

A cable, marvelous as it is, maintains a tangible and material connection between speaker and hearer: one can grasp its meaning. But here is nothing but space, a pole with a pendent wire on one side of a broad, curving ocean, an uncertain kite struggling in the air on the other — and thought passing between.

— Ray Stannard Baker

The wireless telegraph is not difficult to understand. The ordinary telegraph is like a very long cat. You pull the tail in New York, and it meows in Los Angeles. The wireless is the same, only without the cat.

— Albert Einstein

Going Wireless in the Belle Epoque

Erik Born

I. The Wired City, ca. 1890



Figure 1: "Telephone lines, New York, [ca.] 1888". Image Credit: Friedrich Kittler, *Gramophone, Film*, *Typewriter*, p. 6.

There are too many wires.^[11] Under a network of wires so dense as to block out the sky, several pedestrians have been frozen, mid-stride, in contemplation of this spectacle of infrastructure.

The image is centered on a utility pole, the physical support for the lines of communication leading off into many different directions. With over 30 crossbeams carrying 5 to 10 wires each, the utility pole has become bent at several stress points, almost being ripped to splinters. In this respect, the utility pole makes visible an increasing strain on wired infrastructure: were the pole to collapse, the orderly network of wires leading off into all directions would spill over into disorder. Someone — an eavesdropper? a Victorian repairman? — has climbed up to the third rung of the pole. Beneath him, several passersby, including two businessmen and a costermonger with her clients, are taking a break from their business, completely absorbed by the scene.

As they gaze up at the cables, perhaps they are wondering, "How did our world become so wired?"



Figure 2: "Disorderly wires on Lower Broadway about to be cut down". Image Credit: *Harper's Weekly* 33, p. 601.

Images of the wired city were popular at the turn of the twentieth century, when the telegraph, telephone, and electrical networks were rapidly expanding. Around 1900, the common scene of wired infrastructure tended to be centered on the utility pole, the physical support for a dense communications network leading off into many different directions. Usually, the scene involved a group of city-dwellers going about their business, mostly oblivious to the modern technology suspended precariously above their heads.

The congestion of wires attests not only to the limitations of wired technology, but also to nascent service practices. To keep up with the demand for service, telephone wires were usually laid one-at-atime with each new subscription. At the time, there was no practical way of consolidating multiple wires into one cable, though techniques were developing for sending and receiving multiple messages on the same channel.



REMOVING THE TELEGRAPH POLES IN UNION SQUARE, NEW YORK CITY .- DRAWN BY W. A. ROSENE-[SEE PAGE 231.]

Figure 3: "Removing the telegraph poles in Union Square, New York City". Image Credit: *Harper's Weekly* 33, p. 337.

A mid-19th-century innovation, the utility pole was

intended to consolidate telegraph wires and allow for easier service access. At the same time, the orderliness of telegraph lines, the rectilinear grid of a network attesting to foresight and planning, also became symbolic of Western progress.^[2] While utility poles allowed wires to be run through cities with less danger to public safety, they eventually came to be used for precisely the opposite purposes, as the telephone pole, in the United States, became a site of public lynchings.^[3]

By the 1890s, there was a growing resistance to the aesthetics of the growing wired infrastructure. As a result, utility poles were increasingly removed from high-traffic areas, and pushed out into the outskirts. While wires held out the promise of instantaneous communication, they also constituted a threat to urban environments, because a downed wire, vulnerable to the elements, could prove fatal to the unlucky passerby. The utility pole makes visible this strain on wired infrastructure: were the pole to collapse, the orderly network of wires leading off into all directions would spill over into disorder.



FIG. 18 .- MODEL POLE LINE ON FIRST AVENUE.

Figure 4: "Model pole line on First Avenue". Image Credit: *Harper's Weekly* 33, p. 596.

Gradually, wired infrastructure moved from the center of cities to their periphery. To replace the haphazard wired infrastructure, urban planners consolidated wires and increased the height of utility poles. Out of sight, out of mind — ultimately, such images of orderly wires created a sense that the fearsome power of electricity was under control.^[4]



Old Swiss Road, Built by the Romans, Lined with Granite Telegraph Poles

Figure 5: "Old Swiss Road, Built by the Romans, Lined with Granite Telegraph Poles". Image Credit: *Popular Mechanics* (December 1911), p. 851.

In some regions, utility poles proved more difficult to remove, since they had been constructed out of more permanent materials. In southern Switzerland, for example, telegraph poles were built out of granite, rather than timber, making better use of the region's natural resources. An image showing the construction of telegraph lines alongside an ancient road serves as a reminder that many new infrastructures tend to follow the paths created by existing infrastructures.

II. Wireless Futures from the Belle Époque





Figure 6: "Un quartier embrouillé" [A tangled neighborhood]. Image Credit: Albert Robida, *Le Vingtième siècle. La vie électrique*, pp. 128–129.

While wires tended to remain far overhead or buried underground, a satirical image of the wireless future could frame humans and technology on the same plane. In speculative writing, too, wireless visions were at the center of the crossroads of science and fiction.^[5] In reality, however, wires continued to occupy a tenuous position at the periphery of everyday life.



(Buen Humor, Madrid)

Figure 7: "Wo sollen wir bloß bleiben, — wenn doch alles drahtlos wird!" [Where should we go when everybody goes wireless!"]. Image Credit: *Buen Humor*, Madrid, reprinted in C.K. Roellinghoff, "Radio im Humor," p. 80.

Many observers at the turn of the twentieth century were convinced that the advent of wireless technology spelled the end of wired infrastructure. As one engineer put it,

"Telegraphy without wires — how attractive it sounds. No more unsightly pole lines disfiguring the streets and highways, ornamented with the dangling skeletons of by-gone kites. No more perpetual excavation of the streets, to find room beneath their surfaces for additional circuits that cannot possibly be crowded on to the staggering lines that darken the sky with their sooty cobwebs."^[6]



Figure 8: "F.H. Collins. Magneto Ear Phone". Image Credit: U.S. patent 622,328, issued April 4, 1899; reprinted in Grant Wythoff, "Pocket Wireless," p. 40.

One of the main attractions of wireless technology, as Grant Wythoff argues, was that it promised to wrap the vast infrastructure of wired systems around the bodies of individual users, thereby creating a form of "pocket wireless," not unlike a smartphone.^[7] The projected capabilities of such wireless gadgets easily outpaced technical limitations, though science and fiction remained interdependent in these wireless futures.



Drahtlofe Telephonie. Eine Ullegorie von Eruft Lubbert.

Figure 9: "Drahtlose Telephonie. Eine Allegorie von Ernst Lübbert." [An allegory of wireless telephony by Ernst Lübbert]. Image Credit: Robert Sloss, "Das drahtlose Jahrhundert," in *Die Welt in Hundert Jahren*, p. 41.

In 1910, Robert Sloss's predictions about a coming "Wireless Century" combined a fictional narrative of a voyage to the North Pole with a concrete description of recent developments in wireless engineering.^[8] Sloss's predictions about applications for wireless technology included contacting a family member, receiving an opera broadcast, shopping for a wedding dress virtually, and even using a wireless energy generator to power a spaceship. In a complex mixture of indicative and subjunctive moods, Sloss negotiated the liminal status of wireless technology between the real and the imaginary:

"I could go on in this style, God knows how long, and tell wonders on top of wonders, without straining the powers of my imagination in the least, since all the things in the course of the 'story' up to this point, which have sounded so wonderful, are actually problems that have already been solved today, or that are by no means part of the realm of pious wishes or overwrought hopes and expectations. No, they are facts that are only waiting to be introduced into our practical life."^[9]

This mixture of fact and fiction, also evident in the allegorical engraving accompanying the article, underscores Sloss's utopian vision of a wireless world in the offing.



THE WIRELESS ERA WILL CREATE A STATE LIKE THE SOCIALIST DREAM

Figure 10: "The Wireless Era will create a State like the Socialist Dream". Image Credit: Ivan Narodny, "<u>Marconi's Plans for the World</u>"

The wireless revolution promised not only to do away with the familiar urban infrastructure of physical wires, but also to enable the creation of a new electrified world without borders. Since wireless signals are universally available, at least in theory, to anyone with a receiver, the spread of wireless technology was taken to be a sign of impending universal social equality. Ultimately, wireless technology was thought to promote free circulation, a dominant precondition for progress since the Enlightenment.^[10]

In hindsight, it is probably easier to identify with the predictions attached to wireless gadgets, many of which have come true, than with those attached to the social and political implications of wireless infrastructures, which remain speculations.

III. In Praise of Wireless Infrastructure



Für das kommende Frühlingsreinemachen Vorrichtung zur Säuberung der Antenne (Zeicheren zur Hach W. Relieren)

Figure 11: "Für das kommende Frühlingsreinemachen. Vorrichtung zur Säuberung der Antenne" [For your upcoming spring cleaning: a device for cleaning your antenna]. Image Credit: Drawing by Heath W. Robinson, reprinted in C.K. Roellinghoff, "Radio im Humor," p. 85.

"Infrastructure," as comedian John Oliver points out, "is not sexy."^[11] Only when infrastructures malfunction, when a bridge collapses, when a nuclear reactor melts down, or when a denial-ofservice attack shuts down half the Internet, do these crucial everyday services receive any public attention. Otherwise, one of the defining characteristics of infrastructure is invisibility.^[12] With wireless technology, this invisibility is only partly due to the medium of transmission.

Even though wireless technology is itself invisible, the same need not be true of wireless

infrastructures. As media theorist Lisa Parks observes, "We describe ourselves as a 'networked society' and yet most members of the public know very little about the infrastructures that support such a designation — whether broadcasting, web, or wireless systems."^[13] For Parks, our widespread ignorance of networking technology is due largely to the increasing invisibility of that technology in the public sphere.



Figure 12: "Antenna support structure". Image Credit: Robert P. Juengert und Edward Weingart, <u>US Patent Nr. US5611176 A</u> (18. Mar. 1997).

Today, mobile antennas are increasingly packaged inside, rather than outside, of consumer electronics. Antennas are shot into orbit on satellites. Cellular towers are driven out into the suburbs, or hidden in plain sight inside sailboat masts, barn silos, bell towers, flag poles, church spires, or summit crosses. And artificial structures are designed to resemble natural objects, such as the strange case of "antenna trees."^[14] As Peter Schaefer argues, the displacement of technology and the emphasis on immaterial infrastructures "promote a teleological narrative of physically connected data transfer systems progressing to lighter, cleaner networks that are increasingly disconnected from the natural world."^[15]



Figure 13: "Eine unangenehme Weihnachtsüberraschung" [An unpleasant surprise on Christmas]. Image Credit: Drawing by Heath W. Robinson, reprinted in C.K. Roellinghoff, "Radio im Humor," pp. 82–83.

Today, many advocates of wireless convergence believe that wireless infrastructures will eventually replaced their wired counterparts, thereby increasing access, reducing costs, and removing the necessity of a material support for digital technology.

To counter these assumptions, media theorists have recently taken to showing the material underpinnings of what are usually perceived to be immaterial technologies. After exposing the common governmental practice of concealing infrastructures inside "antenna trees," Lisa Parks has drawn on fieldwork and historical maps showing "signal territories" with the aim of increasing technological literacy about infrastructures.^[16] Adopting a similar approach, Nicole Starosielski has examined the history of undersea fiber-optic cables in The Undersea Network, a book accompanied by an interactive digital mapping utility.^[17] Operationalizing Adrian Mackenzie's theory of "wirelessness," Jussi Parikka has illuminated the critical engineering practices informing the Weise 7 group's wireless devices.^[18] In Tubes: A Journey to the Center of the Internet, journalist Andrew Blum helped popularize

some of this work with a mixture of reporting on data centers, underground fiber-optic cables, and the engineers who construct and operate them.^[19]

Many of these strands were brought together in a special issue of *Amodern* on "Network Archaeology," which made a plea for expanding the field of media archaeology from objects and artifacts to include the study of networks and the history of connections.^[20]



Figure 14: "Telefunkenstation / Gruss vom Weinburg Nauen Stadtforst" [Telefunken station / Greetings from Nauen Stadtforst vineyard]. Image Credit: <u>Geschichtsspuren.de</u>

To these studies, I would add that significant historical alternatives to today's strategies of concealment and displacement can be found in previous attempts to come to terms with the place of communications infrastructures in the public sphere. In the early twentieth century, cities tended to celebrate their infrastructure more than we do today. There was an entire genre of "wireless poetry," consisting of odes to antenna towers, and these towers themselves attracted thousands of visitors a year.^[21] Just as late 19th-century postcards often paid tribute to smokestacks as signs of industrial progress, producing strange images of smog-covered destinations, early 20thcentury postcards often featured antenna towers as signs of a region's communications prowess.



Figure 15: "Im drahtlosen Zeitalter!" [In the wireless age]. Image Credit: Drawing by Barlog, reprinted in C.K. Roellinghoff, "Radio im Humor," p. 87.

Since modern wireless technologies rely on the invisible medium of electromagnetic waves, they were unable to draw on the dominant iconography of network infrastructure, such as cables, switches, and transmitters, commonly found in representations of wired systems. However, wireless infrastructures have remained visible in another sense — namely, in that they are a highly symbolic means of negotiating the modern politics of visibility. At once material and invisible, wireless media ultimately encourage us to rethink the "common visual and conceptual paradigm of what it means to be modern."^[22]

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