communications
"revolution"

telephone & telegraph

History of Information
March 5, 2013
Could a new phonetic alphabet promote world peace?

By Tom de Castella
BBC News Magazine

Backers of a universal alphabet say it will make pronunciation easy and foster international understanding. But can phonetic spelling systems really smooth the path to world peace?
Although many feel freer with the presence of one network ... much of the public does not realize the growing power and control the social network has over such private information. .... Oftentimes, buyers are not aware of the fact that, while these technologies simplify aspects of life, manufacturers have purchasers in the palms of their hands as they create technology that consumers are tempted to update every couple years, thus increasing sales. --Charlote Banayan

Disruptions: As User Interaction on Facebook Drops, Sharing Comes at a Cost
By NICK BILTON

What changed? I recently tried a little experiment. I paid Facebook $7 to promote my column to my friends using the company’s sponsored advertising tool.

To my surprise, I saw a 1,000 percent increase in the interaction on a link I posted, which had 130 likes and 30 reshares in just a few hours. It seems as if Facebook is not only promoting my links on news feeds when I pay for them, but also possibly suppressing the ones I do not pay for.
something happened

**technology, at last!**
overview

wishing on technology

inventing inventors?

eyewitness enthusiasm

communications "revolution"

changing world
to make a long story short

**point-to-point**
Morse invents the telegraph
Bell invents the telephone

**on to broadcast**
Marconi invents long-wave transmission
coming into California

Henry George, *SF Herald* (1869); *Progress & Poverty* (1879)

Marconi America; Federal Telegraph
coming into class

assignment

technology controls: 25%
technology makes you free: 25%
both: 50%

calling on ...

Sebastian Delgado  Tamara Takeshita
Justine Coven     Ione Sterental
Eric Lindholm     Melanie Cebula
Warren McQuinn    Steven Rivera
Meg Dholakia
overview

wishing on technology

inventing inventors?

eyewitness enthusiasm

communications revolution

changing world

to make a short story long ...
changing world: overland

Rome to Holy Roman Empire

"it took twenty-six days for Caesar to send a letter from Britain to his dear friend Cicero in Rome"

Franz von Tassis, 1489
Changing infrastructure

Roads

[Before the eighteenth century] "Roads were ... a mechanism for government and a tool for the travels of soldiers, but very rarely an artery for trade ... between 1726 ... and 1848 ... state control had constructed the entire [British] road system ... 119,527 miles of road that yearly consumed £1,600,000 in parish rates and £1,097,000 in turnpike tolls"

Jo Guldi, Roads to Power, 2012
changing world: by sea

messages by sea
irregular: merchant ships
regular: packet boats
speed: steam

"soon afterwards the Britannia steam-packet from Liverpool, eighteen days out, was telegraphed at Boston."

--Charles Dickens, *American Notes*, 1842
built infrastructure

**canals**
Wedgwood's distribution

**railways**
mail coach, c. 8 mph
early train, 20-30 mph
increasingly wired
increasing intervention

CHAPTER XCVII.

AN ACT

To provide for the construction of Telegraph Lines within the State of California.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Sec. 1. The right and privilege is hereby granted to Oliver E. Allen and Clark Burnham, or their assigns, to construct and put in operation an Electro-Magnetic Telegraph Line, from the city of San Francisco to the city of Marysville, by the way of the cities of San Jose, Stockton and Sacramento, with right of way over any lands belonging to this State, and on or along any streets, roads or highways, or across any stream or streams; Provided, they do not obstruct the same, and no person or persons shall be allowed to locate, or construct, or run any Telegraph Line, or any portion thereof, within half a mile of the Line or route selected by the said Allen and Burnham or their assigns, except that when within half a mile of any incorporated city, the proprietors of any similar Line of Telegraph, may enter said city and depart therefrom, making their Station therein, within twenty yards of the Station of said Allen and Burnham, or their successors, for the term of fifteen years; Provided, that the said above named parties or their assigns shall, within eighteen months from the passage of this Act, construct and put in operation a Tele-
interconnections

**international cables**
(but also treaties, standards)

- Prussia-Austria: 1849
- England-France: 1851
- New York-Newfoundland: 1856
- Britain-North America: 1858-1866
- Atlantic telephone cable: 1956
"control through communication"?
cause or effect

"Between 1600 and 2000 we argue that changes in transport and communications technology were the single most important factor in both ushering in the era of the mass army and in leading to its eventual demise."

--Onorato et al, "Technology and the Era of the Mass Army" 2012

"communications ... occupies a crucial position in the organization and administration of government and in turn of empires and western civilization."

--Harold Innis, Empire & Communication, 1950
overview

communications "revolution"

changing world

control or freedom?

eyewitness enthusiasm

inventing inventors?

wishing on technology
a good thing?

**assignment**

technology controls: 25%
technology makes you free: 25%
both: 50%

calling on ...

Sebastian Delgado          Tamara Takeshita
Justine Coven             Ione Sterental
Eric Lindholm             Melanie Cebula
Warren McQuinn            Steven Rivera
Meg Dholakia
technology and freedom

time matters

It also seems that with the passing of time and changes in the nature of information technologies, it becomes possible to rid these new technologies of their monopolistic “control” factors faster than in the past. This is seen in the difference between the examples in the readings and those of Apple.

--Sebastian Delgado

However, once time and news were no longer able to be controlled by a few people, this information helped to liberate workers and newspapers from being taken advantage of. With widespread access, communications technologies are freeing, but when certain people have entire control over the technology, it can be limiting and controlling.

--Justine Coven
technology and freedom

control and freedom

Control can also be established by the government, as in patent law. The AT&T company (and Bell) used the controls of patent law to their advantage, though, using the courts to gain a monopoly over a specific technology: sending spoken signals over electric wire. As in Beauchamp's writing, "under the decision, such advances were controlled by Bell's rights" (863). Bell and AT&T used the controlling influence of the courts and the patent system to gain the freedom of spreading the company across the continent. Almost all examples show that having control and freedom at the same time is not a dichotomy.

-- Eric Lindholm
Technology builds control schema; the use of technology helps us control. Freedom is not increased, but new handholds – new possibilities for control – can be uncovered.  

--Warren McQuinn

A recent article in the New York Times was entitled: “For Twenty-Somethings: Ambition at a Cost,” it described the way in which new communication technologies have erased the division of work/leisure by forcing us to be “on-call” at all times. The article describes a man who had to leave his own surprise birthday party, because his boss called him and told him to come in. I doubt there is any more symbolic example of loss of control than being unable to choose how we spend the only day meant to celebrate our existence.

--Meg Dholakia
For example, let us look at high school bell systems. In high school, the time-keeping system sounds a bell when it is the appropriate time for class to start, break time, or class to end. This forces students to assimilate to a system in which their breaks and actions are dictated, rather than decided upon by individuals themselves. Similarly to the situation in 1335, during Phillip VI’s rule, students must attend to the bell system, or face the punishment (e.g. detention). As Thompson points out, “evidence is plentiful, and, by the method of contrast, it reminds us how far we have become habituated to different disciplines.” [p93] Now that we are in a college setting with less strict accounting technology (the campanile) we notice more vividly the time conditioning which one underwent during grade school. ... Accounting technology provides one with self-control to be controlled by a greater power.

Tamara Takeshita
"They who have the art
To manage books, and things, and make them work
Gently on infant minds as does the sun
Upon the flower – the tutors of our youth,
The Guides, the Wardens of our faculties,
And Stewards of our labour, watchful men
And skilful in the usury of time,
Sages, who in their prescience would controul
All accidents, and to the very road
Which they have fashion'd would confine us down,
Like engines."

William Wordsworth, *Prelude*, 1850
The two competing visions of communication technology resulting in increasing freedom or increasing control turn out, in this vein, not to be competing at all ... the concern over the control of access to information made possible by a new technology is an eternal issue ...

--Ione Sterental

this is a problem that plagues man no matter where he lies on the timeline; in the past it may have been Catholic priests ... now it may be Facebook using machine learning to cater your news feed to your own bias. Ultimately, each new iteration of information technology will have its benefits and its problems, but these will simply be a continuation of what came before, and in balance with one another, will continue to be compatible as they've always been.

--Melanie Cebula
[I]nformation technologies ... are able to manifest themselves as social forces of a particular place, time, and social level. If we take the development of the internet as an example, we could see that on a personal level, the internet has democratizing effects on those who have access; however, the antithesis of this could be seen at the organizational level, especially in particular governments. ... cameras at the personal level allow the individual to extend human vision, memory, and interaction, but organizationally, even in democratic countries, surveillance systems penetrate every aspect of life. Also, digital information can be tracked and trace, but also hidden and made untraceable.

--Steven Rivera
overview

communications revolution

wishing on technology

inventing inventors?

eyewitness enthusiasm

changing world

what came before?

communications "revolution"
messages without messengers

Dr. Hook's Discourse to the Royal Society, May 21. 1684. shewing a Way how to communicate one's Mind at great Distances.

That which I now propound, is what I have some Years since discoursed of; but being then laid by, the great Siege of Vienna, the last Year, by the Turks, did again revive in my Memory; and that was a Method of discoursing at a Distance, not by Sound, but by Sight. I say therefore 'tis possible to convey Intelligence from any one high and eminent Place, to any other that lies in Sight of it, tho' 30 or 40 Miles distant, in as short a Time almost, as a Man can write what he would have sent, and as suddenly to receive an Answer, as he that receives it hath a Mind
Abbé Nollet
1700–1770

monkish experiments
Abbé Nollet's galvanism, 1753

180 Royal Guards; 1 km Carthusian monks
"when a Leyden jar was discharged, the white-robed monks reportedly leapt simultaneously into the air"
"Voici le rapport du télégraphe qui nous arrive à l'instant. Condé être restituée à la République. Reddition avoir eu lieu ce matin à 6 heures."
30 August, 1794
"The towers of Saint-Suplice are two huge clarinets, which is as good a shape as any, while the crooked, grimacing telegraph forms a pleasant accident on their roof." —Hugo, *Notre Dame de Paris*

**interconnections**

**national system**

- 5,000 km/3,125 m
- 534 stations
- c. 6 miles apart
- in service until c 1853
on land

the Admiralty "six-shutter" telegraph

Portsmouth to London (75 miles): from 3 days to 15 minutes

rebuilt as a

Chappe "semaphore" telegraph, 1815

"[B]y the telegraph [man] renders himself as it were present in the same moment at distant places."

Monthly Review
"Trafalgar, a 'revolutionary' battle in its effects, owed its nature to revolutionary tactics; but those tactics ... were chiefly the product of a revolution in control, brought about by the innovation of Home Popham's telegraphic signalling system."

-- William Keegan, *Battle at Sea*, 1988
Nelson's blind spot

**resisting centralization**

Clapping his glass to his sightless eye, "You know, Foley," he added, turning to his captain, "I've a right to be blind sometimes. I really do not see the signal. D—n the signal! Keep mine for closer action flying."

Battle of Copenhagen, 1801

**compare the US navy and Marconi**
overview

wishing on technology

inventing inventors?

eyewitness enthusiasm

communications revolution

what happened?

communications "revolution"

changing world

Tuesday, March 5, 2013
along came Morse

Samuel Morse
(1791-1872)

"If the presence of electricity can be made visible in any desired part of the circuit, I see no reason why intelligence may not be instantaneously transmitted by electricity to any distance."

1837, patent filing; numerical codes
1843, Washington-Baltimore line (US govt funded)
1861, transcontinental telegraph
1868: *duplex* (Joseph Stearns)

*qadruplex* (Thomas Edison)

**visible speech: harmonic telegraph** (Bell)

"Watson come here, I want (need) (to see) you"

"I could hear your voice plainly.  
I could almost make out what you said"
overview

communications revolution

changing world

eyewitness enthusiasm

inventing inventors?

wishing on technology

communications "revolution"
from private enterprise to moral grandeur

"its great and incalculable practical importance and usefulness to the country, and ultimately to the whole world ... presumptuous ... to attempt ... to calculate ... usefulness .. political, commercial, or social ... it is obvious, however, ... a revolution unsurpassed in moral grandeur by any discovery ... to the present day."

Congressman "Fog" Smith,
Chairman, House Committee on Commerce

Tuesday, March 5, 2013
It is a matter of proud congratulation that we witness the rapid advancement of the arts and sciences on this side of the Atlantic, and to hear how frequently the skill and experience of our citizens are purchased by the wisest monarchs of Europe. The liberality with which our artisans are compensated abroad, is the highest proof of their superiority. Our manufactures are extending throughout the world. The ocean and the land alike bear testimony to American ingenuity. Praise is but a tribute due to her constitution and the laws, which extend equal rights and privileges to all.

Among the most brilliant discoveries of the age, the electro magnetic telegraph deserves a conspicuous place; destined, as it is, to change as well as hasten transmission of intelligence, and so essentially to affect the welfare of society, all that concerns its further developments will be hailed with joy.

Imagination can scarcely conceive what is now accomplished by the electric fluid, when confined and tamed, as it were, to the purposes of life. Thought has found a competitor! Nor is it less gratifying that this invention is American. To a native citizen belongs the merit of the discovery, and it is hoped that the country of his birth will reward him accordingly.

The public, at first, could scarcely believe it possible that intelligence can be sent at the rate of 188,000 miles in a second; nor that the earth would suffice for half of the current of communication; nor that currents of electricity from opposite poles would traverse the same wire at the same time.

--Henry Ellsworth, commissioner of patents
the great inventor

"the great inventor ... to convince the world of a new method of imparting information ... on a higher plane than that accorded to mere inventors" -- *NYT*, 1879

unveiling of Morse's statue

June 10, 1871
communications "revolution"

wishing on technology

inventing inventors?

eyewitness enthusiasm

communications revolution

changing world
reliable witnesses?

business as usual
Congressman "Fog" Smith, business partner

patent partner
Henry Ellsworth
old friends (Yale 1810); prospective in-laws

statue of limitations?
patent troubles
Veil's assistant

"It is singular" that a series "of mechanical and scientific failures [has] given a man such a name and so proud a place in history"

--William Baxter,

"The Real Birth of the Electric Telegraph,"

[n.d.]
Carl Frederich Gauss (1777-1855)
Gottingen observatory telegraph, 1833

Pavel Lvovitch Schilling (1780-1836)
Russian Admiralty telegraph, 1835

William Cooke (1806-1879)
Charles Wheatstone (1802-1875)
GWR telegraph, 1837

Harrison Dyar, 1827, Long Island

Joseph Henry, 1830
"electromagnetism ... discovered in 1820 by a Danish scientist ... the steady reliable current ... by the British chemist J. Frederick Daniell. ... Wheatstone and Cooke had installed an electrically powered signaling system ... several years before Morse ... the American chemist Harrison Gray Dyar ... workable electrical telegraph on Long Island ... 1827"

--R. John, Network Nation
cast your mind back

"[Theodore] De Vinne, in his book [The Invention of Printing, 1789] writes, 'The inventor of printing did not invent paper .. did not originate engraving on wood. He was not the first to print upon paper, he was not the first to make printed books, it is not certain that he made the first press, it is not probable that he was the first to think of or make movable type. What he did was to invent the type mold... it was the type mold that the Koreans developed.'

what did Morse do?

(a) introduced a "binary" code

Morse Code or "Vail Code"?

"a patient waiter is no loser"

Speedwell Iron Works
Jan 6, 1838
"The director of the post will only have to translate these numbers into longs (−) and briefs (-uppercase), ... to deliver this translation to the operator."

Transactions of the American Philosophical Society, 1799
what did Morse do?

(b) reintroduced electronic signaling

1837, 18 submissions to US govt: 17 were line of sight

(c) introduced a simpler system

"[Wheatstone's] system more complicated and less efficient than the American telegraph ... the deflection of the needle became the principle upon which the savans of Europe based all their attempts ... another discovery ... by Ampère and Arago, immediately consequent on that of Oersted, namely: the electro-magnet which none of the savans of Europe ... ever thought of applying ... My telegraph is essentially based on this latter discovery." (1842)
"an industry shaped by law"

**Morse**

1837 filing; patent settled, 1854

"I can't give [the figure] exactly now, but the aggregate ought to sum up something very close to $500,000" --Morse, *NYT*, 1879

**Bell v Western Union, Gold & Stock**

(Elisha Gray, Thomas Edison, E.A. Calahan)

18 years, 600 patent actions & 600 competing patents bought
succeding technology

Bell, Hubbard, & Sanders

(Bell Patent Association, Bell Telephone, AT&T)

1875, telegraph filing multiple patents

1876, Valentine's Day filing

Elisha Gray:

(Western Electric)

late caveat

the English patent

"part of the instrument had been screwed down for Atlantic crossing...."
overview

communications revolution

changing world

eyewitness enthusiasm

inventing inventors?

wishing on technology

war & peace

communications "revolution"
"May the Atlantic telegraph, under the blessing of heaven, prove to be a bond of perpetual peace and friendship between the kindred nations, and an instrument destined by Divine Providence to diffuse religion, liberty, and law throughout the world."

---President Buchanan, 1858

"Tomorrow the hearts of the civilized world will beat in a single pulse, and from that time forth forevermore the continental divisions of the earth will, in a measure, lose those conditions of time and distance which now mark their relations...The Atlantic has dried up and we become in reality as well as wish, one country."  ---Times
"It is impossible that old prejudices and hostilities should longer exist, while such an instrument has been created for the exchange of thought between all the nations of the earth."

-- Charles Briggs & Augustus Maverick, The Story of the Telegraph, 1858

"Steam was the first olive branch offered to us by science. Then came the still more effective olive branch--this wonderful electric telegraph, which enables any man who happens to be within reach of a wire to communicate instantaneously with his fellow men all over the world."

-- Ambassador Thornton, 1858
and moral progress

"facilitating Human Intercourse and producing Harmony among Men and Nations ... [I]t may be regarded as an important element in Moral Progress"

--- *Daily Chronicle* [Cincinnati] 1847

"the hand of progress beckons ....
a rivet is loosened from the chains of the oppressed"

--- *Commercial and Financial Chronicle*, 1865.

"the great chain that will bring all civilized nations into instantaneous communication...the most potent of all the means of civilization, and the most effective in breaking down the barriers of evil prejudice and custom"

--- *Hunt's Merchants' Magazine*, 1868
Crimean War, 1855

"The steamer and the electric telegraph made the blood of England beat quicker in every heart, when our newspapers recorded, on the 13th of November, the most sanguinary and heroic battle of modern times, fought in the Crimea only a week previous."

--Charles Knight, *Knowledge is Power*, 1855

"The press and the telegraph are enemies we had not taken into account"

--Earl of Clarendon, British Foreign Secretary
Bismarck & the Ems telegram

His Majesty [having told Cont Benedetti that he was awaiting news from the Prince,] has decided [with reference to the above demand] not to receive Count Benedetti again, but only to let him be informed through an aide-de-camp that his Majesty [had now received from the Prince confirmation of the news which Benedetti had already received from Paris and] had nothing further to say to the ambassador.

a war caused by telegram
Zimmerman telegram

War again

We intend to begin ... submarine warfare. We ... to keep the United States neutral.

In the event of this not succeeding, we make Mexico a proposal of alliance on the following basis: make war together, make peace together, generous financial support and understanding on our part that Mexico is to reconquer lost territory in Texas, New Mexico, and Arizona.

Received, Mexico, Jan 17, 1917
Zimmerman telegram

We intend to begin ... submarine warfare. We
... to keep the United States neutral.
In the event of this we make Mexico a proposal of alliance
on the following basis together, make peace together, generous financial support and an understanding on our part that Mexico is to reconquer the lost territory in Texas, New Mexico, and Arizona.

received, Mexico, Jan 17, 1917

---

GERMAN PLOT TO LINK JAPAN AND MEXICO IN ALLIANCE OF WAR AGAINST AMERICA.
We intend to begin unrestricted submarine warfare. We shall endeavor to keep the United States neutral. In the event of this not succeeding, we make Mexico a proposal of alliance on the following basis: make war together, make peace together, generous financial support and an understanding on our part that Mexico is to reconquer the lost territory in Texas, New Mexico, and Arizona.

Berlin, Jan. 7.—“Never since the beginning of the war have the relations between Germany and the United States been as cordial as now.” Amid tremendous cheers, James W.
ZIMMERMANN EXPLAINS.

Herr Zimmermann paints what all admirers here and in Germany will consider a damning picture of the contrast between American and German methods. “Our behavior contrasts considerably with the behavior of the Washington Government,” he truly says. And he explains: When he instructed the German Minister to Mexico to propose an attack on the United States by Mexico and Japan, it was done with a kindliness regard for our feelings; was done with the utmost secrecy. Washington, with a coarseness which volatizes him, obtained and published confidential instructions—“in a way that was not unobjectionable,”

GERMAN PLOT TO LINK JAPAN AND MEXICO IN ALLIANCE OF WAR AGAINST AMERICA.

GERARD IS HONOR GUEST

Envoys Sees Cordial Relations Between Germany and U. S.

TELEGRAM SENT TO PRESIDENT

Banqueters at Berlin Cheer Ambassador When He Tells of Good Feeling That Exists—German Officials Take Same View and Von Gwinner Calls Gerard “Peace Dove.”
"If information is power, whoever rules the world's telecommunication system commands the world"

--Peter Hugill

open to all?

cable cutting and cable tapping
"The telephone, the teleprinter and the wireless made it possible for orders from the highest levels to be given directly to the lowest levels, where, on account of the absolute authority behind them, they were carried out uncritically ... Former dictatorships needed collaborators of high quality even in the lower levels of leadership, men who could think and act independently. In the era of modern technique an authoritarian system can do without this ... The means of communication alone permit it to mechanise the work of subordinate leadership. As a consequence a new type develops: the uncritical recipient of orders"

--Albert Speer, Nuremberg trials.
overview

communications revolution

wishing on technology

inventing inventors?

eyewitness enthusiasm

changing world

communications "revolution"

free market

Tuesday, March 5, 2013
speculation of freedom

"The telegraph being alike open to all puts the whole community upon a par, and will thus 'head off' the most adroit speculators, because they will not have the power to monopolize intelligence.

Public Ledger and Daily Transcript
(Philadelphia), 1846
speculative alliances

patented revolver, 1835

Samuel Colt
1814-1862

Colt & Morse, 1843

patented revolver,

naval mine

Colt & Robinson, 1846

New York & Offing

Line of Magnetic Telegraph
"It is evident that the system of Telegraphing news is destined to supersede in a great degree, the publication of commercial newspapers in this and other Northern cities."

"We may safely calculate .... every person desiring early information from abroad must become a subscriber and consult the Books of [our news-room]."

--Colt & Robinson
speculative precedents

Admiral Cochrane
"Napoleon is dead" 1814
Omnium from 26-1/2 to 33

Stendhal
*The Telegraph*, 1835

Thomas Cochrane
1775–1860
speculative control in action

New York Associated Press
James Gordon Bennett
*New York Herald*

Moses Beach
*New York Sun*

**consolidation:**
Sibley's Western Union, 1855
Gould's Western Union, 1881
"The newspapers of California, which hardly dare notice the incorporation of a rival company, and dare not endorse a public measure of which you disapprove, are subservient enough already... you could destroy a private business... more completely than earthquake or conflagration could do the work the Telegraph, which has become a necessity of individual and social life, is not merely private property... it is a great public trust to be administered for the benefit of the whole community. ... This crushing of newspapers may be a small thing to the Great Western Union--mere pastime to its managers"

--Henry George, 1869
contemporary views

Richard John, "Robber Barons Redux: Antimonopoly Reconsidered."
Enterprise & Society (2012) 13(1) 1-38
competitive markets?

Western Union

"the first industrial monopoly, swallowed up its last two rivals in 1866. .... [O]nly in the United States and Canada did the telegraph remain under private control after 1868"

-- Du Boff, "The Telegraph...Technology & Monopoly", 1984
natural monopoly?

**Ma Bell**
- 1876 Bell Telephone
- 1885 AT&T
- 1894 Bell Patents expire
- 1899 AT&T incorporates Bell
- 1910 AT&T buys Western Union
- 1913 Kingsbury (monopoly) Commitment
- 1915 AT&T San Francisco
- 1927 transatlantic telephone
- 1982 break up: the Baby Bells
reassembly?

Ameritech - now AT&T
Bell Atlantic - now Verizon
Bell South - now AT&T
Pacific Telesis - now AT&T
Southwestern Bell - now AT&T
US West - independent
2011 AT&T attempts to buy Verizon, T-Mobile
coming up

7 Mar: The Telegraph in China

Guest Lecture: Tom Mullaney, Stanford University