

Funny Noises
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The Mother of All Network Protocols

I recently had the pleasure of reading a book called The Victorian Internet, by Tom Standage¹. It's not my intention to review it here, but it gave me a lot to think about and is well worth reading. It's an enjoyable history of telegraphs and telegraphy, but its true value is in providing a perspective for viewing today's developments in communications.

The basic premise of the book is that the "mother of all networks" was the telegraph network which began before the Civil War and continued to develop into the 1920's. Standage sees the telegraph network as a model for the Internet and there are indeed many similarities. The Internet is often cast as a revolutionary mode of communication, with far-reaching social, political, economic, and moral implications. But if you look at it as a logical extension of technology, the Internet is *evolutionary* rather than *revolutionary*. In contrast, the introduction of the electric telegraph was truly revolutionary. That word "electric" is very important, because the first telegraph system was demonstrated in France in 1794, and the french gave it the name "telegraph." But it used moving signal arms and was limited to line of sight between stations, hence really just an improvement on smoke signals and beacon fires. It took another fifty years of development before the electric telegraph came into being, but once it did the development of true *networks* was immediate, explosive, and with far-reaching consequences.

For literally thousands of years, communication between people who were at some distance from each other was essentially limited to what could be carried by a messenger on foot, on horseback, or by boat. Beginning in 1844 networks grew like a virus, spreading along highways and railroad tracks and crossing the oceans at a rate that would have been simply unimaginable fifty years earlier. Not only was this the first rapid deployment of technology in the history of mankind, the telegraph itself became the medium for propagation of later technologies. That's a process that is still evolving today, and it's at the heart of the Internet.

In 1844 the only telegraph line was Morse's demonstration line between Baltimore and Washington, a distance of 40 miles. Six years later, according to the US Census of 1850, there were already *12,000 miles* of telegraph lines in use. Governments tried very hard to control them, dictating who could send telegrams, who they could be sent to, what could or could not be said in a telegram, how much they would cost, and of course there were taxes. But ultimately governments failed to control the telegraphs and left most of the details to the telegraph companies. The obvious parallel here is current governmental interest in controlling the Internet, while in practice the only controls are imposed by Internet service providers.

The great telegraph networks were never really replaced by but *evolved* into the wireless networks and telephony networks. Just as the original electric telegraph depended on Samuel Morse's code, so did the evolution of radio-communications, and later digital communications. It sounds "clever" to say that Morse was the original digital mode, but it's literally true. Morse uses a simple "binary state" store and carry information, and that is exactly what all those gigabytes of "ones and zeroes" on your hard disk and DVD are using.

If you want to, you can use any of the existing means of communication to carry a message in Morse code-- and that's a real lesson in "backwards compatibility." There is actually a large group of former (and aging) telegraphers who use the telephone system to hook up keys and sounders, keeping the art alive with the aid of Ma Bell. I believe they are working on ways to do it via the Internet even now.

So at last I am maybe getting to the point here, and that is simply this: Morse code is right at the the root of all of our means of communicating with each other beyond the range of the human voice. Have we outgrown it? We may think we have, but then again we have a lot of strange ideas about ourselves and our role in the universe. Certainly we have isolated ourselves from the technology, for the most part, and few Internet users ever think about how they are still really working with ones and zeroes. But I've done exhaustive research and discovered that in all the history of the development of travel, from horseback, to train, to car, to airplane, not once has it been suggested that we might as well cut off our feet. Maybe we don't use them as much as our forefathers did, and maybe we can survive without them, but it sure is comforting to know we can walk a couple miles if we have to.

¹ The Victorian Internet, by Tom Standage. Walker and Company, New York, 1998.