

Disorderly Infrastructure: Wi-Fi in the Shadow of the Rural Telecom Co-op

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I'd like to talk today about wireless data networking: specifically, how does this "ubiquitous network" some of the earlier speakers have been talking about come to be? My point here is to offer this example of wireless as the just sort of modern phenomenon that the Institute is well-placed to investigate through social research. Wireless at the moment offers us an interesting case where we have the chance to make useful, practical suggestions to public policy and Internet practice, but it is also a case that we can use to build general knowledge. So: How does a ubiquitous network come to be? This is a question of what today we like to call "infrastructure." You could title this talk, "Where could wireless infrastructure come from?"

As you may have noticed from the programme, I flew here from the Midwestern United States—a place well known for its farmers and tornadoes. I've brought with me a puzzle from the Midwestern past that I hope will shed some light on our present situation with wireless. It involves farmers. More about that in a second; just bear with me and it will all make sense. First, I'll tell you what sort of wireless I'm concerned about, then I'll give the puzzle from the past, and finally I'll conclude by unpacking the relationship between the Midwestern past and the wireless present.

The Present State of WiFi

Our present situation is this: An acquaintance of mine purchased a new laptop recently, and it came with a wireless card, much like the Orinoco I have here. My acquaintance's employer had installed a so-called "wireless Ethernet" access point at the office instead of rewiring the building at great expense. Now my acquaintance went to visit friends in New York, and when he opened his laptop in their apartment to show them some pictures, he noticed that he was on the Internet. His card was getting a connection from somewhere. First he thought, "Where is this Internet connection coming from?" Second, he thought, "What do I care where it comes from?" and he quickly checked his email. (Maybe you can sympathize.)

As the price of access points and cards have dropped, we are now seeing a proliferation of these wireless data, or "WiFi" networks.¹ An hour and a half of driving around in Manhattan with an antenna will net you 448 distinct WiFi networks.² In Alessandro Ovi's beautiful phrase, these are "water lilies;" little ovals of connectivity that are not centrally deployed, that sometimes overlap a little, whose stems lead to the Internet—usually through a broadband connection. If you happen to be near one of these water lilies, depending on how the access point is configured, you might get an Internet connection.

There are some different ideas about who should pay for these pretty lilies and how they should work. Companies that tried to build a proprietary system like this across the US are now bankrupt.³ People install access points in their homes and offices for their own

¹ To be precise, I mean wireless local area networks operating over the 2.4 and 5 GHz radio bands that interoperate using the IEEE 802.11 specifications.

² Dragorn (2002).

³ e.g., Ricochet, which filed for bankruptcy in August, 2001.

use, and they don't realize (or don't care) that their network spills over the property line. The owner of a small café near my office at the University of Illinois installed a free access point because he thought it might increase his business. That, and he talked an engineering student into setting it up, in exchange for free coffee for life. The life of the access point, that is.

Some rather generous individuals, particularly here in the UK,⁴ have started doing two things: (1) they've made maps of these lilies so that anyone can find them, and (2) they've started building their own access points (or lilies) *just* so that other people can use them—this is sometimes called “open” or “community” wireless. In response, some rather ungenerous Internet Service Providers have modified their terms of service to forbid connection sharing, while some rather confused government agencies are thinking about whether or not my acquaintance stole anything from New York on his visit there. And what if my friend had listened to things on that network that he wasn't supposed to? We can say: Please don't, but it's a bit of a security problem.

A Puzzle From the Past

Now we get to the puzzle about farmers. For a moment, please think back to “when old technologies were new,” to steal Carolyn Marvin's phrase.⁵ It's the beginning of the 20th century and the exciting technology is the plain old telephone system. Let's do some role-playing—please pretend that you are all farmers from the American Midwest. If it helps, if you're from Illinois you mostly grow corn.

Now anyone that knows anything about the telephone will tell you that it is more expensive to serve rural areas than urban areas. There are all those miles of dusty prairie to cross, with only the occasional farmer for a customer. If a telephone company didn't particularly want to offer you service to your isolated homestead, we can't blame them. We don't blame them today—rural telephone service is subsidized in many countries.

Here's the puzzling thing: It is an amazing and forgotten fact that before 1920, rural farmers in the US were more likely to have a phone than city-dwellers. In this early period, rural telephone penetration was higher and it grew faster than it did with your big city friends.⁶

In telephone system history (admittedly, a small discipline) the years after the expiration of the Bell patents in the late 1890s are called “the independent era.” By 1907 there were over 18,000 telephone systems—these were the independents. Some were cooperatives, some were experiments, some were profit-making ventures, some investment scams, some illegal “wildcat” lines.

During this time period anyone could open the Montgomery-Ward mail order catalog and purchase not just a telephone, but also spools of wire, insulators, lineman's climbing spurs and kneepads.

⁴ For more information about UK activity, see <<http://consume.net/>>.

⁵ Marvin (1988).

⁶ This section is adapted from Fischer (1987a, 1987b).

Some systems were technically sophisticated while others just ran the telephone current over whatever old barbed-wire fences were handy. Some of the independents didn't even have switching, or they had switching only during the day, when the farmer's daughter was awake and near the switchboard. Non-switched meant one big party line, when you turned the handle to make the phone ring, all of the phones on the system would ring. If your phone rang and the call wasn't for you, you were not supposed to listen in. Please don't. It's a bit of a security problem.

The Underserved

Who were these wildcat operators, these independents? Who were they really? Were they telephone...geeks? Were they ideologues? Did they believe that the telephone should be "free as in freedom"?⁷ Looking back at the historical record, it seems that they were everybody. In 1910, you could join the Liberty Home Telephone Company of Liberty, Tennessee if you could come up with three things: (1) \$25, (2) a promise to donate your labor as needed, and (3) a pole. The Liberty Telephone Company was founded by a family who wanted a phone.

Where were the more established telephone companies during all this? By that I mean mainly Bell but also, later on, large urban independent companies. Remember, they weren't serving rural areas because rural areas are unprofitable. But let's take a second look at that. It was the meticulous research of Claude Fischer at Berkeley that solved this puzzle. While it's true you had far fewer subscribers-per-mile of telephone wire in rural areas, the cost isn't just the amount of wire and the number of poles. While you'd use more wire in rural areas, land and labor were cheaper, and farmers were willing to pay significantly more than their urban contemporaries for telephone service. While the phone was a convenience for the urbans, it was a necessity for the isolated, and they begged for it. During the early part of the 20th century, the telephone companies in the US were working to generate demand among city-dwellers while simultaneously ignoring your demand, rural demand.

So then what was really going on here? Let's just come out and say it: The telcos wouldn't build an infrastructure for farmers because farmers are stupid and poor. "Farmers, as a class, are troublesome customers," a telephone company executive explained in 1903. The surviving memoranda and correspondence from the telephone industry tell us that they thought farmers were hardheaded, shortsighted, tight-fisted, and uneducated. They were prone to "misuse of the telephone instrument." If you gave them a telephone they would probably only want to play banjo to each other anyway.

Lessons For Today

Let's wrap up by getting back to the present. There are clear and useful parallels here, and they teach the lesson that infrastructures need not be the product of governments and industry alone. It's not just governments that build roads and telcos that build phones. Another lesson might be, after our conference title, someone needs to be watching to see that the network serves everyone who needs it. Even banjo-players.

Groups of disorderly amateur enthusiasts were important in the development of the telephone in the Midwest, just as they were important with the beginning of radio

⁷ Apologies to Richard Stallman.

broadcasting. Some of these rural telephone cooperatives I mentioned still exist and even thrive; others were purchased or merged and then integrated into the telephone system we still use today. Responding to altruism and experimentation in a nascent infrastructure with suppression and criminalization is not reasonable. It is not in society's interest to let the state act on the fears of the Internet Service Providers at this time.

Now that I've hopefully convinced some of you about some of that, I'd like to argue the opposite side of some of my propositions—a typically academic thing to do, perhaps. I don't want you to get the impression that I am in thrall to romanticism. I mean the romantic ideal of transformative individuals.⁸ In the trade press Jeff Bezos used to be such a person but now he's Linus Torvalds. I am not saying: "Unleash these individuals and they will set us free." A lot of the amateur telephone networks didn't work very well. I also think the Midwestern farmer needed the telephone a lot more than we need WiFi. And the Internet is not the telephone: we know that people *do* use the Internet to talk to their neighbors,⁹ but this isn't the majority of use as it was on the prairies in 1910, as the farm co-ops usually didn't have interconnection.

It is important to say, then, that the point is *not* that great things come from grassroots, individualistic action. These grassroots, individualistic community wireless groups are standing on the shoulders of giants; it is the *stem* of the water lily—the gateway to the Internet—that makes the network attractive, and a host of industry and government action effort made that possible.

Many communication technologies had these interesting amateur-built infrastructures in one way or another, but some did not, and we don't know enough about these processes for me to imply that there is a stage-model and keep a straight face: e.g., first let the amateur enthusiasts play, then good things will follow. But we do know enough to say that as a research site this is something that bears more looking into. We know that there are many different ways that infrastructures begin, and some of them are "disorderly." We do know enough to say: "Let these water lilies grow for a while longer... It could be beautiful."

Speaker Note

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⁸ This notion is after Streeter (1999).

⁹ See, e.g., Hampton & Wellman (2000).

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