology occupies an ever-larger role in society. This book sheds light on the historical origins of that debate and in so doing, attempts to illuminate the contemporary debate as well.