

NOTES

1 INTRODUCTION

1. We decided against the commonly used terms “cost” and “benefit” because of their limiting economic undertones. Thereon, we looked for ones that would help us think afresh in two ways: by being free of thought-limiting baggage and by prompting a wide-angle view. We eventually settled on “gains” and “travails.”

As our use of “gain” is relatively straightforward, we will be spare and not belabor it. On the other hand, our use of “travail” calls for some discussion. Etymologically, “travail” comes to us from Latin via Old French. Its Latin root is “trepalium,” an instrument of torture—“tres” (three / tri) and “palus” (stake). Since then, it has acquired milder meanings (“travel” is also its descendant). In today’s French “travail” means work. In contemporary English, “travail” has a wider range of meanings: “physical or mental work, esp. of a painful or laborious nature; great effort or exertion; hardship, suffering; (now frequently in weakened use) trouble, difficulty” (Oxford English Dictionary Online, July 1, 2021). All in all, “travail” nicely satisfies both our considerations. It is an uncommon but familiar word and has almost no history of usage in policy research, at least as a term of art or anything even remotely approaching it. Further, in contemporary English, its range of meanings, all centered on some degree of suffering, help us maintain a wide angle on what the individual bears in return for universal access.

In other contexts, authors have talked of “travails of the American labor movement” (Cochran 1995, 466); “travails of a widow” (Onuegbu 2006, i); “travails of a progressive conservative” (Lurie 2012, iii); “travail of native Americans” (Weeks and Gidney 1981, iii); and “human travail of Russia” (Dawson 1945, iii). On our part, we talk of the travail of the individual. Among the domains we focus on, we have a rare essay by columnist Henry Mencken’s entitled “Travail” wherein he views the education system from the standpoint of the student. He starts his essay thus: “It always makes me melancholy to see the boys going to school. During the half hour before 9 o’clock they stagger through the square in front of my house in Baltimore with the

despondent air of New Yorkers coming up from the ferries to work . . . In the afternoon, coming home, they leap and spring like gazelles" (Mencken 1955, 182). In the rest of the essay, he reflects on why this is so, laying out various reasons: nature of tasks, rules, and teachers; lack of human-level respect and connection, genuine learning, and excitement. Our approach is similar to Mencken's in one important way and also different in an important way. We also endeavor to be comprehensive, laying out myriad aspects of travail. However, unlike Mencken, we do not pass a judgment. We only seek to fully understand. Further, Mencken does not delve into gains from education—it was not part of his project. We, on the other hand, delve also into the gains from the education and other systems, in the same comprehensive manner as the travails. We use "gains" and "travails" for their utilities explained above. However, we are not wedded to these particular terms. If the reader prefers to use substitute terms, in our estimation, it would not detract from our analysis. One possibility would be the approach in Jayakar (2017), where "costs" and "non-monetized costs" (e.g., psychological stress) are considered separately, as are "benefits" and "non-monetized benefits."

2. Here, we are reminded of William James's observation, made famous by Mary Douglas: what we consider to be "dirt" is essentially "matter out of place"—same particles on the ground outside the home would not be dirt (quoted in Douglas 1966, 165). She added: "Dirt offends against order. Eliminating it is not a negative movement, but a positive effort to organize the environment" (Douglas 1966, 2). In contrast, from the perspective of reversal, dirt presents an opportunity for a positive moment in a radically different sense—an invitation to interrogate the present order and discover other possible orders by center-staging it.

3. For the selection of such cases, Thomas identifies three routes: the local knowledge case (familiar to the researcher), the key case, and the outlier case.

4. Conceptually, "a node is a point in a network where two or more links intersect. A link is a path between these nodes" (Carlton and Klamer 1983, 450). Physically, a node could be a building (e.g., a post office or school) or a switching mechanism of some sort (e.g., a telephone switch or power substation). The connections between nodes could be provided by other systems (e.g., postal system-enabled interlibrary loans of books), or they could be integral to the system (e.g., long-distance telephone lines).

5. Ritchie, Lewis, and Elam (2003, 88) also have a third question for human subject-based studies: "Will the sample frame provide a sufficient number of potential participants to allow for high quality selection, particularly given that not all will be eligible or willing to participate in the study?"

6. REA also oversaw the expansion of rural telephony, often employing strategies that it had employed for rural electrification. Also, power-line telecommunications technologies use electricity distribution networks to transfer information.

7. More broadly, welfare initiatives are rarely entirely humanitarian endeavors (see Esping-Andersen 1998), something we overlook when it comes to universal access programs.

8. The degree by which the individual is beholden to the system varies, however, from case to case. In the case of telephony, the level of conscription is pretty high. Just consider how the ring of the telephone often trumps a conversation with copresent

others. Moreover, what seems like an instinctual picking-up of the telephone and starting a conversation is in reality a highly conditioned behavior, a product of much tutoring. Subscribers were taught to “place the telephone fairly against the ear,” “speak directly into the mouthpiece keeping the mustache out of the opening,” and follow the protocol wherein the caller signals end of conversation unless a man was calling one of the “second sex” (Fischer 1992, 70–71). On the other hand, in the case of public libraries, the level of conscription is very low. It is available as a community resource, but its actual use is pretty much up to the individual.

2 POSTAL SYSTEM

1. Behringer (2006) considers the Taxis service to be the first modern postal system on two counts. One, unlike earlier postal systems restricted to state-approved users, it was open to the public upon payment of a fee. Two, it operated on a regular schedule. Moreover, the contract between the Taxis and the Hapsburgs “laid down the basic terminological framework of the modern European postal system” (341).

2. William Blackstone, the author of the influential *Commentaries on the Law of England* (1765), characterized the postal service as “most eligible method . . . of raising money” (quoted in John 1995, 26).

3. In 1852, a Michigan congressman noted that over his twenty-five years of service, not one application for a new mail route had been turned down (John 1995).

4. US Postal Service, Free Delivery, http://about.usps.com/publications/pub100/pub100_018.htm (accessed March 25, 2016).

5. Some paid a private company to pick up their mail from the post office.

6. US Postal Service, Rural Free Delivery (RFD), http://about.usps.com/publications/pub100/pub100_020.htm (accessed March 25, 2016).

7. Some in rural America even felt that that the postage they paid was subsidizing the free postal delivery in the cities (Law 1996).

8. US Postal Service, Rural Free Delivery (RFD), http://about.usps.com/publications/pub100/pub100_020.htm (accessed March 25, 2016).

9. The skeptics included people in the post office, who had long opposed the expansion of postal service in rural areas on the grounds that it could never be self-supporting (Roper 1917).

10. Bissell continued to feel this way a decade later. In his estimation, the government had made a “great mistake” by introducing RFD. He anticipated the actual cost to far exceed the estimated one. Furthermore, he believed that it would increase the isolation of rural residents by reducing their in-person interaction with people in the nearby town—post office employees, country store owners, and their employees, and others (*New York Times* 1902b).

11. Gary was partly quoting a report of the Committee on Post Offices and Post Roads of the Fifty-Fourth Congress.

12. Patronage of all the residents of a service area was critical for the success of RFD. At times, rich residents’ reluctance was a problem. Since they owned automobiles, they did not see mail pickup at the post office as a burden (*New York Times* 1908a).

13. According to Heath, the value of farmland touched by RFD increased from \$2 per acre to \$3 per acre (*Grand Rapids Herald* 1899).

14. They also carried printed cards with more detailed information (*New York Times* 1901d). This lasted only a short while because around 1902, newspaper and telephone became the main channels for the dissemination of weather information (Law 1996).

15. The abovementioned gains of rural people were also gains of the system. For instance, farmers' time savings with RFD also increased the productivity of the overall economy. According to one estimate, the elimination of farmers' trips to the post office was worth millions of dollars in time saved (*New York Times* 1899). Similarly, the increase in the value of land increased tax collection, wider dissemination of prices increased the efficiency of the markets, and so on.

16. Beyond its wide-ranging metaphoric import, shedding light on myriad mechanisms of modern empire building, Carey's aphorism also had a very literal rendition. The British commonly named places after imperial surveyors. Most famously, the world's highest mountain, known as Sagarmāthā in Nepali, was named Mount Everest after George Everest, surveyor general of India.

17. Often, the local postmaster would also double up as a storeowner, or conversely, a storeowner would also serve as a mail pickup station.

18. The post office facilitated this by setting up special rates for deliveries weighing less than four pounds (helpful for provisioning items such as food, coffee, tobacco, and drugs). As Postmaster Robert Wynne explained, "the system by which these packages are to be delivered is already established, and such delivery would entail no additional expense upon the department" (*New York Times* 1904, 6). A similar logic was at play, when, in 1908, P. V. De Graw, an assistant postmaster general, recommended, in his annual report, an increase in the allowable parcel weight to eleven pounds, arguing: "It can be given with the facilities now employed and would materially increase the revenues of the department" (*New York Times* 1908b, 8).

19. In 1889, after a year of limited RFD service, Sears reported selling "four suits and a watch every minute, a buggy every ten minutes and a revolver every two minutes" (Law 1996, 102).

20. Before the start of parcel post, the post office could carry packages weighing only up to four pounds. For bigger packages, rural resident's choice was either the more expensive, quicker express companies or the much cheaper, slower railroads. But the railroads charged to carry a minimum of 100 pounds. To get the best out of these options, the mail-order companies encouraged customers to come together and aggregate their orders into one big one. Sears, in its catalog, told its customers: "So that in case you only have a small order and want it to come by freight, you could have some friend buy goods at the same time, send his orders with yours, and have both orders shipped in your name" (quoted in Kielbowicz 1994b, 97). In this pre-parcel post world, in 1911, Montgomery Ward shipped 82 percent of its orders via railroads and only 8 percent via mail (Kielbowicz 1994b).

21. The notion that connectivity is inherently good was conjoined with the notion that the circulation of information is inherently good. The Congregationalist minister Leonard Bacon in 1843 asked a profound question: Why was the government subsidizing the

circulation of newspapers and not Methodist circuit riders? (John 1995). Fundamentally, he was questioning the type of information that RFD would put into circulation. He feared that it would secularize society. The fact that RFD served as a conduit for the spread of consumer culture should give us reason for pause, whether we are for or against it. The deeper lesson for us is that we need to go beyond our preoccupation with the circulation of information and pay attention to the type of information in play.

22. The post office was also okay with the carriage of other periodicals, as they carried much less advertising than did magazines.

23. In 1928, RFD constituted one-seventh of the overall cost of the postal service but carried only one-sixtieth of the overall mail (*New York Times* 1924a).

24. They are expensive to create and maintain (i.e., their fixed cost is very high). But the marginal cost associated with each use is very low, even negligible for electronic systems. In the case of such systems, the allocation of fixed costs is the determinative factor. However, it is a matter of contention because there is no determinative rationale for cost allocation itself—there are myriad rationales. Furthermore, such systems are characterized by network externalities, wherein each node increases the overall value of the system, but in ways that elude quantification. In such a setting, myriad interpretations arise—each meritorious in its own ways. For instance, Postmaster General Frank Hitchcock's statement, in 1910, reported that RFD made a loss of \$28 million in the last fiscal year. Representative Sims of Tennessee took issue with this statement on two counts. One, the postmaster had not taken into account savings of \$5 million from the discontinuance of old services replaced by RFD, and also the closure of post offices made redundant by it. Two, the postmaster "credited the rural service only with the collection of mail made on the routes and not with any part of the mail delivered" (*New York Times* 1910a, 2). The latter point is particularly noteworthy for our analytical exercise, as Representative Sims was criticizing the post office for overlooking the gain to the system—namely, the delivery of newspapers, magazines, mail-order packages, and other items to rural homes.

25. While this dispute produced travails for the system, for our analytic purposes, it is important to note that the argument was about who was making unfair profits. The fact that profits were being debated at all is more important than who was making them. Either way, though, they constituted gains for the system.

26. A *New York Times* article on the negative impacts of RFD on rural businesses complained: "The individual chiefly concerned is the farmer, and he has benefited" (*New York Times* 1902e, 5).

27. In fact, James Cowles, founder of the Postal Progress League, explicitly said of parcel post: "It will tend to make the whole United States one great city, within which our various transportation agencies will move to and fro like a weaver's shuttle, weaving a web of ever increasing concord and prosperity" (2012, 237).

3 EDUCATION

1. Educational institutions are also sorting mechanisms that reproduce and reinforce social stratification (Arboleda 1981; Birenbaum 1971; Lavin, Alba, and Silberstein 1981; Ornstein 1974; Rossman et al. 1975; Schrag 1971; Willingham 1970).

2. The 1563 law transferred to the state functions that earlier had been performed by guilds (e.g., wage-setting, training). The 1601 law provided monies for basic support of the poor and required them to be trained in a trade (Kotin and Aikman 1980).
3. Rhode Island's religious heterogeneity deterred finding a consensus on education (Kotin and Aikman 1980).
4. Our understanding of what constitutes adequate education changes over time, often expressed in terms of "the provision of educational opportunity which is needed in the contemporary setting to equip a child for his role as a citizen and a competitor in the labor market" (Wise 1983, 301).
5. The 1648 amendment specified that students be taught to read perfectly (Kotin and Aikman 1980).
6. The New Haven Colony, established in 1638, was merged with the Connecticut Colony in 1665.
7. In this period, four major factors undermined universal education. One, increasing conflict between the colonial legislatures and British imperial authorities often led to the repealing of laws. Two, economic hardship was created by the Indian wars. Three, increasing geographic spread of the population made enforcement difficult, and at the same time, the need for labor in frontier settlements increased the opportunity cost of education. Four, there was a decline in motivation to teach Scripture to children, corresponding with the decline in the importance of religion (Kotin and Aikman 1980).
8. In effect, universal suffrage would be meaningless without universal education (Adams 1875; Boone 1889; Carlton 1906).
9. The founders, concerned with the fragilities of the newly born country, saw universal education as a vehicle for perfecting the union (Messerli 1967). For instance, in 1786 Benjamin Rush wrote of "producing one general and uniform system of education" that would "render the mass of the people more homogeneous and thereby fit them more easily for uniform and peaceable government" (Rush 1965, 10). George Washington carried this theme into his will, where he expressed a desire "to see a plan devised on a liberal scale which would have a tendency to spread systematic ideas through all parts of the rising Empire, thereby to do away local attachments and state prejudices" (Thomas 1967, 3).
10. All education systems are marked by a tension between "the good of society" and "the good of the individual" (Rudolph 1965, xv). The founders were biased toward the former.
11. More than a century later, Chief Justice William Brennan even talked about "the economic function (of the education system in) keeping children of certain ages off the labor market and in school" (*Wisconsin v. Yoder* 1972).
12. It echoed Benjamin Rush's argument in 1786 that education was necessary for making citizens "republican machines." In 1849, supporters of New York's 1849 School Law also echoed this point: "We hold, therefore, that our present school tax is not imposed on the rich for the benefit of the poor; but imposed on the whole State for the benefit of the State" (Carlton 1906, 48–49).

13. Thaddeus Stevens, U.S. representative from Pennsylvania, pointedly noted that people paid taxes for jails even when they did not use them (Stevens 1964).

14. In effect, people of this belief reject the notion that education is a public good. In a striking contrast, advocating for universal education, Strong (1963, 99) said: "Why does the state take money from your pocket to educate my child? Not on the ground that an education is a good thing for him, but on the ground that his ignorance would be dangerous for the state." In this formulation, the benefit that accrues to the individual is rendered only incidental. The rich pay taxes for universal education not for the benefit of the disadvantaged children but for themselves, as their education is important for the society as a whole, bringing about productivity gains and the reduction of problems such as poverty, intemperance, and social unrest (Carlton 1906).

15. Has centralization increased? For many conservatives, the establishment of the US Department of Education in 1979 epitomizes centralization. But then, the US continues to have more than 3,000 school districts that jealously guard their local autonomy. The reality is perhaps quite complex, as increased centralization does not necessarily mean that the system is centralized.

16. Benjamin Peers, the author of a mid-nineteenth-century tract advocating universal education, warned: "In a society where everyman may do pretty much as he pleases, it is of the utmost importance that its members be so educated that they shall choose to do right" (Jackson 1941, 66).

17. Jackson (1941) summed up the importance of universal education from the standpoint of the body politic as follows: "The American experiment, basically desirable and an improvement over anything previously known, yet bore seeds of destruction whose shoots could be held within bounds only by education. Of them, universal suffrage was the most obvious" (65).

18. In the 1960s and 1970s, homeschooling was against the law and largely confined to hippies and back-to-the-landers, involving about 10,000 to 15,000 children. Only later, in 1993, did it become legal in all fifty states (Heidenry 2011). Today, the practitioners of homeschooling are largely religious-minded parents, who like the hippies and back-to-the-landers want to keep their children out of the system-administered public schools. The latest available statistics, for 2016, show that 1.67 million children are presently being homeschooled (National Center for Education Statistics 2018).

19. On the production of industrial workers, the French engineer-sociologist Frédéric Le Play memorably said, "The most important product of The Mines is The Miner" (Schrage 2000, 13).

20. Wayland is basically talking about "network externality," a term typically not used in education. It, however, is noteworthy for us, as our project includes many systems wherein network externality is a major issue.

21. On the administration of aptitude tests, the military found that twice as many persons had the capacity to attend college than those actually enrolled (Bowles 1966; Munday and Rever 1971; Willingham 1970). Furthermore, after the war, studies

indicated that the increased taxes paid by the beneficiaries of the G.I. Bill exceeded the cost of the program. In effect, the taxpayer incurred no net cost for the education provided to veterans via the G.I. Bill (Educational Policies Commission 1964). These war-related experiences set the stage for the subsequent discussion.

22. The anti-elitist atmosphere of the 1960s and 1970s energized activists to push for universal access to higher education. However, in marked contrast to the earlier expansion of universal education, a knotty question arose: Should the beneficiary of taxpayer largess have the talent required to make good use of it? Scholars, who see the education system as a sorting mechanism that perpetuates social inequities, argue that the focus should not be on picking winners, but on cultivating the maximum potential of every student who enters higher education (Karabel 1972; Rossman et al. 1975). With such a philosophy, the City University of New York offered admission to all students who ranked in the top half of their graduating class and also directed its efforts toward remedial programs for weaker students (Lavin et al. 1981). On the other hand, California created a three-tiered higher education program, with the University of California system for the top eighth of high school graduates, the California State University system for the top third, and community colleges for all high school graduates. Within this tiered system, it offered opportunities for upward mobility (Jaffe and Adams 1972).

23. While there has been much talk of providing tuition-free access to two years of college since the publication in 1947 of the President's Commission on Higher Education report *Higher Education for American Democracy*, little headway has been made over the last several decades.

24. It offered a last-dollar scholarship, wherein students applied for federal student aid (e.g., Pell Grants) and Tennessee covered the shortfall (Kelderman 2014; Pérez-Peña 2014; Semuels 2015).

25. This line of thinking persists. Half a century later, in 1896, Woodrow Wilson, when president of Princeton University, said at the university's sesquicentennial: "The object of education is not merely to draw out the powers of the individual mind: It is rather its right object to draw all minds to a proper adjustment to the physical and social world in which they are to have their life and their development: to enlighten, strengthen and make fit" (Kolowich 2016, A28).

4 ELECTRIFICATION

1. Describing the dramatic contrast between electrified towns and the nonelectrified rural areas, Marvin (1988, 164), writes: "When a small Illinois town installed electric lights, outlying farmers observing the glow were convinced that the town was on fire, and raced in their wagons to help."

2. Edison was the first to conceive of the electric utility model, seeing the future of the sale of electricity generated from a central power plant. J. P. Morgan, the largest stockholder of Edison Electric Illuminating Company, wanted Edison to focus on the manufacture and sale of electric appliances. With regard to central power plants, Morgan thought that they were too expensive and were not good business

from a profitability standpoint. Eventually, Edison invested his own money and pressed forward with central power plants (Rudolph and Ridley 1986). Interestingly, in the case of radio as well, Westinghouse and other companies saw business opportunities mainly in the sale of radio equipment at first, only later realizing that broadcasting by itself could be a business (Davis 1930; Douglas 1987b).

3. Marvin (1988, 18) thus retells the story of Edison soliciting a millionaire for the provision of electric lights for his house: “During the conversation, the millionaire asked whether Edison could install an electric motor to run the steam engine that operated his passenger elevator.”

4. According to Hughes’s conceptualization, the network development process has five phases: (1) the invention and development of a system (with inventor-entrepreneurs playing a dominant role); (2) the transfer of technology from one region and society to another; (3) the scaling-up of the network and the emergence and resolution of critical problems or reverse salients (with researchers and engineers playing a dominant role); (4) the system acquiring momentum (with managers playing a central role); and (5) qualitative change taking place in critical problems in technical and organizational areas (with the rise of financiers and consulting engineers).

5. Even here, they were concerned that few farming activities required continuous supply of electricity over the entire year—that is, across seasons (Meinig 2004).

6. Sad irons (metal plates heated on stoves) were precursors of electric irons.

7. *Oxford Dictionaries* (Lexico, <https://www.lexico.com/en/definition/sad>, accessed August 1, 2019). We would like to thank an anonymous reviewer for an edifying comment on the etymology of “sad.”

8. He became the first administrator of the REA.

9. Morris Cooke never bought into the math employed by the utilities to estimate the cost of providing electricity to rural areas. The variance in the calculations of different utilities deepened his suspicion. For instance, an Illinois Commerce Commission study found that estimates of different utilities for the material costs of rural electrification ranged, for no clear reason, from \$365 to \$1,000 per mile. Similarly, the costs of labor, capital, insurance, overhead, and transportation varied, with final costs ranging from \$500 to \$2,000 per mile (*Electrical World* 1931). Such studies suggested that “there can be no strict allocation of costs. It is all a matter of judgment and experts differ” (Burrill 1931, 697). Moreover, he felt that technological advances had changed the economics of electricity distribution. In the 1890s, electricity was basically used for lighting in the evening. Here, the utilities had to recover their costs over a short period of time, resulting in high rates. Since then, applications of electricity proliferated, flattening the demand curve over the day. Cooke argued that an increase in quantum of demand and its flattened pattern had changed the cost structure. With these changed parameters, he argued, we need to rethink the fundamental assumptions and the methods for estimating costs (Childs 1974). Essentially, Cooke put his finger on the slippery assumptions that plague cost allocations in networked infrastructures, wherein high fixed costs need to be recovered somehow, and there are many different ways of doing so.

10. Later, REA also engaged in the development of rural telephony. In 1949, Congress amended the Rural Electrification Act to authorize REA to advance loans for the development of rural telephony (Rural Electrification Administration 1990).

11. At first, REA provided loans at a rate that covered the government's cost, fluctuating with the market. In 1944, REA fixed the rate at 2 percent, the cost incurred by the government. Later, when the interest rate rose in capital markets, the government started subsidizing REA loans. REA maintained the 2 percent rate until 1972, even though the government's cost had hovered at over 5 percent for several years (reaching a high of 5.986 percent in 1970). Even in 1973, when interest rates started fluctuating again, REA borrowers were charged subsidized interest rates—3.72 percent, with the cost to government being 6.129 percent. Such subsidies continued over the years. For instance, a decade later, in 1983, the rate was 4.90 percent and the cost to the government was 10.850 percent (Rural Electrification Administration 1990).

12. Among other things, REA offered promotional rate schedules, wherein per-unit costs decreased with increased consumption (Cooke 1935).

13. In the case of refrigerators, such efforts brought down costs by 20–25 percent (Christie 1983).

14. When the area coverage approach started showing success, the utilities sought to stymie its spread to new areas by building so-called spite lines. Their intent and calculation were as follows:

The pattern was fairly uniform. Here is a small cooperative in a moderately prosperous rural community. The plans for the project submitted to Washington provide for about 26 miles of lines to serve only about 100 members. The local power company hears that the line is about to be approved. Promptly the company drives a seven-mile power line through the middle of the project. In this way it picks up 35 of the cooperative's best prospective customers. Without these 35 customers the project is not practicable. Consequently REA is forced to refuse the loan. Then the 65 other farm households come to the company with the request to be hooked up, too. And the company replies that it is not profitable to serve any others than those already on the compact seven-mile line. Therefore, 65 households that might have had electricity are forced to go without it (Childs 1974, 50).

After the construction of a spite line, if the community still made an effort to create a cooperative, the utility tied it up in the courts, as REA was prohibited by law from engaging in areas already served by a private company (Childs 1974).

15. Initially, many people in rural areas were also bewildered by electricity. For instance, in Iowa, a local newspaper wondered whether cows would know when to sleep after the introduction of electric light, writing: "Is there a town over the broad earth where cows run loose under electric lights?" (quoted in Marvin 1988, 119).

16. Interestingly, rural mail service was also expected to stanch the depopulation of rural areas (Roper 1917). See our discussion of this in chapter 2.

17. Electricity was also expected to make small, noncash-crop farms viable, diversifying agriculture (Deutsch 1944).

18. Some even felt that at least one male child should stay on the farm (*Rural Electrification News* 1936a).

19. See steps 1 and 2 in figure 1.2.
20. See step 3 in figure 1.2.
21. There were many signs of latent demand in rural areas. Farmers were using their automobiles as sources of stationary power for turning farm machinery, powering sawmills, pumping water, and myriad other applications. Its wide-ranging use inspired a poem with the opening line: “The auto on the farm arose / Before dawn at four. / It milked the cows and washed the clothes / And finished every chore” (quoted in Kline 2000, 74). Some farmers even tapped into electric power lines for interurban trolleys if they passed through the area near their farm (Kline 2000).
22. Handwritten note by John Carmody, John Carmody’s papers, Franklin D. Roosevelt Presidential Library, available at <http://newdeal.feri.org/tva/tva13.htm> (accessed May 1, 2017).
23. Electricity did enhance the rural economy in a number of areas, including canneries, cotton gins, flour and other mills, grain elevators, sawmills, stockyards, and lumber mills (Slattery 1940). But the impact was not as grand as imagined and certainly was inadequate to compensate for other factors that contributed to the depopulation of rural areas.
24. Similarly, Lilienthal (1939) argued, “Electricity is a flexible and mobile force. It can move out, coursing over transmission networks, to seek the worker at the forest, the quarry, and the mine” (58–59).
25. The difference between the nodal and relational perspectives comes out particularly strongly in the contrasting neologisms coined in the US and France in the late 1970s for the then-emerging phenomenon of networked computing—communications and telematics, respectively. The American neologism focused on the computer, the node, whereas the French neologism focused on telecommunications, the connections between nodes (Bell 1980). This difference is significant. The strong suit of the US is computers, which is foregrounded in communications. The French, seeking to stem American dominance, figured that they faced a far more uphill battle in the realm of computers than that of telecommunications, where governments play a critical role and can use “their trump card, which is to decree” (Nora and Minc 1980, 7). They strategically chose to focus on telecommunications instead.

5 TELEPHONY

1. Interestingly, in this emerging landscape, Claude Shannon, the originator of information theory, as a child in a small community in Michigan in the 1920s, jerry-rigged a barbwire-based line to his friend a half-mile away, which they used to send each other telegraph messages in Morse code. We would like to thank an anonymous reviewer for sharing with us this bit of history and directing us to Gleick (2012).
2. Bell maintained the telephones, and the purchaser bought and installed the wires. The charge for each additional phone was \$10 per year (Brock 1981, Brooks 1976).
3. Western Union expanded faster—it had much deeper pockets. It also secured competitive advantage by threatening to deny telegraph service to establishments

(e.g., newspapers and hotels) that procured telephone service from its rival (Brock 1981).

4. In 1883, Bell asked its affiliates in a survey: “Is it desirable and what would be the most practical way, to provide a service which would be in the reach of families, etc.?” (Fischer 1992, 41). We see here that Bell was not sure whether residential service was “desirable” in urban areas, and service in rural areas was not even a consideration.

5. The first key Bell patent expired in 1893 and the second one in 1894 (Brock 1981).

6. In Indianapolis and Toledo, Ohio, the independents charged as low as half Bell’s rate (Brooks 1976).

7. The independents did try to cooperate and build their own long-distance network, but their efforts petered out.

8. Independents’ integration with the Bell-centric system was tightened when the government took over both the telephone and telegraph systems in 1918 as a war measure. President Woodrow Wilson’s proclamation decreed control of “each and every telegraph and telephone system, and every part thereof, within the jurisdiction of the United States, including all equipment thereof and appurtenances thereto” (Brook 1976, 151). The post office appointed a unified Wire Control Board, which in turn appointed and oversaw a telephone and telegraph operating board. Among other things, the government benefited the industry by instituting price increases, which the industry was unable to do on its own. Moreover, “the wartime experience of coordination between AT&T and the independents accelerated the unification of the industry” (Fischer 1992, 50). The control reverted to the private companies in 1919, about nine months after the end of World War 1 (Brooks 1976).

9. The US Census Bureau started collecting data on households with telephone service in 1920 (Bureau of the Census 1976).

10. To expand coverage further in rural areas, in 1949, the US Congress amended the Rural Electrification Act of 1936 and authorized the Rural Electrification Administration (REA) to issue loans and provide advisory services for rural telephony.

11. The data on the users was as follows: wives (60 percent), husbands (23 percent), and others (17 percent).

12. In 1901, the *Washington Press*, published in Iowa, wrote:

We are glad to see ‘phones threading country air as thick as gossamer in October skies . . . for these are wholesome, healthy nerves keeping the country population in vital touch with the rest of the world. Social force is good tonic (Atwood 1984, 82).

This was clearly an overstatement. While less poetic than “gossamer in October skies,” the proponent’s instrumental expectation that the telephone would help resolve the “rural problem” was no less sublime (Brooks 1976; Carey 1989). The reality is that connectivity is a double-edged sword, something we, enthralled with technology, tend to forget. This is very evident in the story of rural telephony.

13. See steps 1 and 2 in figure 1.2.

14. See step 3 in figure 1.2.

15. If there was a unifying point, it was the independents' opposition to the "octopus Bell." On this front, they underestimated the complexities of scaling up their own networks, the competitive advantage that Bell acquired with its long-distance network, and the difficulties of coming together and creating an alternative to Bell's long-distance network.

6 PUBLIC LIBRARIES

1. The Scoville Memorial Library, <https://connecticuthistory.org/the-scoville-memorial-library/> (accessed October 11, 2018)

2. Peterborough Town Library, <http://peterboroughtownlibrary.org/history-and-renovation-9330/location/peterborough> (accessed October 11, 2018).

3. Wayland Free Public Library, <https://waylandlibrary.org/aboutus/about-wpl/history/> (accessed October 11, 2018).

4. Wayland was the benefactor of the abovementioned \$500 gift for the establishment of the public library in Wayland, Massachusetts.

5. In 1876, this threshold of 300 volumes was important for differentiating substantive libraries from those that were libraries in name only. For instance, in the midnineteenth century, Indiana and Michigan mandated that communities establish township libraries. Consequently, during the 1840s and 1850s, communities established nearly 1,600 township libraries in the two states—but nearly all of them fizzled out; only 81 attained the stature of a public library (Kevane and Sundstrom 2014).

6. American Library Association, Number of Libraries in the United States, <https://libguides.ala.org/numberoflibraries> (accessed June 13, 2019).

7. For his part, Carnegie, a rigidly moralistic individual inspired by writings on social Darwinism, sought "to give the 'best and most aspiring poor' the opportunity to improve; the not so good and less aspiring be damned" (Harris 1975, 15).

8. It was also in this spirit of Americanization, many years later, that the American Library Association created the Committee on Work with the Foreign Born.

9. The state averages range from 0.6 miles in the District of Columbia (technically a federal district) to 7.3 miles in Arkansas, which is an outlier—the figure for Montana, the state with the second-biggest average distance, is 4.2 miles (Donnelly 2015).

10. Schmitz, Rogers, Phillips, and Paschal (1995) report how discussions, which included participation from the homeless, on Santa Monica's Public Electronic Network (PEN) gave rise to the SHWASHLOCK (Showers, WASHers & LOCKers) project for the provision of showers, washers, lockers, and access to a laundromat for the homeless.

11. The public library's engagement with social work, a responsibility of other institutions, is controversial. For our part, we are not praising or criticizing libraries for this work. Our approach is agnostic and forensic. We just chart all the gains and travails to the individual and the system stemming from the public library, the way that they exist and function in the world.

12. See the unnumbered table on page 15 of the Pew report for the corresponding percentages for females, non-Hispanic whites, parental status, geographical location, and various age, income, and education groups.
13. The library, unlike education, does not come under the purview of truancy laws requiring compulsory attendance. This is one reason why the libraries have not elicited deep criticism, such as Michel Foucault's critiques of schools.
14. See Knuth (2003) for another library-related project that moves the focus from the individual to the system. In this project, Knuth seeks a fuller account of why we periodically see large-scale destruction of books and libraries. After describing "book burning" during Britain's Protestant Reformation and the French Revolution, she observes: "Bibliophiles quail at such daunting figures, while those who believe that book destruction can be positive point out that the reform activities weren't entirely antagonistic to the cause of libraries. As a result of forced dissolution, private and religious collections often became the property of the state and, ultimately, more accessible to the general public" (Knuth 2003, 24). For example, France used the eight million books confiscated by the revolutionaries to form a network of municipal libraries.
15. This survey was of residents of communities with populations of 300,000 or fewer.
16. Critics tend to undervalue the educational, communal, and uplifting role that public libraries can play for people from different walks of life. This might take different forms and shapes, but it is hard to dispute its *potential* for engagement and empowerment.
17. See steps 1 and 2, figure 1.2.
18. See step 3, figure 1.2.
19. See McNeely and Wolverton (2008) and Vaidhyanathan (2009) for other approaches for reenvisioning the public library.

7 BROADCASTING

1. We take the term "un-order" from Kurtz and Snowden (2003, 465), who explain it as follows:

Un-order is not the lack of order, but a different kind of order, one not often considered but just as legitimate in its own way. Here we deliberately use the prefix "un-" not in its standard sense as "opposite of" but in the less common sense of conveying a paradox, connoting two things that are different but in another sense the same. Bram Stoker used this meaning to great effect in 1897 with the word "undead," which means neither dead nor alive but something similar to both and different from both.

2. When the history of broadcasting is evoked, it is used to argue against the need for policy intervention to further universal access. The argument here is that occurrence of gaps is a natural outcome of differences in wealth, income, age, education, and other such factors. Moreover, such gaps are transitory, since they will disappear as the prices decline with mass production and technological advances. In effect, there is no need for policy intervention. As also noted in chapter 8, on the internet, this argument was memorably cast when Michael Powell, then-chairman of the

Federal Communications Commission (FCC), compared the “digital divide” to a “Mercedes divide” (*Washington Post* 2001).

In this view, universal access policies are relics of the telephony history. According to Compaine (2001b), “notions of the federal government being responsible for providing digital access to all Americans is therefore derived as an extension of the ‘telephone gap’ of the 1930s” (102). In a world of an ever-accelerating pace of technological change, it is no longer relevant. In fact, Browning (1996) issued a call to “bury universal service—to bury it slowly, gently, and with great care to preserve both its spirit and its many achievements.”

3. KDKA was not the first broadcasting station per se. Amateurs were already commonly broadcasting messages, announcements, and music, among other things (Douglas 1986, 1987b). If the criterion for qualifying as a “station” is scheduled broadcasts, there were numerous such stations before KDKA came on the air (Davis 1930; Douglas 1987a; Hijjiya 1992). The importance of KDKA lies in that it was the first broadcasting station established by a major corporation, Westinghouse. The story of its birth starts with a senior Westinghouse executive, Harry Davis, noticing that a company employee, Frank Conrad, an amateur radio broadcaster of “concerts,” was featured in a department store’s newspaper advertisements for radio sets (Barnouw 1966; Davis 1930; Sterling and Kittross 1990. This sparked Davis to see the business potential of broadcasting, and the rest is history.

4. The region names here refer to those of the US Census.

5. For instance, in 1928, while New York City, Chicago, and Los Angeles had twenty-eight, thirty-six, and twenty-four radio stations, respectively, Atlanta had only three and New Orleans only seven (Craig 2004a). Rural America, where 44 percent of Americans resided in 1928, had poor or no service—the entire state of South Carolina had only two radio stations (Craig 2004a).

6. During the Great Migration between 1910 and 1970, about six million Blacks left the South (US Census Bureau 2012). In the decade discussed here, 1930–1940, about 400,000 Blacks left the South (Gregory 2005). Migrants had increased access to public spaces, including ones that provided access to radio (see Grossman 1991 for an in-depth examination of increased access to public spaces in Chicago).

7. The corresponding figures expressed in inflation-adjusted 2022 dollars are \$33,915 and \$1,343, respectively.

8. Listeners of such “crystal sets,” which were batteryless, had to use headsets (Vaillant 2002a, 62).

9. Similarly, in Nazi-occupied France, radio was the last thing that the French sold for food and other necessities of life (Vaillant 2017).

10. The farmers’ efforts to acquire receiver sets were aided by the industry, which offered installment plans (Compaine 2001a).

11. Moreover, radios could be accessed in the homes of friends and relatives or in public places (Craig 2004a). This further reduced pressure for public policy intervention.

12. It has now spread to other countries, including the UK and Canada (Ali 2016).
13. The Radio Act of 1927, Public Law No. 632, February 23, 1927, 69th Congress, <https://www.americanradiohistory.com/Archive-FCC/Federal%20Radio%20Act%201927.pdf> (accessed July 28, 2012).
14. March 28, 1928, 70th Congress, S. 2317, Public Law No. 195, Section 5 (amendment to the second paragraph of section 9 of the Radio Act of 1927), <http://www.loc.gov/law/help/statutes-at-large/70th-congress/session-1/c70s1ch263.pdf> (accessed July 28, 2019).
15. Interestingly, in the then–newly formed Soviet Union, we find an edifying contrast. Vladimir Lenin, who pushed his scientists and engineers to develop radio, wrote to his point person in 1920: “The newspaper without paper and ‘without distances’ which you are creating will be a great thing. I promise to give you any and every assistance in this and similar projects” (Guback and Hill 1972, 11–12). He wanted a powerful transmitter in Moscow that could serve a radius of 1,300 miles. In a 1921 note to a senior official, he envisioned that over a powerful transmitter, “all Russia will hear a newspaper read in Moscow” (Guback and Hill 1972, 16).
16. They included companies such as RCA, Westinghouse, AT&T, and General Electric (GE).
17. In particular, for those invested in local broadcasting, the very notion of national stations was anathema (Messere 2005).
18. The Communications Act of 1934 created the FCC, which replaced the FRC for radio regulation, and took over the regulation of wire communications from the Interstate Commerce Commission.
19. In the first instance of network broadcasting, on October 28, 1922, Westinghouse and AT&T used long-distance telephone lines to broadcast a University of Chicago–Princeton University football game in Chicago to other parts of the country (Banning 1946; Socolow 2001). In January 1923, WNAC in Boston transmitted a five-minute saxophone solo over telephone lines to WEAJ in New York. A few months later, WEAJ and WMAJ in Dartmouth, Massachusetts, established a permanent (i.e., nonoccasional) network (Sterling and Kittross 1990). NBC and CBS were established in 1926 and 1927, respectively (Craig 2010a). In 1927, the two networks together had 6.4 percent of stations. Four years later, the corresponding figure was 30 percent (McChesney 1993). In effect, network broadcasting was building up when the Radio Act of 1927 was passed. But its true significance was not understood at that point in time.
20. From an advertiser’s standpoint, a network offered great efficiencies. Instead of contracting with myriad radio stations and then monitoring whether the advertisements were actually run in all the different markets, all the advertiser had to do was to contract with a network (Horwitz 1989; Kirkpatrick 2006; Socolow 2001; Streeter 1996).
21. In the networked world, localism has become decoupled from locality (i.e., it is no longer anchored in geography). In the case of news, Ali (2016) asks: “Is local news, for instance, specific to an immediate geographic locality? Is it news that is of interest to the local population? Or is it news produced within the locality? In other words, what should ‘count’ as local?” (107). In this context, the debate has

pitted “spatial localism” against “social localism,” with the former centered on a place and the latter on a commonality of interests—which is not necessarily limited to the people of a locality. For instance, aboriginal producers want to be thought of as “local broadcasters” even though their networks span thousands of miles (Ali 2016). As Jean LaRose, the chief executive officer of the Aboriginal Peoples Television Network (APTN) in Canada, explained to her nation’s parliament: “This is a different way of looking at local programming. Programming that reflects Nunavut and Nunavik is local, from our point of view, even though the communities it serves are spread out over a region that represents a large percentage of Canada’s land mass” (Ali 2016, 121).

22. On the fourth anniversary of KDKA’s broadcast of the Harding-Cox election results, the *New York Times* (1924b, 6) wrote: “Today, when radio broadcasting is so much a part of our national life, the crude methods of four years ago and its limited application seem to belong to another century.” In a nutshell, radio became part of the national scene in three to four years.

23. Educators founded the Association of College and University Broadcasting Stations (ACUBS) in 1925, saying in its constitution:

Believing that radio is in its very nature one of the most important factors in our national and international welfare, we, the representatives of institutions of higher learning, engaged in educational broadcasting, do associate ourselves together to promote, by mutual cooperation and united effort, the dissemination of knowledge to the end that both the technical and educational feature of broadcasting may be extended to all. (Saettler 1990, 216)

The ACUBS later became the National Association of Educational Broadcasters (NAEB), a forebear of the Public Broadcasting Service (PBS) and National Public Radio (NPR).

24. First, the FCC put in place programming guidelines that specified that renewal of licenses of stations with less than 5 percent of airtime devoted to local programming would be subject to review. In 1984, it withdrew these guidelines because they turned out to be ineffective. In the same vein, the FCC first stipulated that cable operators with more than 3,500 subscribers could carry TV programs only if they had local facilities for program production. In 1974, it rescinded this requirement because the local origination programming so produced had an extremely small audience, saying that “mandatory origination scheme is not likely to be the most effective means of fostering local expression programming” (Napoli 2001, 212). But then, a little over a decade later, it instituted Main Studio and Program Origination Rules, which required radio and TV stations to (1) maintain a studio, with full-time management and staff, in the principal community of their licensed service area; and (2) originate more than 50 percent of their nonnetwork programs from the said studio or nearby ancillary facilities (Braman 2007; Napoli 2001). Once again, the FCC concluded that this requirement was not productive. In 2017, it eliminated the principal community studio requirement. Now, as noted earlier, broadcasters basically only need to have a local or toll-free number (Feldman 2017).

25. Jerome Barron (1967), who provides an intellectual articulation of such bottom-up efforts, argues that the First Amendment should not apply only to utterances already made, as this creates an asymmetry by protecting the speech of those who

can speak, but without giving voice to those lacking resources. He holds that the right to access is implicit in the First Amendment, and public policy should provide the means for its exercise. Further, while the utterance-oriented interpretation of the First Amendment was understandable when it was ratified, given that newspapers then were small, local, and accessible to the citizens, with regard to our mediatized world, writing in the pre-internet era, Barron asks: What about those who do not get an opportunity to speak via the media at a time when standing on a soapbox to give a speech is no longer effective for public discussion?

26. Further, unlike public television, where financial contributions are earnestly sought, there is no such need for public access television because it is funded directly as part of franchise terms.

27. Interestingly, since the turn of the century, low-power FM (LPFM) activists have sought to provide a corrective. LPFM was a pirate activity until 2000, when the FCC established it as a new class of radio station. Now, the US has about 2,200 LPFM stations (National Archives and Records Administration 2020). They are limited to noncommercial broadcasting and 100 watts of power—giving a service range of about a 3.5-mile radius (FCC n.d.). The activists see LPFM, a community-scale technology, as a vehicle for cultivating the particularities of the local, in marked contrast to the global-scale internet (Dunbar-Hester 2014).

28. Even corporate executives believed that radio advertisements would be too intrusive because, unlike newspaper and magazine advertisements, they could not be avoided. In effect, a stranger's voice would be coming into a house uninvited and making a sales pitch.

29. He was the founder of Henry Field Seed Company, a catalog mail-order business, and the star on-air personality on the broadcasts of KFNF, the radio station he set-up on the top of his premises.

30. The success of KFNF inspired other Iowa stations to follow suit. Iowa, with the nation's principal direct selling stations, itself became the center of controversy (St. Austell 1928).

31. It included a daily news digest prepared by the US Department of Agriculture (USDA), which since the early 1920s has promoted radio ownership by farmers and worked with broadcasters to provide agriculture-oriented, specialized programs. By 1928, USDA's radio service was producing its own programs in script form, which it provided to interested broadcasters free of charge (Craig 2009a, 2009b, 2010a).

32. In 1924, Sears, Roebuck & Co. established WLS (which stood for "World's Largest Store"), which launched the careers of music and comedy superstars such as Bradley Kincaid, Gene Autry, Pat Buttram, George Gobel, and Patsy Montana (Barron 1997; PBS n.d.).

33. In 1922, *Country Life* magazine carried an article entitled "Removing the Last Objection to Living in the Country." The "last objection" here was a stand-in for rural isolation, whose removal would be the grant of a new technology that was an "adaptation of the wireless to a form in which anybody . . . can use the wireless and at a price within the reach of even the most modest purse" (*Country Life* 1922, 63).

34. There were also many small and telling changes. For instance, instead of being addressed as “Ladies and Gentlemen,” the members of the audience were addressed as “Friends” (Kirkpatrick 2006).
35. The *National Barn Dance*, discussed earlier, was also trans-local.
36. In fact, many local stations broadcast church services for shut-ins (Vaillant 2002a).
37. The 1920 census showed that more than half of the US population (51.2 percent) was living in urban areas at that time.
38. Conversely, if the system that thus emerged did not accord with the interests of the powers that be, the zero-tolerance policy for interference would not have had the centrality that it had in the formation of the American broadcasting system. Other organizing principles would have been in play as well.
39. Local radio stations often voluntarily organized weekly “silent nights,” when they all refrained from broadcasting so that their listeners could pick up faint signals from distant places (Kirkpatrick 2011, 256).
40. We would like to thank Kevin Howley for an edifying discussion on the genesis of the present-day German broadcasting system.
41. Initially, policymakers relied on telegraph analogs and precedents for their decision-making on radio-related issues. With the emergence of broadcasting, these policymakers needed a new approach, but they struggled because they could not find a good analog for it. Eventually, they settle on the PICON (“public interest, convenience and necessity”) standard, which had long been used for the regulation of common carriers and public utilities, because it was broad and flexible (Krasnow and Goodman 1998; Sawhney et al. 2010). The FRC cast this broad and flexible (but also vague) language in ways that furthered the advancement of networks over independent local radio stations (see Vaillant 2002a for specific examples).
42. Many nonprofits could not even afford the expense of defending their licenses before the FRC in Washington, DC, which they had to do every three months. Commercial broadcasters frequently challenged their licenses—in any month, as many as half of the nonprofits saw their licenses challenged (McChesney 1993).
43. General Order 32, issued in May 1928.
44. After the passage of the Radio Act of 1912, which established the principle of legally sanctioned exclusive spectrum allocation, the US Department of Commerce allocated what were then understood to be useful parts of the spectrum to the US navy (600–1,600-meter range) and commercial operators (the 200–600-meter range and above 1,600 meters). The amateurs were allocated the portion of the spectrum below 200 meters, which was thought of as a wasteland. They went on to develop shortwave technologies, which proved to be far superior to the ones that the industry was experimenting with for this portion of the spectrum (Streeter 1996). This was a lasting contribution, as shortwave has long been the mainstay of international broadcasting by the British Broadcasting Corporation (BBC) and others.

8 THE INTERNET

1. Stalwarts include Vint Cerf and Bob Kahn (“fathers of the internet”) and others involved with the Internet Engineering Task Force, which developed internet standards to “facilitate, support, and promote the evolution and growth of the internet as a global research communications infrastructure” (Cerf, Kahn, and Chapin 1992, n.p.).
2. The official history also highlights that early foundational research took place concurrently at the Massachusetts Institute of Technology (1961–1967), the RAND Corporation (1962–1965), and the UK’s National Physical Laboratory (1964–1967), without the researchers knowing about developments at other institutions.
3. While the Clinton-Gore administration (1993–2001) is generally associated with the commercialization of the internet, policymakers were deliberating on such a move in the late 1980s. For instance, the Office of Technology Assessment’s 1989 background paper *High Performance Computing & Networking for Science* asks:

One of the key issues centers around the extent to which deliberate creation of a market should be built into network policy, and into the surrounding science policy system. There are those who believe that it is important that the delivery of network access and services to academics eventually become a commercial operation, and the current Federal subsidy and apparently “free” services will get academics so used to free services that there will never be a market. How do you gradually create an information market, for networks, or for network accessible value-added services? (Office of Technology Assessment 1989, 32)

4. See chapter 7, on broadcasting, for a discussion on how Compaine draws on the experience with radio to make his case.
5. Google, Google Map Maker has closed, <https://support.google.com/mapmaker/answer/7195127?hl=en> (accessed April 25, 2022).
6. United Airlines, Taxes and Fees, <https://www.united.com/ual/en/us/fly/booking/flight/taxes.html#:~:text=A%20fee%20will%20be%20charged,in%20person%20at%20the%20airport> (accessed July 12, 2020).
7. To familiarize himself with *Fortnite*, a video game that his 11-year-old daughter was drawn to, Tom Vanderbilt started playing it and found her engaging in “intense negotiations with her largely male teammates . . . working in tandem to devise strategies, tactfully soliciting input or advancing her own opinion, deftly delegating responsibilities. At times it seemed less like a game than a virtual workplace” (Vanderbilt 2020, 32).
8. To explore this opacity, Ekbia (2018) introduces the notion of “the alter-sphere,” where the individual, unaware of the rules of the game, “is objectified in the schemes of other actors,” often unknown ones (77–78).
9. We have been through such cycles many times before. Standage makes this point sharply by calling the telegraph, an obsolete technology, as the internet, our cynosure, of its times—that is, the Victorian internet. Taking the long view, Standage (1999) observes: “The optimistic claims now being made about the internet are merely the recent examples in a tradition of technological utopianism that goes back to the first transatlantic telegraph cables, 150 years ago” (211). Approaching from the other direction, from the oldest to the newest, Mosco (2004) makes the same point: “All the

wonders that were forecast for the telegraph, electricity, the telephone, and broadcasting were invested in the computer” (2).

10. Digital Detox, Camp Grounded, Summer Camp for Adults, <https://www.digitaldetox.com/experiences/camp-grounded> (accessed July 14, 2020).

11. The public and policymakers celebrate technology, dazzled by its benefits—the obvious ones, at any rate. Scholars, in the technopessimist tradition, provide correctives, spotlighting negative consequences—subtle ones. In the 1950s Jacques Ellul (1964) warned against our single-minded pursuit of efficiency, something that we take to be inherently good, saying: “technique transforms everything it touches into a machine” (4). He meant this both literally (physical machinery) and metaphorically (social machinery)—that is, highly rationalized human interactions. More recently, Dreyfus (2009) provided a corrective to John Perry Barlow’s (1996) celebrated view of cyberspace—“a world that is both everywhere and nowhere, but it is not where bodies live” (n.p.). Through a critique of distance learning, telepresence, and online anonymity, he spotlighted the negative consequences of disembodiment. He expressed special concern about the internet, which “affects people in ways that are different from the way most tools do because it can become the main way its users relate to the rest of the world” (Dreyfus 2009, 3). Other scholars, technorealists, argue that we need to go beyond the optimist/pessimist binary and understand technologies in their full complexity, both welcoming and fearing them (for an overview of technorealist principles and values, see Shenk, Shapiro, and Johnson 1998). Of the works in this tradition, Matthew Fuller and Andrew Goffey’s *Evil Media* is noteworthy from the standpoint of our project. They argue that “conventional media studies . . . are far too concerned with thinking things through from the spectator’s perspective” (Fuller and Goffey 2012, 2). They call for the study of the less visible “gray media”—databases, software for teamwork, project-planning techniques and tools, etc. Fuller and Goffey decenter the spectator’s perspective and open up a new way of looking at media. They make this move once. We, on the other hand, make many such moves, and, moreover, in a systematic manner. With regard to connectivity in particular, scholars such as Innis (1950, 1951), Carey (1989), Samarajiva and Shields (1990a, 1990b), and Schivelbusch (2014) have provided incisive critiques. They alert us to the negative consequences that we are ordinarily unable to decipher. However, they do not give us guidance on how to navigate the complexities of connectivity, except for Samarajiva and Shields (1990b). In the context of telecommunications in developing countries, Samarajiva and Shields suggest that rural communities should first develop lateral links with other nearby communities before connecting with a big city. In effect, they suggest an unorthodox sequencing of links—not the nature of connectivity itself. We call for a rethinking of the nature of connectivity. Also, our analysis is not limited to one particular context.

12. At first, the measure of internet access was occasional use. Critics, arguing that it underplayed the severity of the digital divide, pushed for a new measure—frequency of use. This shift was consequential. For instance, in 2006, the proportion of population online was 73 percent, on the basis of the occasional use measure, or 48 percent, on the basis of the daily use measure (Mossberger et al. 2008).

9 CONCLUSION

1. We use the word “discoursed” because many points were not debated per se (i.e., considered point-counterpoint). Different stakeholders made different points in different forums, as opposed to counterposing them on shared forums, as in a debate. For our part, we searched for different points made by different stakeholders in different forums as exhaustively as we could—constructing an inventory of points made by different stakeholders.
2. More recently, the scope of the problem is taken as not only securing access to technologies, but also ensuring the requisite skills to use them.
3. This is not to deny the transformative power of the link, but to underscore its limits. It is not so transformative as to level the power asymmetries between the nodes that it connects. At the same time, it does change the arena in which the power asymmetries between the nodes play out, and on that score, it is transformative. All in all, connectivity redesigns the arena—it does not equalize the participants.
4. REGULATEL (Foro Latinoamericano de Entes Reguladores de Telecomunicaciones) stands for Latin American Forum of Telecommunications Regulatory Entities.

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