

# Narrowcast: Telegraph and Telephone

History of Information, August 4, 2010

# Quiz #3

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1. How was the party line seen as a “necessary evil” in AT&T’s strategy in the early days of its competitive era?
2. Compare Fischer’s description of government subsidization of the nascent telephone and automobile industries, and name one reason that might explain the difference.
3. From a technological determinist’s standpoint, briefly describe the iPhone’s impact and explain its popularity.



# Information, Space, and Time

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- ▶ 1684: philosopher/physicist Robert Hooke speaks to Royal Society of London on “how to communicate one’s mind at distances in as short a time almost as a man can write what he would have sent”
- ▶ Many others strive for this as well...

# The Optical Telegraph

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- ▶ Examples of fire signals in classical literature and antiquity
  - ▶ Homer's *Iliad*
  - ▶ Aeschylus's *Agamemnon*
  - ▶ Histories of Thucydides, Herodotus
  - ▶ Bible: "...set up a sign of fire in Bethhaccerem..."
  - ▶ Romans: over 3,000 watchtowers along Mediterranean, Atlantic coasts; fire/smoke signals warning of pirates/invaders
  
- ▶ Persists up to the French Revolution



# Chappe's Telegraph

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- ▶ 1794 – first “telegram” sent
- ▶ “software” made it a success
  - ▶ First codebook: 9,999 entries but required four positions for each signal
  - ▶ Second code: two positions/signal
  - ▶ Third: added more signals
  - ▶ By 1830, more than 45K words/phrases
- ▶ But some weaknesses
  - ▶ Human
  - ▶ Natural
- ▶ About 4-6 100-signal telegrams/day
- ▶ Imitations in Europe, America
  - ▶ 1840: optical line between NY, Philadelphia



# Information, Space, and Time

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- ▶ “Technologically, the advent of electricity was certainly revolutionary. From an information point of view, however, the revolution began half a century earlier, when Claude Chappe (1763-1805) devised a way to send any message whatsoever, in either direction, much faster than any horse could gallop. That, and not the technical means (electricity, radio waves, fiber optics, or any other) is the essence of telecommunications...[i]t was the demand for rapid communications that created the telecommunications systems, not the other way around.”

- Daniel Headrick



# Morse's Innovation

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- ▶ Patent for telegraph filed in 1837
- ▶ Morse as “inventor” of the telegraph (some parallel to Marconi and wireless): “contributor”, “entrepreneur”
  - ▶ Wheatstone and Cooke (England)
  - ▶ Schilling (Germany)
- ▶ Morse code patented in 1840 (binary-ish)
  - ▶ Again “software” made a big difference
- ▶ Senate demonstration in 1844
- ▶ Baltimore-D.C. Line:
  - ▶ “What Hath God Wrought”



# “The Victorian Internet”

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- ▶ Explosive growth almost impossible to trace at the time
  - ▶ “It is anticipated that the whole of the populous parts of the United States will, within two or three years, be covered with net-work like a spider’s web.” (1848)
- ▶ Operation of telegraph had “qualities like a chat room”:
  - ▶ OMG U TXT 2
    - ▶ Shorthand used by telegraphers:
      - G A = Go Ahead
      - G M = Good Morning
      - S F D = Stop For Dinner
      - Numbers used as abbreviations too
  - ▶ Telegraphers in branch offices would chat, play chess, tell jokes during quiet periods
    - ▶ But primarily a business tool; only the rich had luxury of trivial msgs



# “Annihilation of Space and Time”

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- ▶ Railroads
- ▶ Commodities Markets
- ▶ Military
- ▶ Press
- ▶ Cable connecting London, Paris ushers in submarine telegraphy boom
  - ▶ But failures at longer lengths show its limitations



# Utopianism

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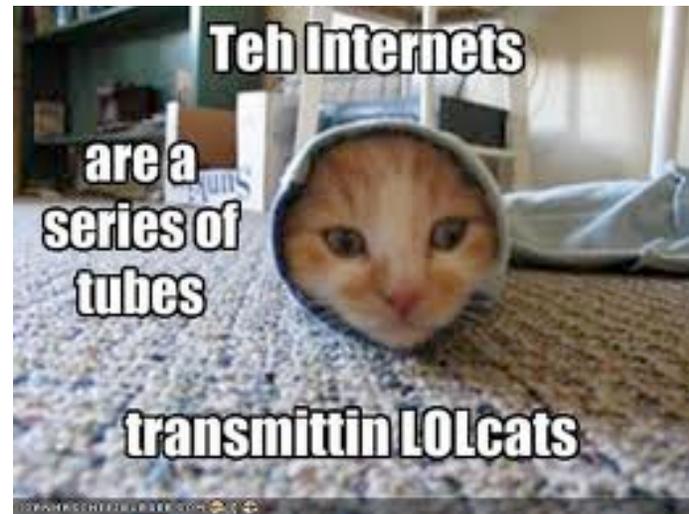
- ▶ *“We are one!” said the nations, and hand met hand, in a thrill electric from land to land.”*
  - From “The Victory,” a poem written in tribute to Samuel Morse, 1872
- ▶ Common “Organicist” metaphor with telegraph as nervous system and railway as musculature



# Trauma, Tension, and Confusion

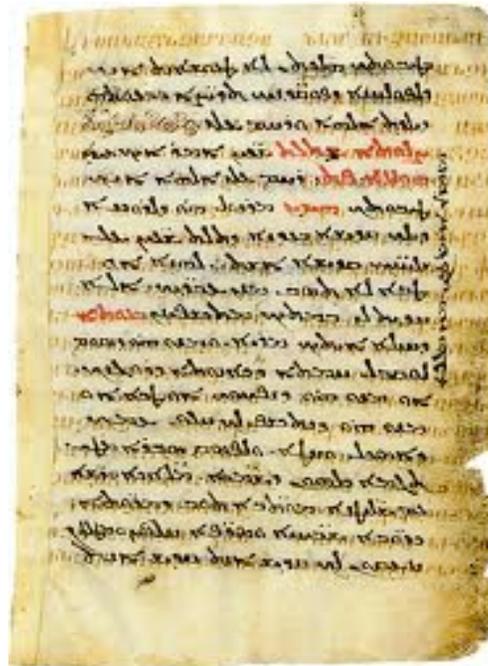
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- ▶ No technical knowledge needed
- ▶ No special equipment needed
- ▶ Yet still had to overcome commonly held misconceptions, misunderstandings, and confusion
  - ▶ “hollow wires”?
  - ▶ “speaking tubes”?
  - ▶ “tightrope”?
  - ▶ State of message in transit
  - ▶ Concept of retransmission



# Infrastructure as Palimpsest

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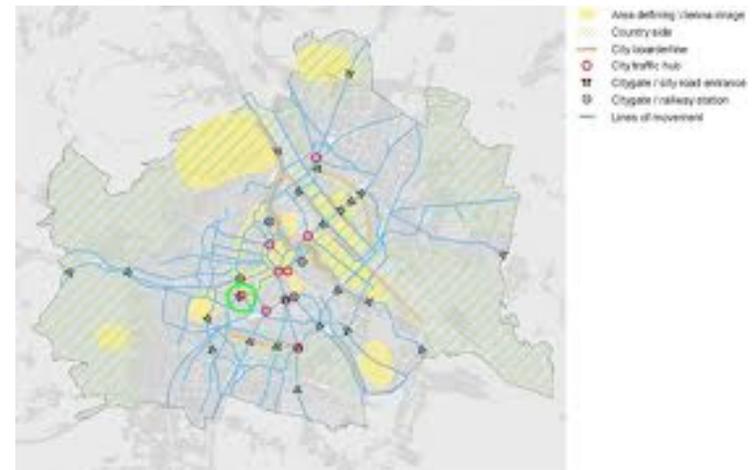
45 375  
Codex Bezae Cantabrigiae, Palimpsest  
Manuscript of St. Matthew, 5th, 6th, and 7th half of 10th c.



# Infrastructure as Palimpsest

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- ▶ Railway uses/augments existing trade routes
- ▶ Telegraph built along railroad right-of-way
- ▶ Telephone in some instances attempted use of telegraph lines
- ▶ Original DSL used existing copper phone lines
- ▶ ...



# Missed It By That Much

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- ▶ “Home Telegraphs”
  - ▶ Signaling device with preconfigured switch settings would enable subscribers to “buzz” the central office for different services
  - ▶ Home-to-home telegraph systems
- ▶ Voice Telegraphy
  - ▶ “For [businessmen], voice transmission, scratchy and often indistinct, could be an adjunct at best.”
  - ▶ Elisha Gray



# Telephone

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**The Measure of Progress**

The progress of the past, as well as that of the future, is measured by criticism—for criticism exists only where there is faith in ability to improve.

We do not criticize an ax, cart or wooden shoe because they are obsolete. During the reconstruction period through which our country is now passing, if the public does not criticize any public utility or other form of service, it is because those

services have made such

some little leaps for improvement.

The intensive evolution of telephone service is, under the most favorable conditions, subject to criticism, for the reason that it is the most intimate of all personal services.

The accomplishment of the telephone in the past lived the quality of service demanded today; a greater accomplishment in quality and scope of service will set new standards for the future.

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

**Our Policy      Our System      Universal Service**

"Monitor The Department's activities just"



# Utopianism/Mysticism Redux

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- ▶ "Someday we will build up a world telephone system, making necessary to all peoples the use of a common language or common understanding of languages, which will join all the people of the earth into one brotherhood. There will be heard throughout the earth a great voice coming out of the ether which will proclaim, 'Peace on earth, good will towards men'".

-John J. Carty, AT&T, 1891



# Bell's Ring

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- ▶ 1876 – Alexander Graham Bell constructs telephone and files patent claim
- ▶ 1877 – Bell Telephone Company
- ▶ 1878 – first switchboard, New Haven, Connecticut
- ▶ What key business decision affecting the technology's diffusion was made?



Prof. Bell's vibrating reed—used for a receiver



Alexander Graham Bell's first telephone

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▶

# Bell's Ring

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- ▶ What key business decision affecting the technology's diffusion was made?
  - ▶ Bell remained the exclusive builder of telephones, leasing the instruments and licensing local service providers



# “Educating The Public”

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- ▶ **Publicity**
  - ▶ “Theater of Science”
  - ▶ Overcoming misinformation, confusion
    - ▶ Would it speak their language?
    - ▶ “I can now state in all truthfulness that I have talked over a talkaphone” - 1897 letter
- ▶ **Explicit Advertising**
- ▶ **Soliciting**
  
- ▶ How did Bell initially market the device?
- ▶ Who was its target demographic?



## Monopoly: 1880-1893

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- ▶ "When the competing telephone exchange closed in San Francisco in 1880, the Bell local raised its charges from \$40 to \$60 a year. The local manager justified the move: ... 'The public always expects to be "cinched" when opposing corporations consolidate and it was too good an opportunity to lose"

- Fischer



# Competition: 1894-WWI

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- ▶ Bell's patents expire in 1894
- ▶ More options for customers from thousands of new companies
- ▶ Competition drives lower prices
- ▶ Dirty tricks proliferate
- ▶ 1913 Kingsbury Commitment
  
- ▶ Throughout this period we see emergence of social norms
  - ▶ Bell attempts to “educate” socially as much as technically
  - ▶ Efforts to suppress “hello” fail – operators nicknamed *hello-girls*
- ▶ 1920s: Marketing shift from practicality to **sociability**



## Consolidation: WWI-WWII

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- ▶ Government takeover of telcos during WWI both discredit nationalization **and** usher in new fees that remain to this day
- ▶ Regulators persuaded of the advantages of natural monopoly
  - ▶ And stated goals align well with Bell's strong suits
- ▶ Many households disconnected during the depression era
  - ▶ Industry didn't recover until WWII
- ▶ Over time, positive evolution of public image
  - ▶ From "Octopus" to Ma Bell



## “Twilight”: 1969-1984

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- ▶ **1969: MCI competes with AT&T on long distance**
  - ▶ But still needs to interconnect with AT&T’s local loop or build a shadow network
    - ▶ Sues; 1972 – AT&T allows interconnection
- ▶ **1984: DOJ breaks up AT&T for antitrust violations**
  - ▶ Broken into 7 Regional Bell Operating Companies (Baby Bells)
    - ▶ Pacific Bell, US West, Southwestern Bell, Bell South, Ameritech, Nynex, Bell Atlantic



# What Comes Around, Goes Around

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- ▶ **2005: SBC (Southwestern Bell, Pacific Bell, and Bell South) buys AT&T**
  - ▶ Reconstitutes much of the former Bell system
  - ▶ Verizon - Ameritech, Nynex, GTE



# The Telephone as “Literacy”

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## **California LifeLine**

### **Low-income phone service**

AT&T California is committed to increasing telephone service availability for all Californians. California LifeLine (sometimes referred to as "ULTS" or "LifeLine") keeps low-income households connected by providing discounts on the telephone connection charges and the monthly basic telephone service charge.

## **California LifeLine Service**

California LifeLine is a program sponsored by the California Public Utilities Commission (CPUC) that provides discounts on connection and monthly residential basic telephone service charges to eligible low-income households. Additional discounts are available to qualifying customers who live on federally recognized Tribal Lands or have a deaf or hearing impaired member in the household.

Other benefits include the availability of free toll blocking and no charge for the monthly Federal Subscriber Line Charge and the Federal Universal Service Fee. However, any other AT&T California features such as Call Waiting will be charged at the regular rate.

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# Claims of Social Effects

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- ▶ Telephone altered physical layout of American cities
  - ▶ Erased the “friction of space”
- ▶ Force for democracy
- ▶ Expansion/Diminution of personal relations
- ▶ Responsible for the creation of skyscrapers?
- ▶ Lack of telephone at some point equaled isolation
- ▶ Just a convenience – no great impact (homeostatic)
  
- ▶ Fischer finds that Americans assimilated the telephone easily and used the device to pursue ends more fully



# Oral Culture Reimagined

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“Yesterday I was writing a deep article on a sublime philosophical subject while such a conversation was going on in the room. I notice that one can always write best when somebody is talking through a telephone close by... Then followed that queerest of all the queer things in this world,—a conversation with only one end to it. You hear questions asked; you don't hear the answer. You hear invitations given; you hear no thanks in return. You have listening pauses of dead silence, followed by apparently irrelevant and unjustifiable exclamations of glad surprise, or sorrow, or dismay. You can't make head or tail of the talk, because you never hear anything that the person at the other end of the wire says.”

- Mark Twain, *A Telephonic Conversation*, *The Atlantic Monthly*, June 1880



**YES, WE'RE  
ALL VERY  
INTERESTED  
IN WHAT  
YOU'RE HAVING  
FOR DINNER  
TONIGHT.**

(Please keep phone conversations to yourself.)



# American “Style” of Technology?

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- ▶ What constitutes a society’s technological “style”?
- ▶ What are the key components of an American “style”?

