



narrowcast

telephone & telegraph:
point-to-point vs broadcast

History of Information
March 2 2010





March 5 -- proposal due

March 11 -- outline due

March 18 -- **8 am** paper due

paper option

Students can submit a 5-6 page paper instead of a midterm exam. The description of the paper topic is below. We think you'll get a lot out of the exercise, but be warned it will probably involve more work than preparation for the exam will. If opt to do the paper and then decide at the last minute that you can't, **you can always take the midterm.**

Students who want to do a paper in place of a midterm should send us **a note by March 5** indicating what topic they'll be taking on so that we can sign off on it. **A 3/4-page outline of the paper, with a list of sources, will be due on March 11.** The paper itself will be due on **March 18 by 8 AM.**

Topic: The paper will have three parts:

1. A careful description of two contrasting positions on the notion of technological determinism, based on the Heilbroner reading and the Bijker article "King of the Road." Alternatively, you may choose another scholarly source to stand in for one of the two positions. (A "scholarly source" would be a journal article or a book published by a scholar or researcher -- but not, for example, an article in a popular magazine, a web site or blog, and not, it goes without saying, an article from Wikipedia, though that may be useful in locating scholarly references.)
2. An application of one or the other of these positions relative to either the development of writing or printing -- how well does the position on technological determinism hold up when evaluated against the effects of these technologies? The discussion should draw on the class readings (required and suggested), the class discussion, and external scholarly sources. How well does the position you have chosen to elaborate hold up when measured against the effects of writing or printing? Be specific in discussion these effects.
3. Finally, present your own view on the relation of technology to social and cultural change (this is something more than a one-sentence description, and should account for the examples you have talked about in section (2).

In addition to the readings mentioned above, **the paper should draw on at least three scholarly sources.**



aob

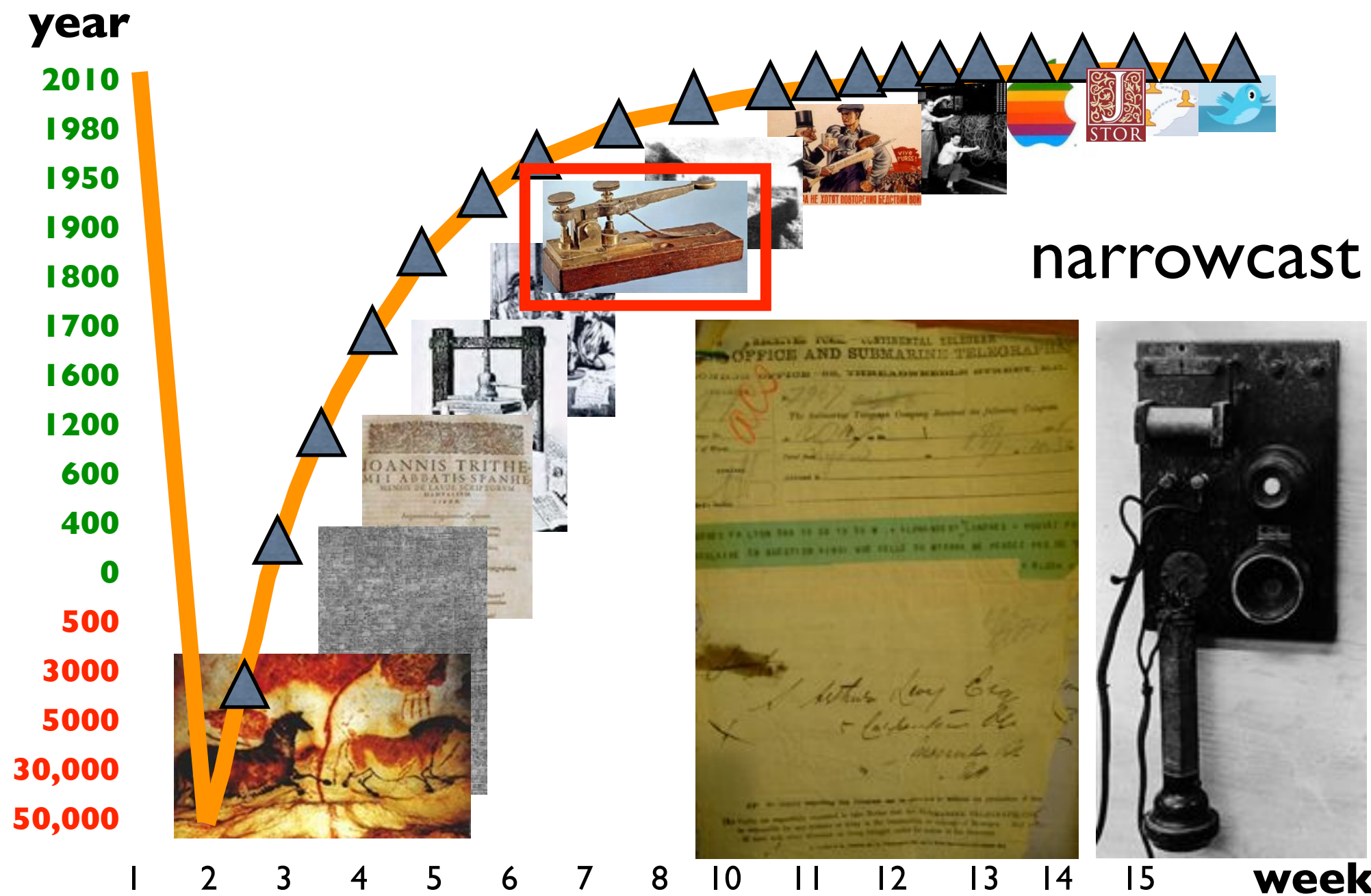
"The State of the Internet"

<http://flowingdata.com/2010/03/01/the-state-of-the-Internet/>





where are we going?





getting technology right

taking sides

Socrates was wise?

Socrates was foolish?



turning the corner



information transformed

telegraph

electric telegraph

harmonic telegraph

telephone

technological predictions
(and your thoughts throughout)



Henry Adams
1838–1918

where to begin

"Only on looking back, fifty years later, at his own figure in 1854, and pondering on the needs of the twentieth century, he wondered whether, on the whole, the boy of 1854 stood nearer to the thought of 1904, or to that of the year 1 ... in essentials, the American boy of 1854 stood nearer to the year 1 ... The education he had received bore little relation to the education he needed. Speaking as an American of 1900, he had as yet no education at all. He knew not even where or how to begin."

Henry Adams, *The Education of Henry Adams*
[1905]



"a law of acceleration"

"Before the boy was six years old he had seen four impossibilities made actual--the ocean-steamer, the railway, the electric telegraph, and the Daguerreotype. ... Every day Nature violently revolted, causing so-called accidents. The railways alone approached the carnage of war; automobiles and fire-arms ravaged society."



error-free?

"[I]n every city, town, and farmhouse, were myriads of new types--or type-writers--telephone and telegraph girls, shop-clerks, factory-hands, running into millions of millions and, as classes, unknown to themselves as to historians. . . . All these new women had been created since 1840; all were to show their meaning before 1940."



information transformed



Visite à
l'imprimerie
1784?

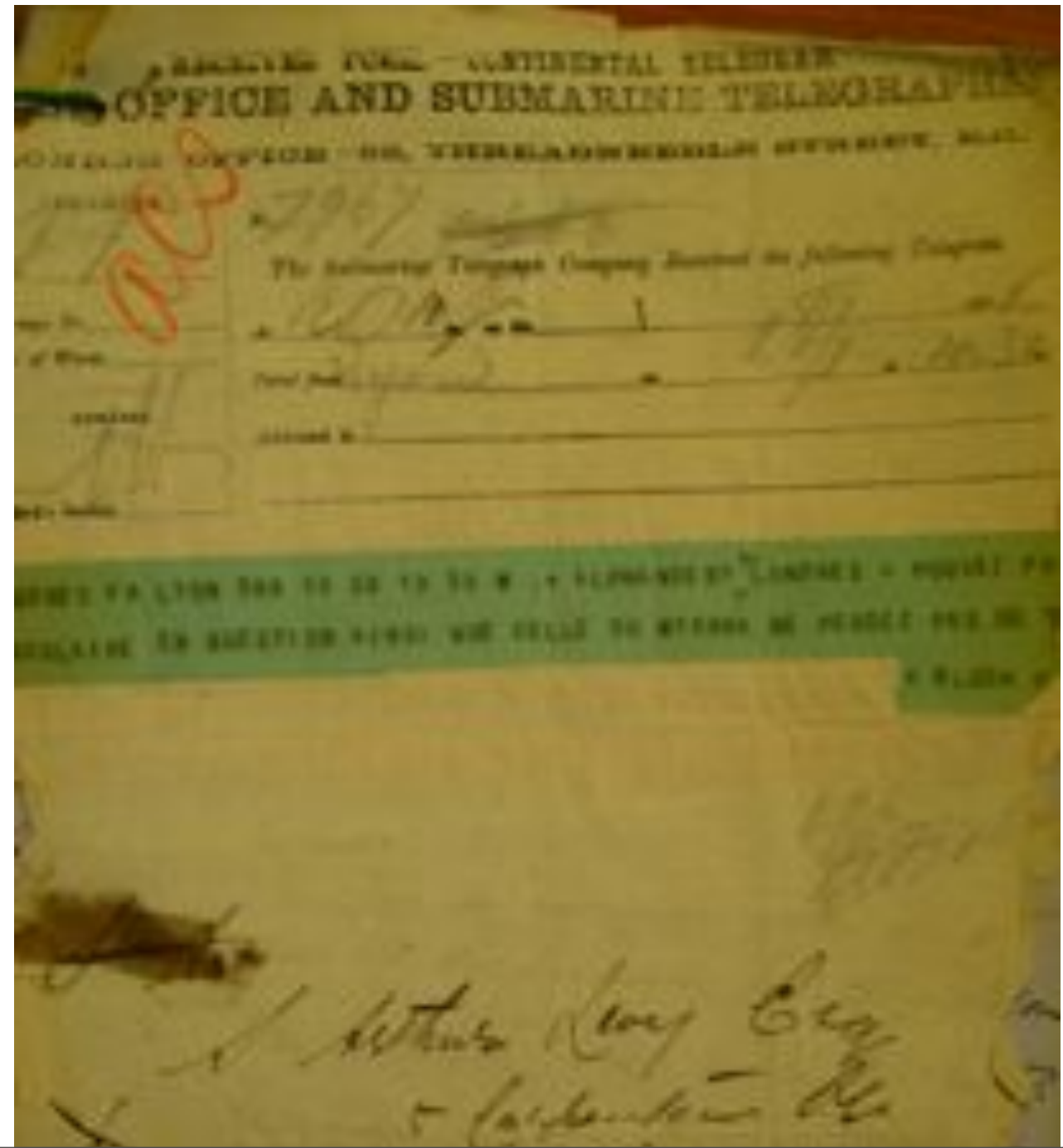




information transformed

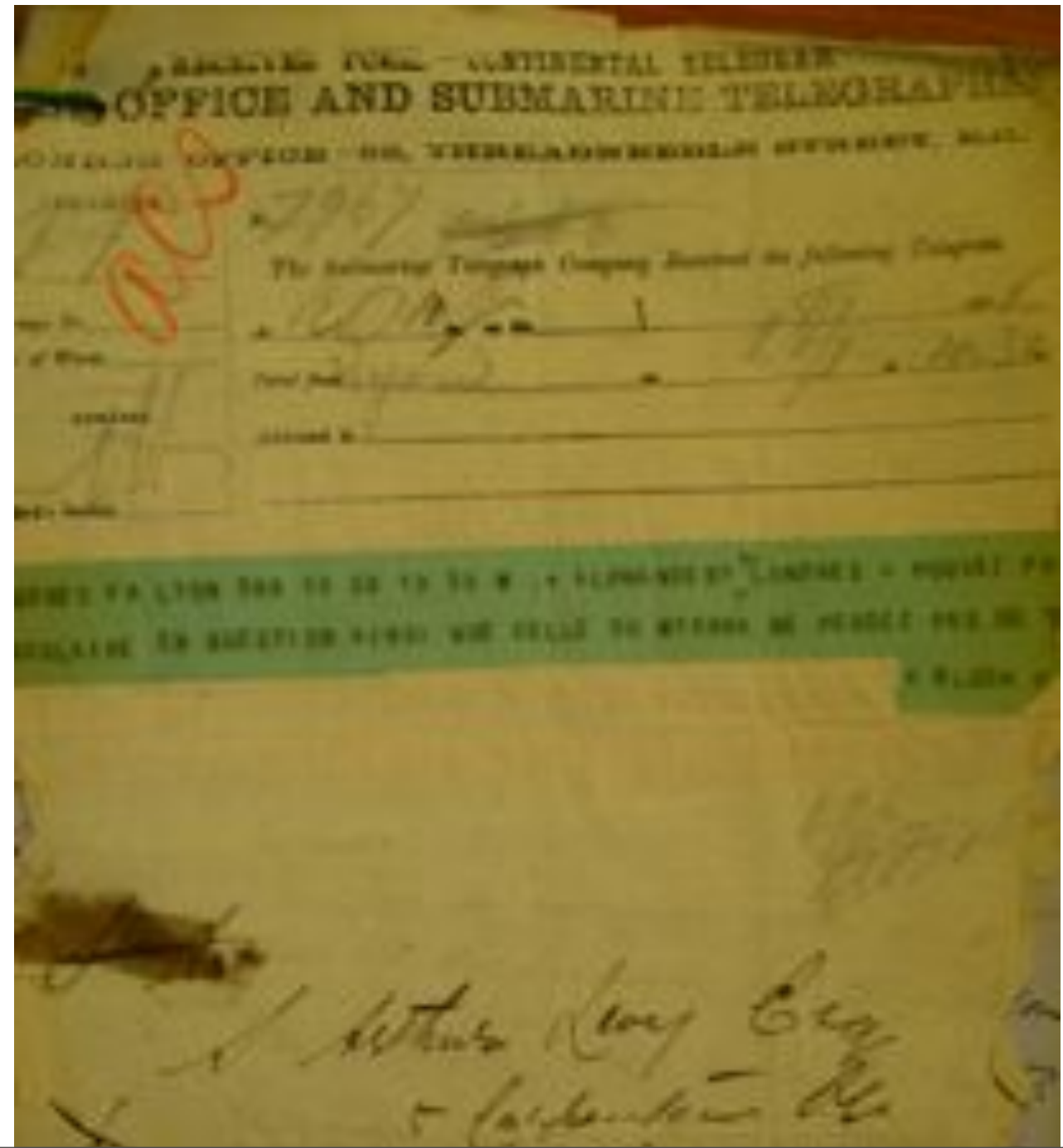


Visite à
l'imprimerie
1784?





information transformed





information transformed

physical infrastructure

industrial infrastructure

finance & monopoly capitalism
industrial research

national interest

state support
military/intelligence
property

international interests

colonialism, international business
standards





Telephones require defined infrastructure – the system of altering the way they communicate is not something that can be quickly changed

-Soheil Sazesh



[Bell and Colt & Williamson] ignore the complexities and the interplay of the environment, social sciences, and technology; instead the two papers focus on the immense benefit to human society in the foreseeable future by telephone lines, without looking at all into the enormous infrastructure undertaking and what that might mean to the development and implementation of new communication systems

Sam Kravin





infrastructure builders

Newman & Co,
1660ff

Dartmouth
Bournemouth
London
Vianna
Porto
Bilbao
Newfoundland
Concepcion
Zanzibar
Madagascar

politics

growing nations, growing empires
democracy?

business

overseas investment, overseas exploitation
development?

politics & business

East India Company ...
Falklands Company



common problem

Packet boats
from England,
1720

France, 3
Spain, 2
Flanders, 2
Holland, 2
Ireland, 2

too much time, too little news

communication needs

speed
frequency
regularity

messages by sea

irregular: merchant ships
regular: packet boats

TRADE BETWEEN LONDON AND BOSTON, U.S.A., 1765-71 (claxi, 158).—
In 1775 the postal communication with the British Dominions in America was by five packet-boats between Falmouth and New York, sailing from the former the first Saturday, from the latter the second Saturday in every month, they were,
Halifax, Capt. John Bolderson.
Duke of Cumberland, Capt. John Mitchell.
Lord Hyde, Capt. Norris Goddard.
Harriet, Capt. Geo. Oaks.
Mercury, Capt. Rob. Dillon.
The postage between London, and any port within the British Dominions in America, of a single letter (i.e., one sheet of paper) was 12d., which covered inland conveyance in the Dominions up to 60 English miles; from 60 to 100 miles, 6d.; 100 to 200 miles, 8d., not passing through a chief office; and so in proportion increasing two-pence for any distance above every 100 miles. All double, treble,





carrying trade

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





carrying trade

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"



Fra

489





carry to send



mail coach
roughly 8 mph



train

"the Average speed of the early railways in England is 20 to 30 miles an hour, which is roughly three times the speed previously achieved by stagecoaches"

--Schivelbusch, "Railroad Space & Railroad Time"

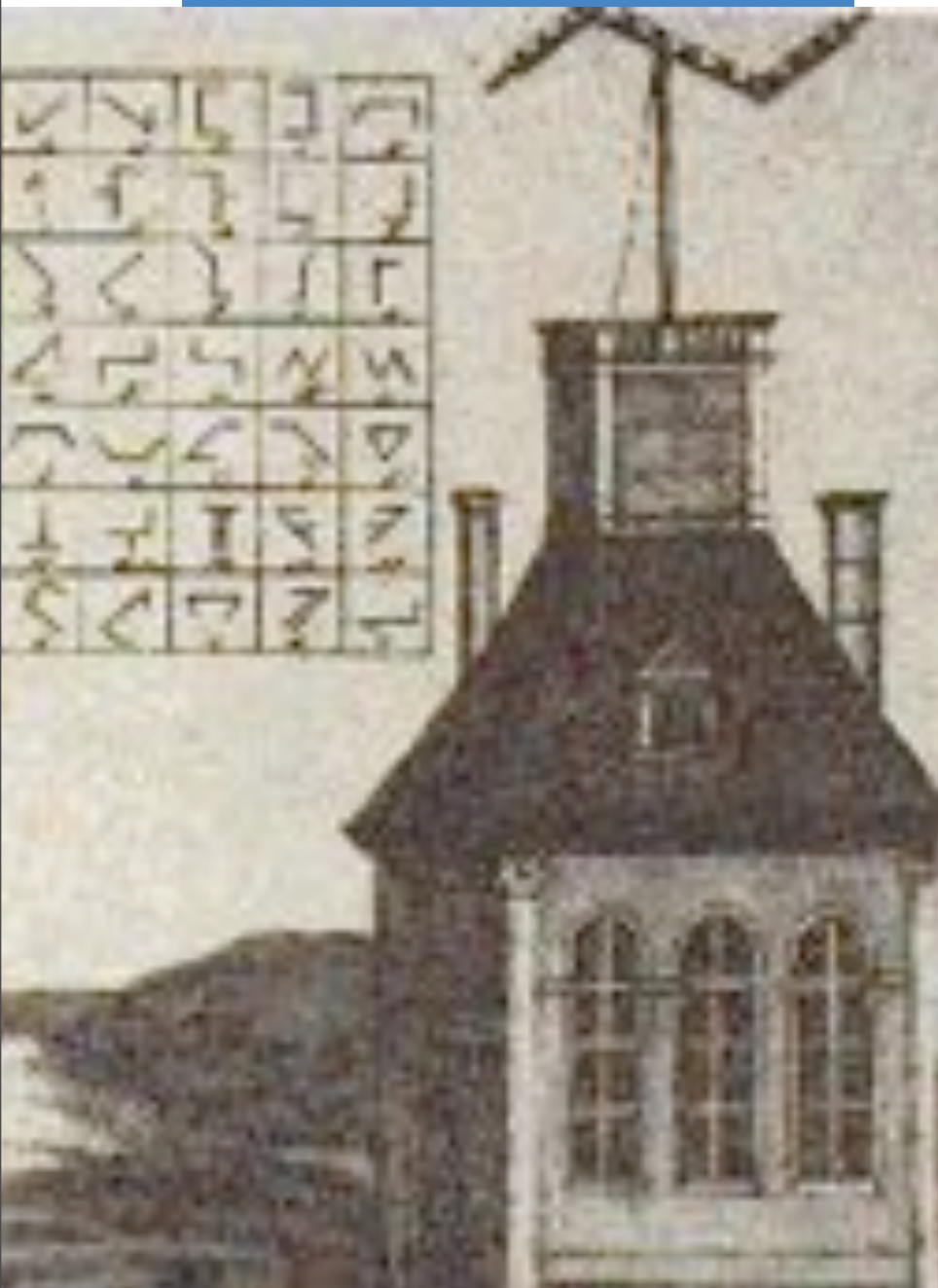


Claude Chappe
(1763–1805)



see

Chappe *sémaphore* La Ligne Paris-Lille 16 stations





Claude Chappe
(1763-1805)

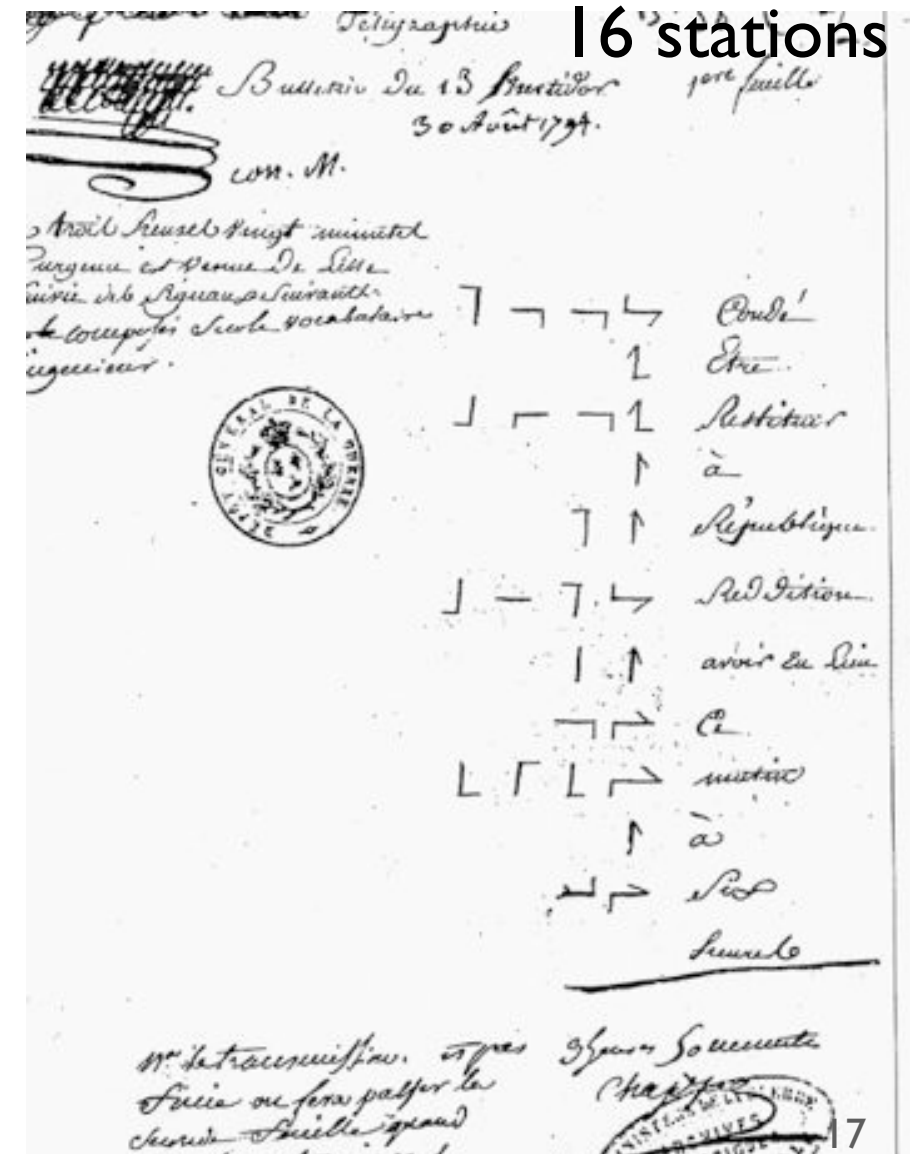
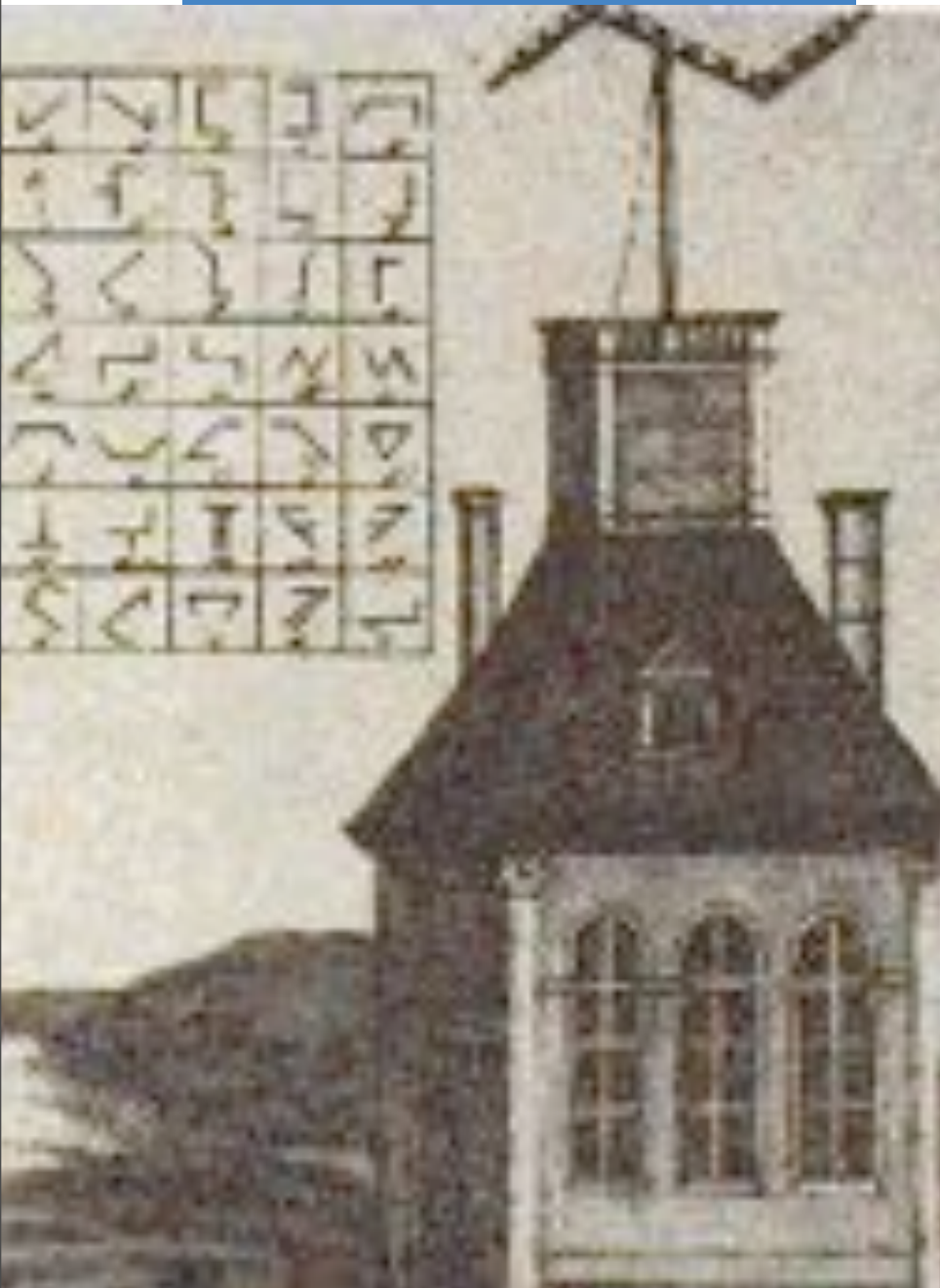


see

Chappe sémaphore

La Ligne Paris-Lille

16 stations





Claude Chappe
(1763–1805)



"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."

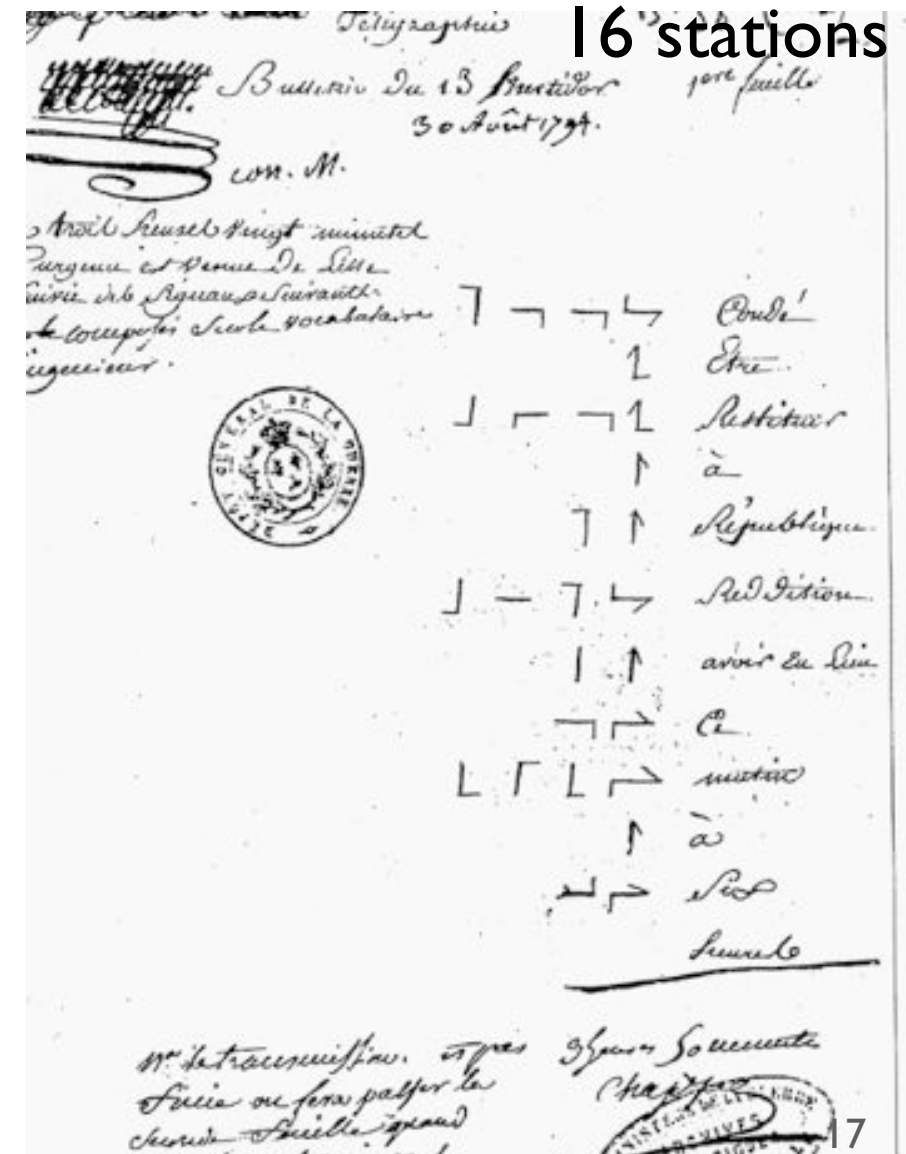


30 August, 1794

see



Chappe sémaphore La Ligne Paris-Lille 16 stations





national aspiration

"The establishment of the telegraph is ... the best response to the publicists who think that France is too large to form a Republic. The telegraph shortens distances and, in a way, brings an immense population together at a single point."

--Claude Chappe, 1793



national system

5,000 km/3,125 m

534 stations

c. 6 miles apart

in service until c 1853

a single point?





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heard this elsewhere?

"at bottom, this invention might
suffice to make possible the
**establishment of democracy among a
large population ... no reason why
it would not be possible for all
the citizens of France to
communicate their will ... in such
a way that this communication might
be considered instantaneous."**

Alexandre Vandermond, 1795



infrastructure



infrastructure

roads



infrastructure

roads

canals



infrastructure

roads

canals



To and from Albany and Buffalo, by the Erie Canal.

Passengers by the Canal will reach Buffalo from Albany, or Albany from Buffalo, if travelling by the boat, in about six days. The usual rate of fare is 7 cent per mile without, or 14 cents with board. Travelling by packets, passengers from and to Buffalo and Schenectady arrive in about 3 1/2 days. No packets ply between Albany and Schenectady.

Albany		Canastota	2 146	Port Gibson	3 235
West Troy	7	New Boston	4 150	Palmyra	5 240
Jenotson	2	Chittenango	3 133	Fairport	12 252
Schenectady	21	Kirkville	5 158	Pallam's Basin	1 253
Amsterdam	17	Madison	4 162	Fittsford	6 259
Schoharie Creek	5	Orville	3 165	Rochester	10 269
Fultonville	5	Syracuse	6 171	Spencer's Basin	12 281
Spencer's Basin	9	Geddesburg	2 173	Adams	3 284
Canajoharie	3	Nine-mile Creek	5 174	Brookport	5 289
Fort Plain	3	Camillus	1 179	Holley	5 294
Little Falls	16	Canton	5 184	Hulbertson	4 298
Herkimer	7	Jordan	6 190	Albion	6 304
German Flats	2	Weed's Fort	6 198	Eagle Harbour	3 307
Frankfort	4	Centre Port	1 197	Knowlesville	4 311
Utica	9	Port Byron	2 199	Madona	4 315
Whitesboro	4	Wootenusa	6 205	Middleport	6 321
Oriskany	3	Lockpit	6 211	Lockport	12 333
Rome	8	Clyde	5 216	Pendleton	7 340
New London	7	Lyons	9 222	Fancwania	12 352
Loomis	6	Lockville	6 231	Black Rock	9 363
Oneida Creek	3	Newark	1 232	Buffalo	3 364
Levon Basin	3				

Cleveland to Portsmouth, by Ohio Canal.

Boston	21	Dover	10	93	Lancaster			
Wiles	9	29	New Philadel's	4	97	Canan	11	200
Old Portage	2	34	New-comers			Columbus side-		
Akron	6	38	Town	21	118	cut	18	218
New Portage	6	44	Coshocton	17	132	Bloomfield	10	228
Clinton	8	52	Lewisville	14	133	Crookville	8	236
Mamilton	13	60	Newark	44	176	Chillicothe	22	258
Bethlehem	6	71	Hebron	9	182	Piketon	25	282
Bolivar	9	80	Locking Summit	4	189	Lanesville	14	297
Zoar	3	83				Portsmouth	12	309



infrastructure

roads

canals

63

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Fultonville	5 51	Syracuse	6 171	Spencer's Basin	12 281
Spencer's Basin	9 60	Geddesburg	2 173	Adams	3 284
Canajoharie	3 69	Nine-mile Creek	5 174	Brookport	5 289
Fort Plain	3 72	Camillus	1 179	Holley	5 294
Little Falls	16 88	Canton	5 184	Hulbertson	4 298
Herkimer	7 95	Jordan	6 190	Albion	6 304
German Flats	2 97	Weed's Fort	6 198	Eagle Harbour	3 307
Frankfort	4 101	Centre Port	1 197	Knowlesville	4 311
Utica	9 110	Port Byron	2 199	Madona	4 315
Whitesboro	4 114	Wootenusa	6 205	Middleport	6 321
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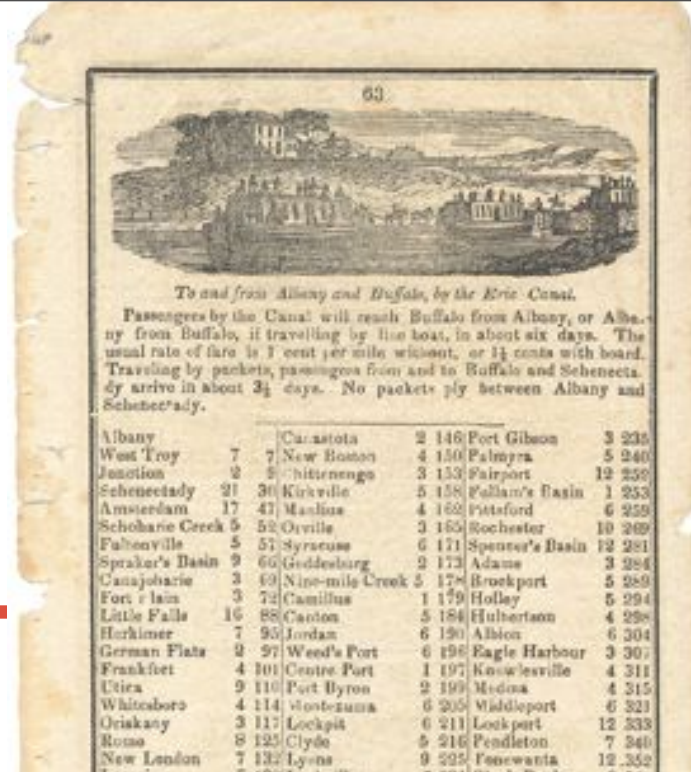


infrastructure

roads

canals

railways



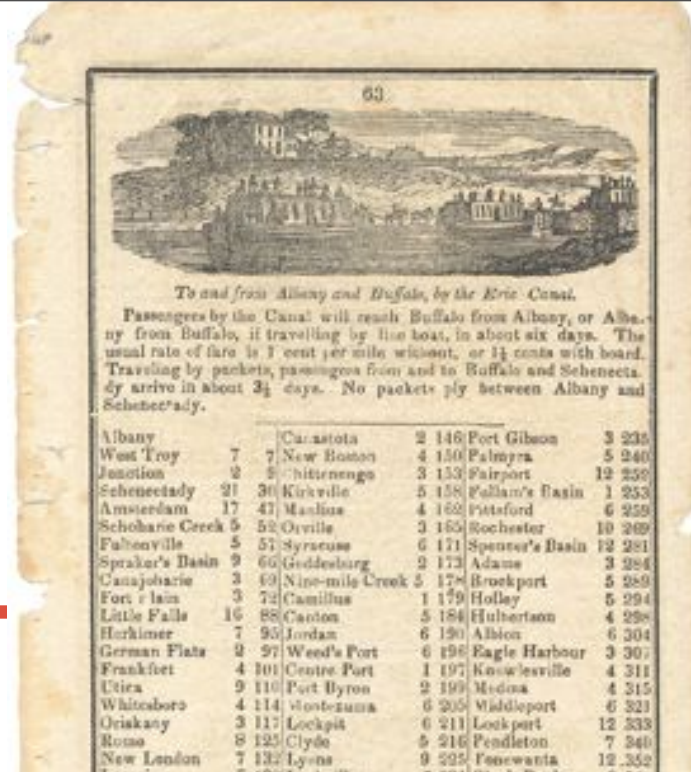
infrastructure

roads

canals

railways





infrastructure

roads

canals

railways





infrastructure





Via Easter





interconnections



cables

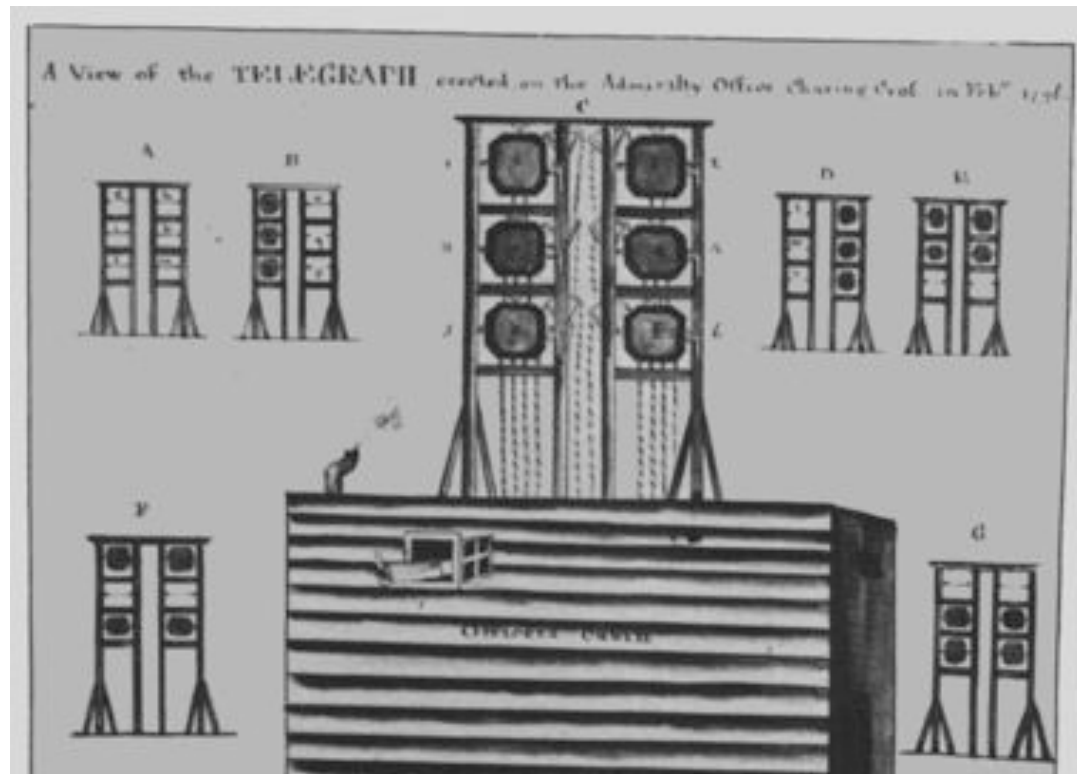
(but also treaties, standards)

Prussia-Austria: 1849

England-France: 1851

New York-Newfoundland: 1856

Britain-North America: 1858-1866



military connections

on land

the Admiralty "six-shutter" telegraph
Portsmouth, Deal, 1796

Portsmouth to London (75 miles):

from 3 days to 15 minutes

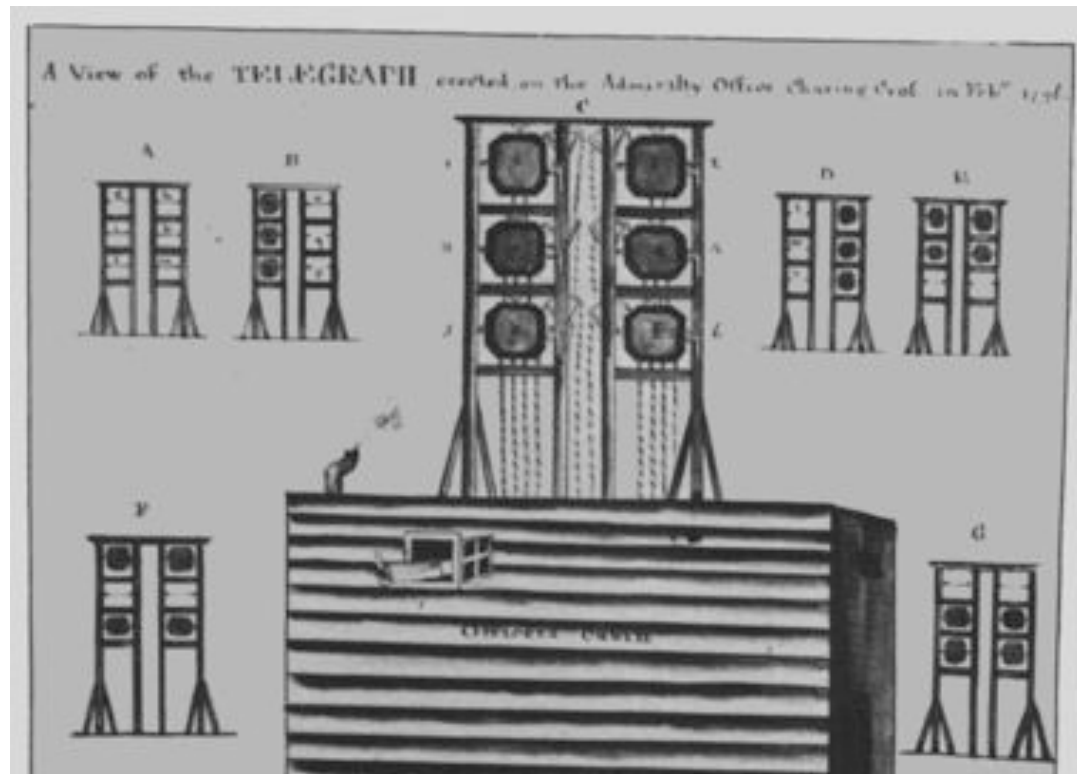
rebuilt as a

Chappe "semaphore" telegraph, 1815

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

Monthly Review





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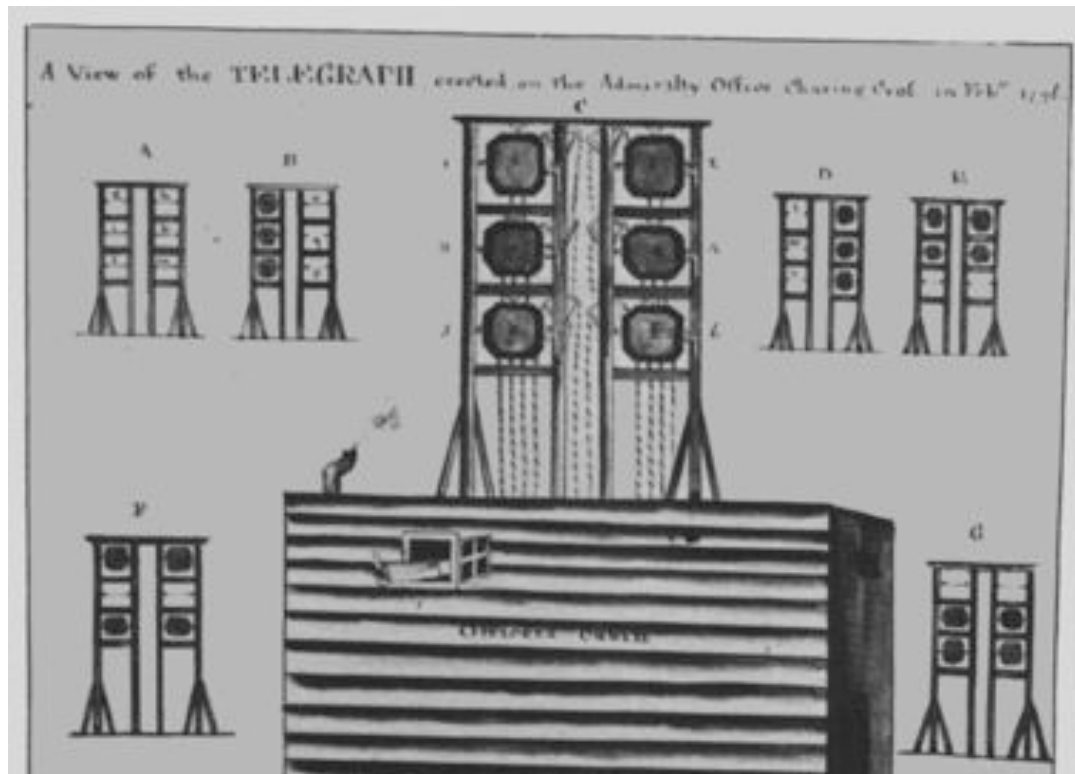
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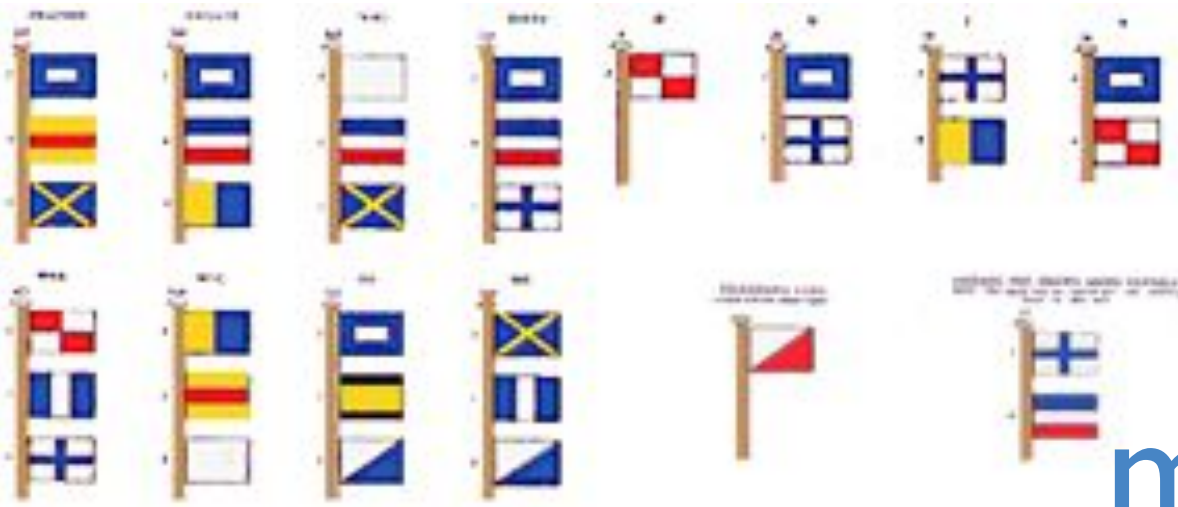
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Monthly Review





military connections



at sea

1805: "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. ... Nelson had at his disposal the means to direct his ships wherever he wanted them to go".

William Keegan

Home Popham (1762-1820)

Telegraphic Signals, or Marine Vocabulary, 1800



Abbé Nollet
1700–1770



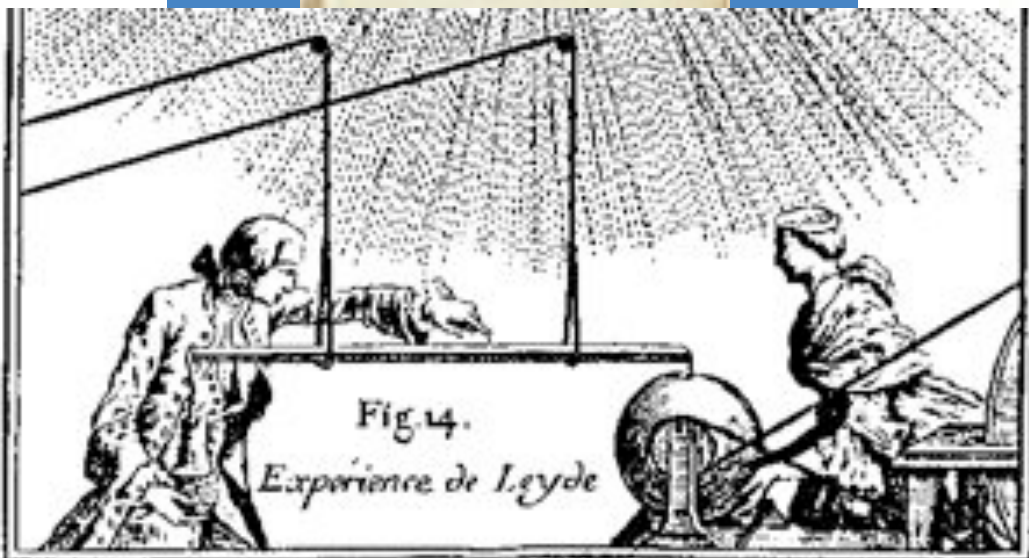
line-of-shock

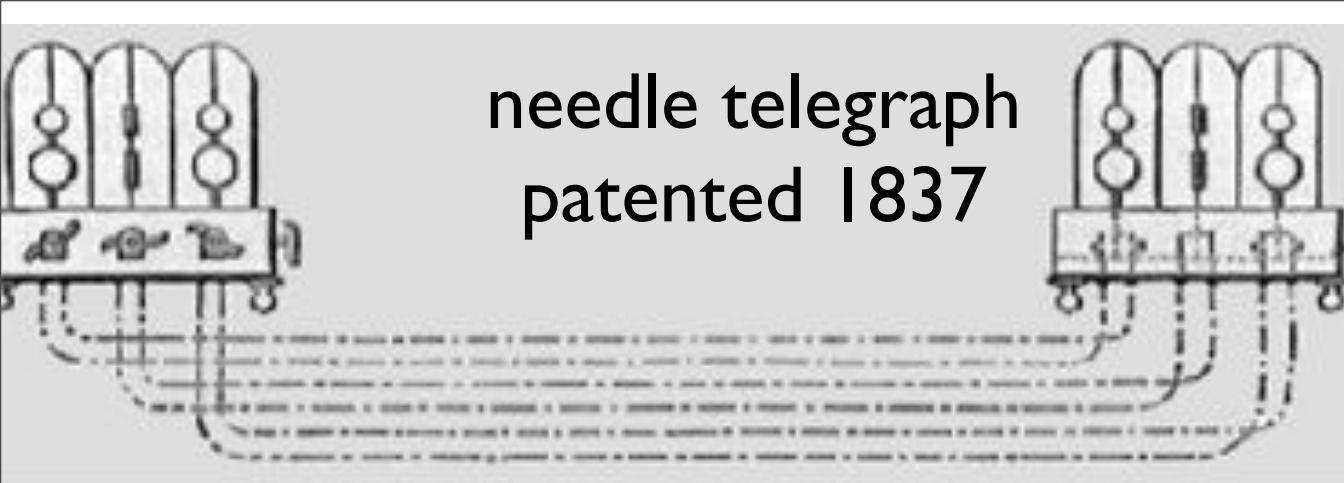
galvanism: Abbé Nollet's electrical signals

180 Royal Guards

1 km Carthusian monks

"when a Leyden jar was discharged, the white-robed monks reportedly leapt simultaneously into the air"



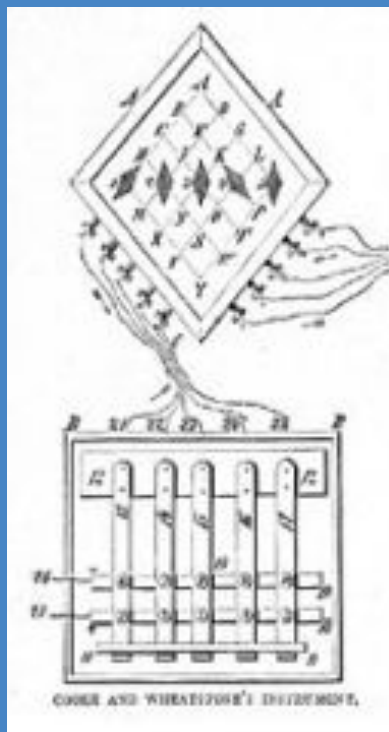


needle telegraph
patented 1837

transatlantic race



Pavel Schilling
1780-1836



Carl Frederich Gauss (1777-1855)
Pavel Lvovitch Schilling (1780-1836)
William Cooke (1806-1879)
Charles Wheatstone (1802-1875)

Russian Admiralty telegraph, 1835

"The unwearied invisible messenger,
now employed daily and nightly, by land
and by water, in carrying the dispatches
of commerce and war to every corner of Europe
was first brought into the service of mankind
by an invention for
which the English patent
was granted ... on the 12th of June, 1837."

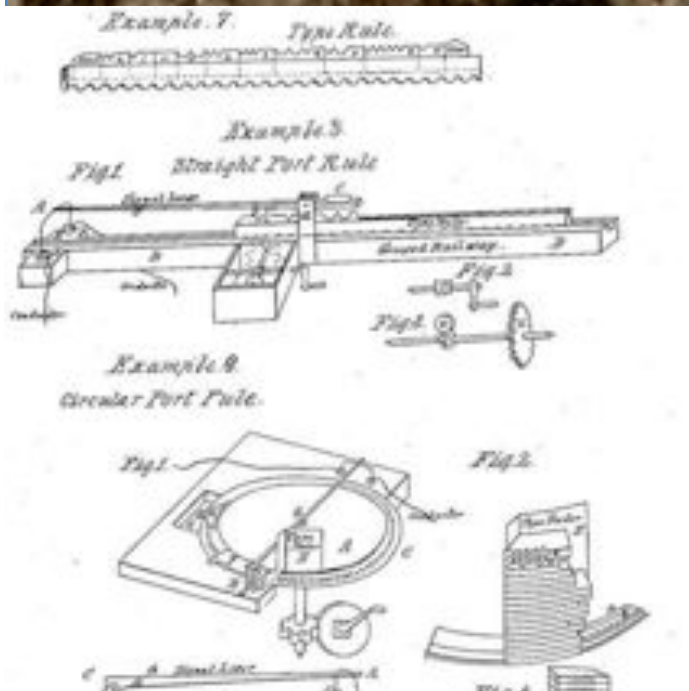
GWR telegraph, 1837

*Cooke, The Telegraph, Was it Invented by Professor
Wheatstone? 1855*



[E]ach writer also overreaches to some extent: Morse claims that the telegraph's messages will travel 2,000 times faster than light --Daniel Foster

electric telegraph



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

Morse, US patent
Daguerre, fixed image



morselization



Alfred Vail
1807-1859

Vail's code?

"a patient waiter is no loser" [1838]

"Morse" code
patented 1840

"International Morse Code," 1851

Wednesday, December 31, 1997 Published at 15:59 GMT

World

The end of the line for Morse Code

A: --	B: -...	C: -.-.-
D: -...	E: .	F: -.-.
G: -.-.	H:	I: ..
J: -.-.-	K: -.-	L: -.-.
M: --	N: --	O: -.-.-
P: -.-.-	Q: -.-.-	R: -.-.
S: ...	T: -	U: -.-
V: -.-.-	W: -.-	X: -.-.-
Y: -.-.-	Z: -.-.-	



Colt's connection



Samuel Colt
1814-1862

patented revolver, 1835

**electrically discharged
naval mine, 1843**

production line, 1855

with Morse
detonator
rubber insulation





independent entrepreneurs

"To meet any contingency not now anticipated and to guard against any want of requisite funds in an enterprise of such moment to the Government the committee recommended an appropriation of \$30,000"

"proprieters of the right to construct and use exclusively the ELECTRO-MAGNETIC TELEGRAPH ...from New York City, to any point or points on the shores of Long Island and New Jeresey."



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; To whom granted
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; rights and privileges
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- Duty of grade &c.

Repeal of this law.

Meaning of this Act.

SEC. 5. Any future Legislature may alter, amend, or repeal this Act, upon the petition of a majority of the voters of the Counties through which the Line may pass.

SEC. 6. Nothing in this Act shall be so construed as to prevent the construction of a Telegraph Line between the Atlantic and Pacific.

APPROVED May 3, 1852.





"This will kill that"

Victor Hugo

supersession

Their idea was that the system of telegraphing news" was destined to substitute "the production of commercial newspapers", which is clearly untrue (maybe we can assume that the Internet will supersede the publication of newspapers in the future, but obviously the telegraph did not).

Marco Danesi

"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."

Colt & Robinson, "To the Public"



first movers



Paul Reuter
1816–1899

Associated Press, 1846

James Gordon Bennet, *New York Herald*

James Webb, *Courier & Enquirer*

Gerald Hallock, *Journal of Commerce*

Horace Greely, *Tribune*

Moses Beach, *New York Sun*

Eustace Brooks, *New York Express*

Reuters

1849: pigeons & "the last mile"

1851: moves to London

"follow the cable"

ahead: 19th century public sphere



complements

Water-Cooler Effect: Internet Can Be TV's Friend

By BRIAN STELTER

Published: February 23, 2010

Remember when the Internet was supposed to kill off television?

[U2](#), [Enlarge This Image](#)



[Skip Bolen/Getty Images](#)

This year's Super Bowl, won by the New Orleans Saints, was the most-watched television program in United States history.

Readers' Comments

Readers shared their thoughts on this article.

That hasn't been the case lately, judging by the record television ratings for big-ticket events. The Vancouver Olympics are shaping up to be the most-watched foreign Winter Games since 1994. This year's [Super Bowl](#) was the most-watched program in United States history, beating out the final episode of "M*A*S*H" in 1983. Awards shows like the [Grammys](#) are attracting their biggest audiences in years.

Many television executives are crediting the Internet, in part, for the revival.

Blogs and social Web sites like [Facebook](#) and [Twitter](#) enable an online water-cooler conversation, encouraging people to split their time between the computer screen and the big-screen TV.

☒ SIGN IN TO RECOMMEND

 TWITTER

 COMMENTS
(50)

 E-MAIL

 SEND TO PHONE

 PRINT

 REPRINTS

 SHARE

CRAZY HEAR
NOW PLAYING
3 ACADEMY AWARD
NOMINATIONS

MUSIC BY TELEGRAPH.

About two months ago Mr. Edith Gray, of Chicago, a gentleman well known in the electric telegraph world as a maker and inventor of some of the most valuable instruments now in use, conceived an idea which would be an extraordinary development of telegraphic science if he could only succeed in practically demonstrating it. Short as has been the lapse of time since he first began his experiments, he has succeeded, almost beyond his own anticipations, in perfecting an instrument which will convey sound by electricity over an unbroken current of extraordinary length—that is, without the aid of automatic repeaters. In the ordinary transmission of messages over the telegraph wires to points at long distances, a message is generally repeated by automatic-working instruments about every 500 miles, in order to renew the current of electricity. Mr. Gray has already transmitted sounds, which are distinctly audible at the receiving point over an unbroken circuit of 2,400 miles. This is, more properly speaking, a discovery—not an invention. The

New York Times, July 10, 1874

THE TELEPHONE.

Prof. Reuss, a distinguished German performer on telegraphic instruments, has recently made an invention which cannot fail to prove of great interest to musicians, and, indeed, to the general public. The telephone—for that is the name of the new instrument—is intended to convey sounds from one place to another over the ordinary telegraph-wires, and it can be used to transmit either the uproar of a Wagnerian orchestra or the gentle cooing of a female lecturer.

New York Times, March 22, 1876



-graph to -pho simple harmonics



what and who

THE TELEPHONE.

HISTORY OF THE INSTRUMENT AND ITS INVENTOR—A CONVERSATION BY WIRE ON WEDNESDAY BETWEEN BOSTON AND A NEIGHBORING TOWN—THE "LAST ROSE OF SUMMER" SUNG BY TELEGRAPH.

From the Boston Transcript, Feb. 1.

At noon yesterday a distinguished party of gentlemen were assembled at the office of the Boston Rubber Shoe Company on Congress street in order to witness a series of experiments performed on the telephone between the inventor, Prof. A. Graham Bell, here, and his associate, Mr. Thomas A. Watson, at the residence of Mr. Coerver at Malden, about six miles distant. Prof. Bell had

New York Times, Feb 3, 1877

TELEGRAPHING TUNES.

Results of Mr. Elisha Gray's
Electrical Investigations.

He Is Able to Telegraph Music from
Paris to Chicago.

Experiments with His Newly-In-
vented Telephone.

Practical Bearings of His Re-
searches.

Twenty Messages May Be Sent Over
One Wire at Once.

The Theory of Musical Tele-
graphy.

Chicago Trib July 12, 1874

THE TELEPHONE.

Horror of an Evanston Operator—
Waltzing by Telegraph.

Prof. Elisha Gray and His Wonderful Invention—
How It Works.

A telegraph operator at Evanston the other
night was frightened almost out of his wits by
hearing his "cut-out board" play "Ninety and
Nine." When capable of thinking—for aston-

Chicago Trib Feb 11, 1874

THE TELEPHONE.

To the Editor of The Tribune.

CHICAGO, Feb. 10.— Upon reading the criticisms
of THE TRIBUNE on the playing of Gray's Tele-
phone at Martino's Hall on the occasion of the tele-
graphers' reception, it occurred to me that possi-
bly a false impression had obtained in some minds
as to what was claimed for it. It never has been
asserted for a moment by the inventor that
the instrument equaled in quality or volume
of tone ordinary musical instruments in
its present development. In fact he is
not trying to develop a musical instrument
but a system of multiple telegraphy based upon the
simultaneous transmission and analysis of musical
tones. As a musical instrument, however, it sur-
passes all others in the distance to which it can be

Chicago Trib Feb 16, 1874

and where

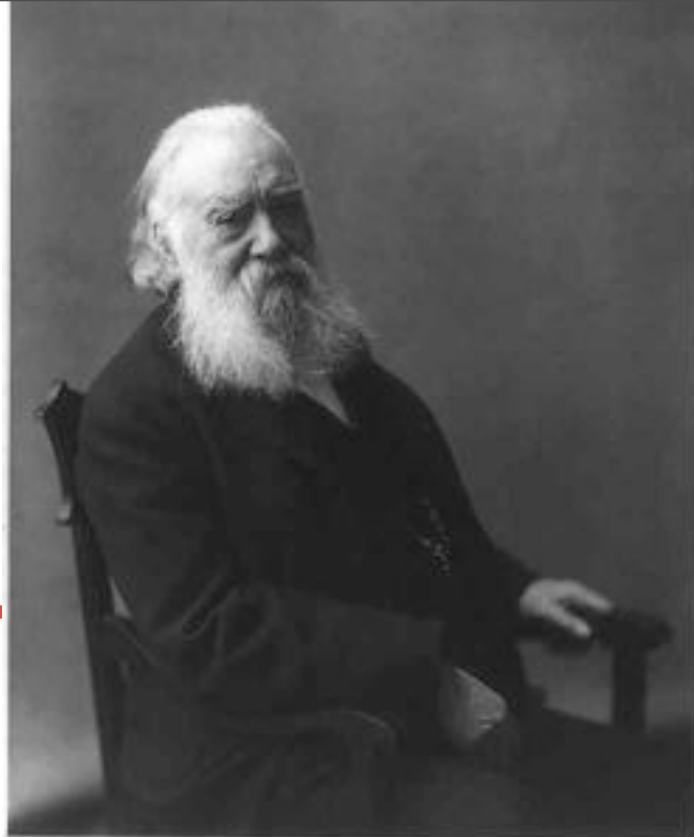
GRAY'S ELEGY.

THE INVENTOR OF THE TELEPHONE UN-
WILLING TO ACCEPT THE PATENT-OFFICE
DECISION AS SUCH.

The decision of the Patent-Office awarding
priority of invention of the telephone to Alex-
ander Graham Bell, of Cambridge, as announced
in THE TRIBUNE of Sunday, created consterna-
tion among stockholders of inventions of
Elisha Gray and amusement in electrical elec-
tion. The stockholders had no ground for alarm. How-
ever, as at the time of the consolidation of the
American Speaking and the American Bell Tele-
phone Companies ironclad contracts were
signed perpetually protecting them. In other
words, the decision has no financial bearing on
the case. The Patent-Office award is a great
historical matter in which Chicago has an in-
terest, for the highest authorities of
Europe and electricians generally re-
gard Gray as the inventor of the
telephone in reality, and the highest prizes have
already been awarded him. Mr. Bell has seen fit
to be elaborately represented by counsel in
Washington, and on purely technical points,
and by peculiar Celestial methods, and at great
expense has possibly sent his name down the
historic corridors of time as the real inventor.

Dr. Gray in an interview yesterday concluded
that perhaps a higher authority than the Pa-
tent-Office, with legal jurisdiction, might yet
change the verdict.

Chicago Trib July 24, 1883



Alexander Graham Bell
1847-1922



simple harmonics

1868: duplex (Joseph Stearns)

quadriplex (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"



disharmony



Elisha Gray
1835-1909

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
for want of a nail

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



what?

early uses envisaged for the telephone

- broadcasting music
- transmitting sermons
- broadcasting news
- providing wake-up calls
- conferring degrees
- telephoning in airplanes
- political ads

"When offered the Bell patents for
\$100,000 in 1876, Western Union turned
them down"
-Friedlander



and who?

"communication between bankers, merchants,
manufacturers." --Bell

"The record of intelligence is made in a
permanent manner, and in such a form that it
can be at once bound up in *volumes* convenient
for reference." --Morse

"Businessmen relied on letters and telegrams,
often with complex codes, to produce written
records of their transactions ... voice
transmission, scratchy and often indistinct,
could be an adjunct at best"

Claude Fischer, *America Calling* 1992



shaping the phone



"an industry
shaped by law"

Morse

1837 filing

patent settled, 1854

Bell

v

Western Union, Gold & Stock

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

settlement

10 November, 1879

18 years, 600 patent actions

Hofl 10-Narrow- 43



by law and by national policy

nationalization

UK telegraph, then telephone

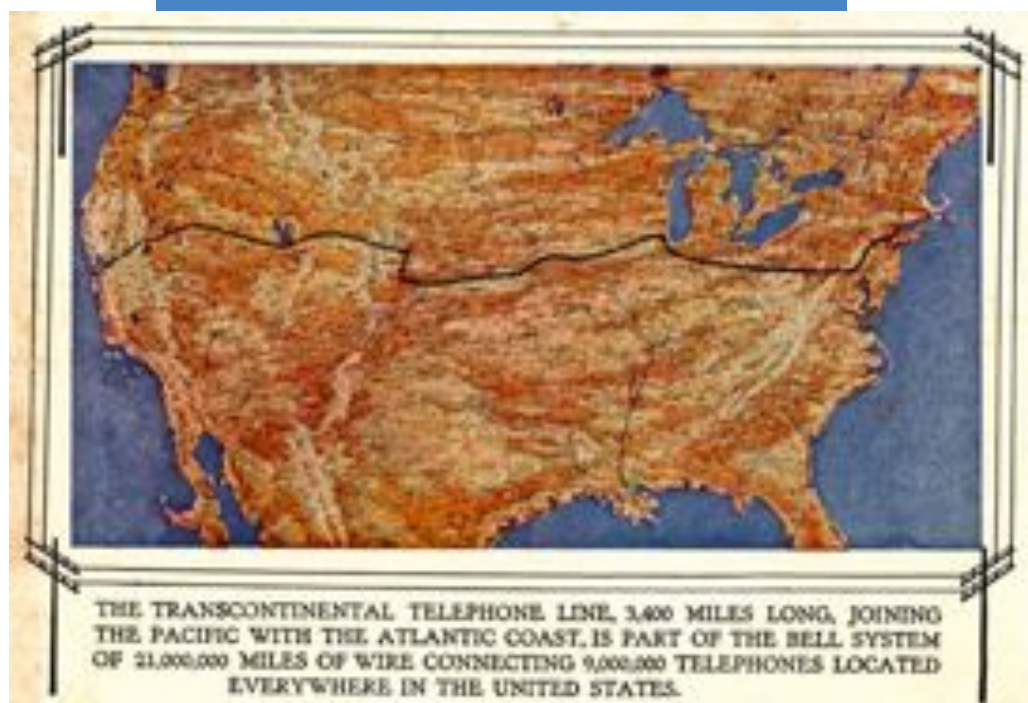
privatization

US *telegraph*: Western Union

telephone: patent monopoly & licensing
(Bell, MacKay Shoe Co)

to private monopoly (AT&T)
subsidized by long-distance charges

(transcontinental phone line, 1914)





The battle was fierce, with spying sabotage, secret purchases of competitors, bribery of city officials, financial subversion. -- Fischer

moving to monopoly

early growth

Between 1880 and 1893, growth from 60,000 to 260,000
from 1:1,000 to 1:250 phones : people

in 1902, roughly 300 companies

but

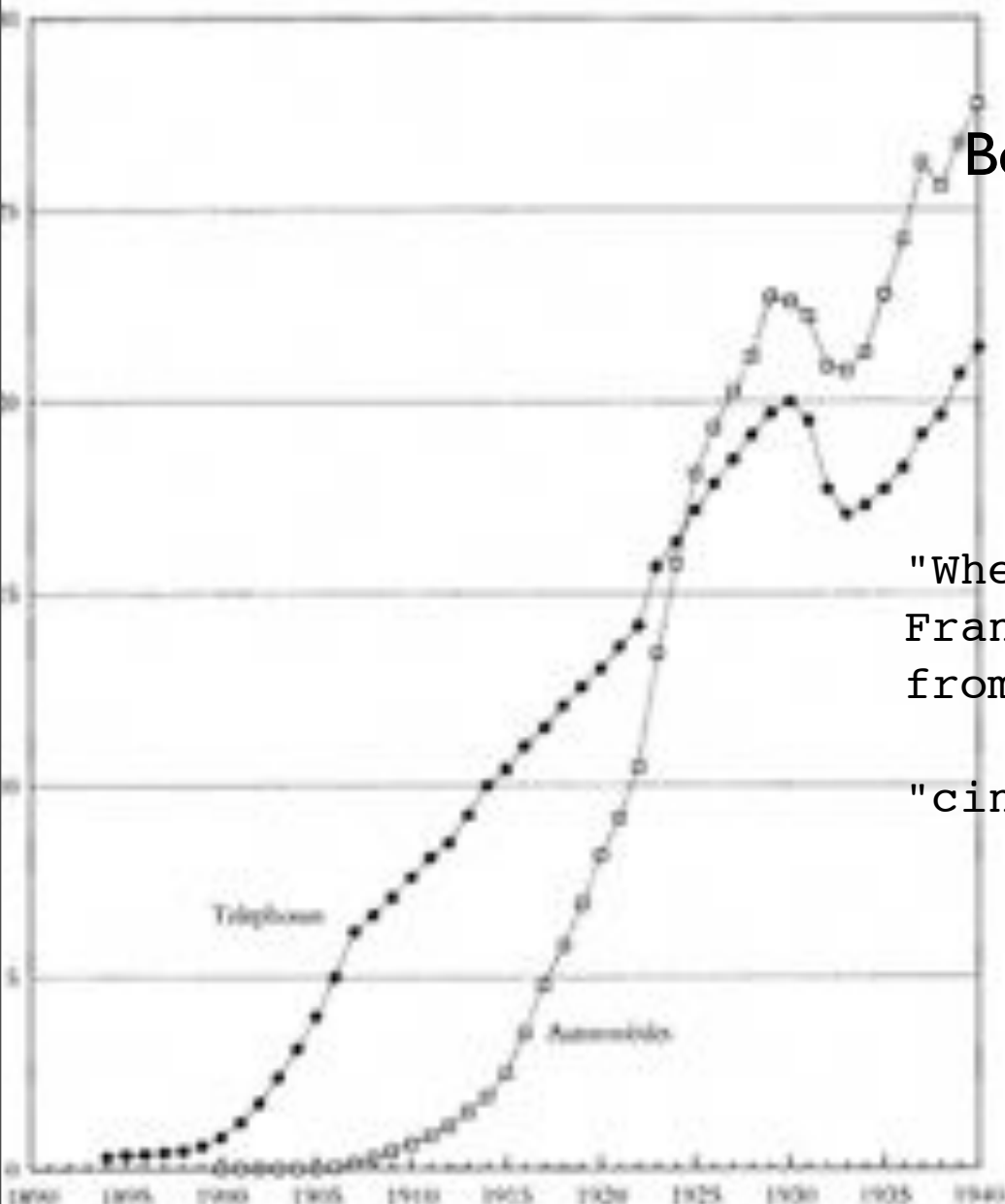
"When the competing telephone exchange closed in San Francisco in 1880, the Bell local raised its charges from \$40 to \$60 a year. The local manager justified the move: ... 'The public always expects to be "cinched" when opposing corporatinos consolidate and it was too good an opportunity to lose"

--Fischer

long distance control

denial of service

Kellogg conspiracy and other patent fights



diffusion of telephones and cars.
1894-1940



spreading

"At the first drugstore he stopped, seeing a long-distance telephone booth inside. It was a famous drugstore, and contained one of the first private telephone booths ever erected.

'I want to use your 'phone a minute,' he said to the night clerk ...

'Give me 1643,' he called to Central, after looking up the Michigan Central depot number. Soon he got the ticket agent."

Theodore Dreiser, *Sister Carrie* [1900]



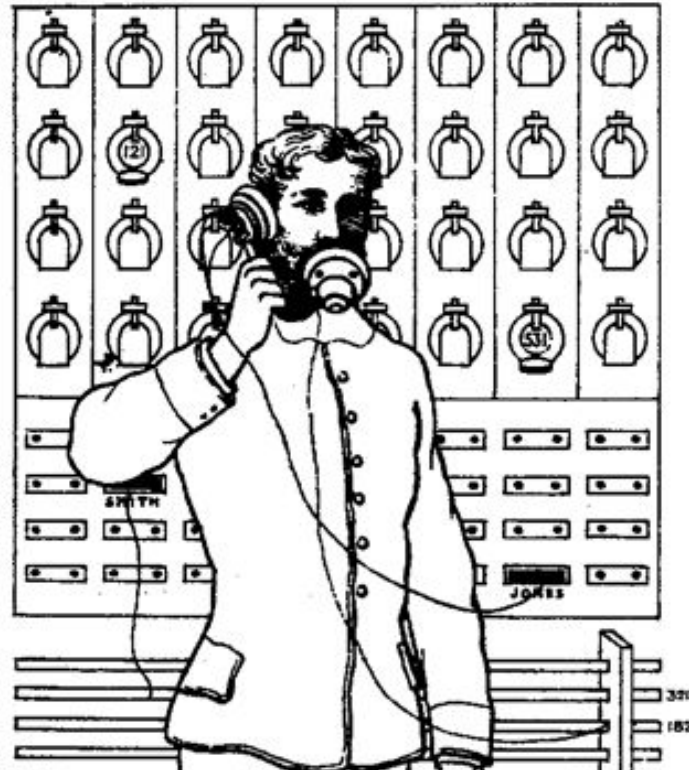
but spreading slowly

"She had to go four blocks to the nearest
drug-store that would be open at this
time of night, and there telephone the
doctor

...

"She went down to Broad Street to see the
curb market; marveled at the men with
telephones in little coops behind opened
windows."

Sinclair Lewis, *The Job*, 1917



"if the U.S. telephone service had to handle the current volume of calls solely through operator operator-assisted methods ... every female in the labor force ... would now be working for AT&T."

--Daniel Bell, "Social Framework of the Information Society"

missing link

exchanges (1878)

modelled on telegraph emergency services
multiple boards & written tickets

switchboard problems

diseconomies of scale
grounds for monopoly?
for international cooperation?

Strowger switch (1888-92)

traffic analyses

1903, Malcolm Rorty, traffic probability



switching

Sabin's Express System
San Francisco, 1894





innocent expectations

An inventor can
see many wonderful
and helpful uses
for their
invention, but an
inventor will
usually not see
any negative uses
for it.

Ryan Manalo

wishful thinking

peace, emancipation, decentralization

... and unintended consequences

the press & public debate

international cooperation

diplomacy & peace

commerce

love



simple & elegant

[T]he inventor will harbor a biased prediction of the utility of his work, focusing on the benefit of such an accomplishment to the betterment of society. ... Bell praises the superiority of the telephone because "it requires no skill to operate," making it easily accessible to the common household; and while the telegraph needs to be interpreted, "the telephone actually speaks" (Bell 156), presumably eliminating the risk of faulty translation. He then makes the logical, but flawed, jump that the telephone "can be utilized for nearly every purpose which speech is employed." Again, the discoverer misjudges the good of his work, by masking the true nature of relaying information, which is always subject to the variability of human error and miscommunications whether face-to-face or mediated by technological conveniences. For every problem, there is an answer that is simple, elegant, and wrong.



heard it all before?

Bell asks Congress to fund the national telephone system because it would benefit society “in a way never previously attempted.” However, Morse used the same argument when asking for funding of his telegraph a mere 50 years before. These so-called original and advanced technologies would both create “intercommunication” (Bell), “instantaneous transmission” of precise information (Morse), and “complete annihilation of space” (Morse). Bell fails to see how his invention has already been around in a different form that did not revolutionize society and Morse fails to acknowledge how his telegraph may be just as important or unimportant as the to other telegraphs invented before his.

--Alejandra Castellon

THE FIRST MESSAGE.

ENGLAND GREETES AMERICA

QUEEN VICTORIA

TO

PRESIDENT BUCHANAN.

wishing on technology

"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



peace



"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



"Making a better
machine cannot make
men better."

Emile Zola
La Bête Humaine,
1890



decentralization

"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



once again, one voice

"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



public sphere

raising the level of debate

THE
ACCOUCHEMENT
OF
HER MAJESTY.
—
BIRTH OF A PRINCE.
—

[We were enabled to give the following in a large part of our yesterday's impression :]—

THE TIMES-OFFICE, Half-past 8 a.m.

We have the happiness to announce that the **QUEEN** has been safely delivered of a **PRINCE**.

We are happy to state that Her Majesty is doing well.

We are indebted to the extraordinary power of the Electro-Magnetic Telegraph for the rapid communication of this important announcement.

[The following appeared in a second edition of *The Times* of yesterday :—]

EXPRESS FROM WINDSOR.

In addition to the intelligence of the auspicious event which we published at half-past 8 o'clock, we have just received the following

OFFICIAL DESPATCH.

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THE SUSPECTED MURDER AT SALT-HILL.

SLOUGH, FRIDAY EVENING.

This extraordinary affair, which is wrapt in the greatest mystery, still continues to excite the most intense interest throughout this extensive neighbourhood. A great number of persons, anxious to have a view of the interior of the house, and especially the room in which the supposed murder took place, and now containing the body of the deceased (upon which an inquest was held yesterday), visited the house during to-day; but the constable, with whom is deposited the key of the house, has received strict injunctions from the coroner, before whom the adjourned proceedings will be resumed to-morrow morning, not to suffer any one to enter the premises, and these orders have been strictly attended to.

The deceased had two children living with her at the time of her death; Frederick, the eldest, aged five years, and Sarah, an interesting little girl, one year younger. They

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The deceased had two children, a son and a daughter.

It may be observed, that had it not been for the efficient aid of the electric telegraph, both at Slough and Paddington, the greatest difficulty as well as delay would have occurred in the apprehension of the party now in custody.

[1843]

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[1843]

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[1855]

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OFFICIAL DESPATCH.

[1843]

"a message by electric telegraph might desire the landlord of the hotel to set a watch upon him,"
 --Anthony Trollope, *The Warden*, 1855

public sphere

raising the level of debate

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[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

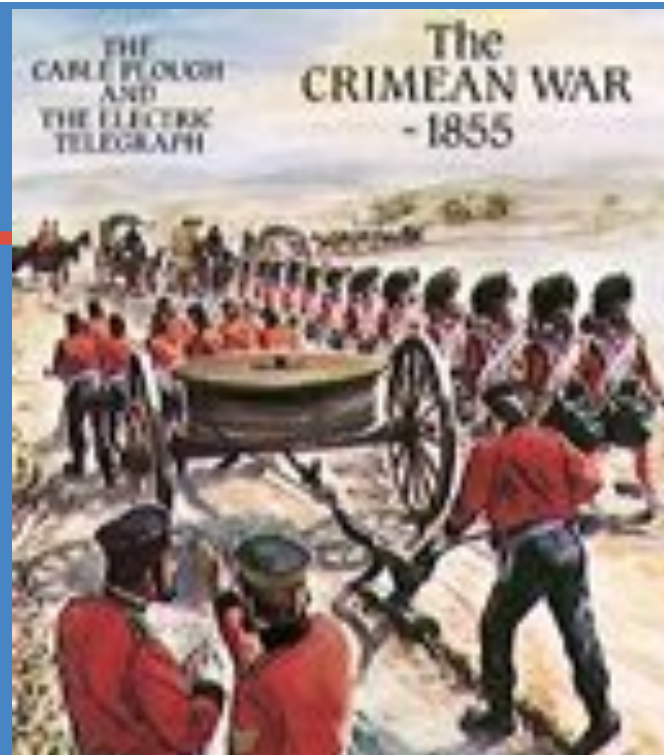
openness

or secrecy?

Crimean War, 1855

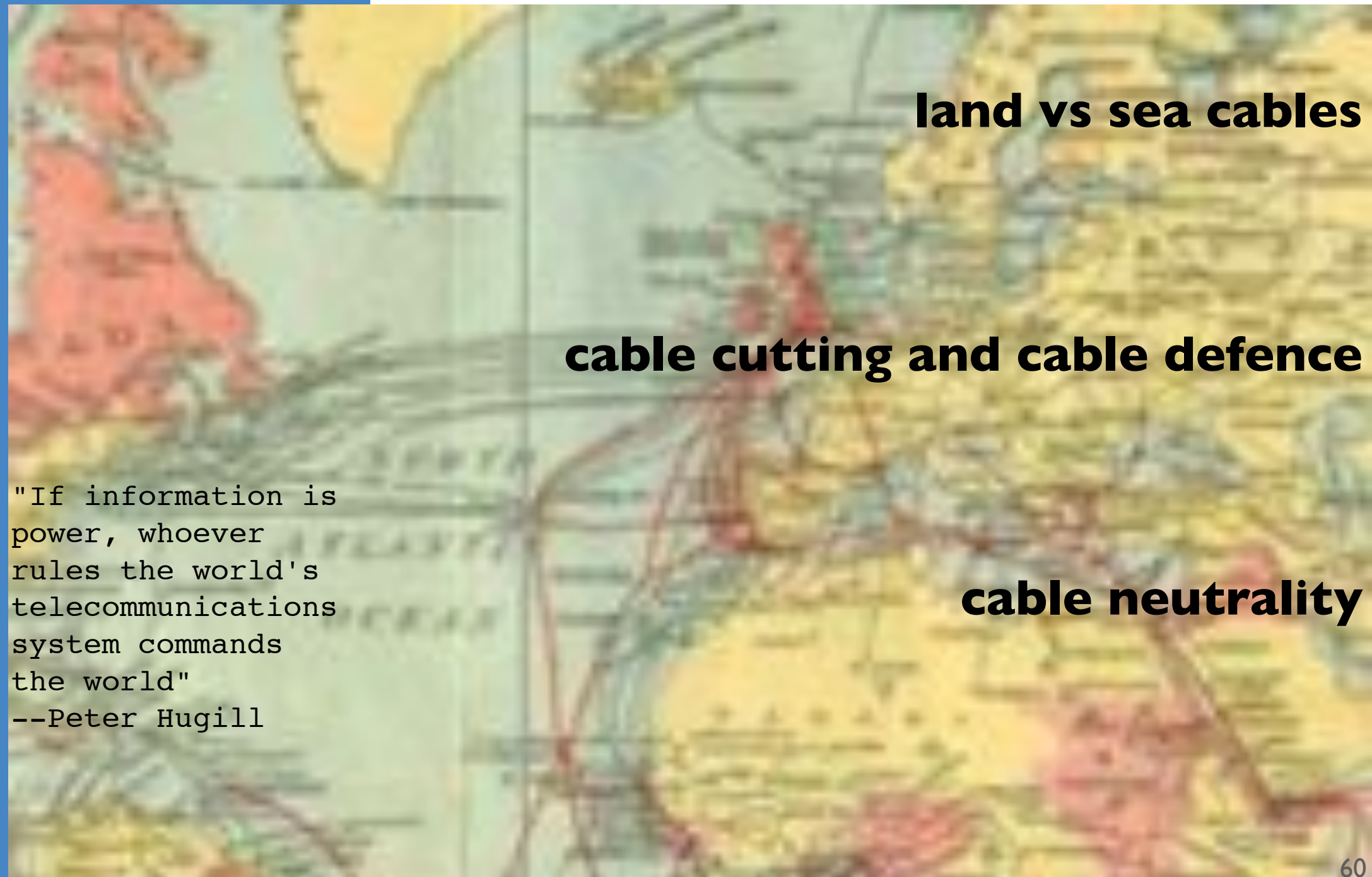
"The press and the telegraph are enemies we had not taken into account"

Earl of Clarendon,
British Foreign Secretary





decentralization?



land vs sea cables

cable cutting and cable defence

cable neutrality

"If information is
power, whoever
rules the world's
telecommunications
system commands
the world"
--Peter Hugill



decentralization?



military

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."

Marconi & the US Navy

Beninger, *The Control Revolution*, 1986

Yates, *Control through Communication*, 1989



decentralization?

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



Otto von Bismarck
1815–1898

peace

LATEST INTELLIGENCE.
(REUTER'S TELEGRAMS.)
DECLARATION OF WAR
BY
FRANCE AGAINST PRUSSIA.
FRANCE.

PARIS, JULY 15.

The French Legislature assembled at 1 o'clock this afternoon, when a communication was simultaneously made by the Government to the Senate and the Corps Legislatif explaining the situation of affairs and terminating by a Declaration of War against Prussia. The Government announced that his declaration is precipitated by the circular of the King to the Prussian agents abroad, which, firstly, confirms the affront to M. Benedetti; secondly, refuses to guarantee the renunciation of Prince Leopold of Hohenzollern; and thirdly, restores to him his liberty to accept the crown of

Bismarck & the Ems telegram
His Majesty [having told Count 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.**

"à Berlin, à Berlin"



franco-prussian war

**started by telegram
resisted by pigeons**

the siege of Paris
the government in Tours



OPEN LETTERS for PARIS. Transmission of by Carrier Pigeons.

THE Director-General of the French Post Office has informed this Department that a special Despatch, by means of Carrier Pigeons, of correspondence addressed to Paris has been established at Tours, and that such Despatch may be made use of for brief letters, or notes, originating in the United Kingdom, and forwarded by post to Tours.

Persons desirous of availing themselves of this mode of transmission must observe the following conditions.

Every letter must be posted open, that is, without any cover or envelope, and without any seal, and it must be registered.

The letter must consist of more than twenty words, including the address and the signature of the sender, but the name of the addressee, the place of his abode, and the name of the sender—although composed of more than one word—will each be counted as one word only.

No figures must be used: the number of the house, or the address, must be given in words.

Combined words joined together by hyphens or apostrophes will be counted according to the number of words making up the combined word.

The letters must be written entirely in French, in clear, intelligible language. They must relate solely to private affairs and no political allusion or reference to the War will be permitted.

The charge for these letters is five pence for every word, and this



4458
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14471
6706
12224
6929
14991
7352
151517
67893
14218
36477
5170
17553
67893
5870
5454
16102
15217
22801

opinionen
Friedensschlüsse
©
reichliche
finanziell
unterstützung
und
unersättliche
Aussichts
Pa/s
Mexico
in
Texas
©
kein
Mexico
©
AR
IZ
ON
A

war again

Zimmerman telegram

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.

received, Mexico, Jan 17, 1917
published March 1, war declared April 6



4458
17149
14671
6706
1250
12224
6929
14991
7362

Opinionen
Friedensschlüsse.
©
reichliche
finanziell.
unterstützung
und
unersättliche
Ansprüche.
Pa/s
Mexico.
in
Texas
©
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GERARD IS HONOR GUEST

Envoy 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."

Berlin, Jan. 1.—"Never since the beginning of the war have the relations between Germany and the United States been as cordial as now."



4458
17149
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12224
6929
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7362

Opinionen
Friedensschlüsse.
©
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Pa/s
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in
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①
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GERMAN PLOT TO LINK JAPAN AND MEXICO IN ALLIANCE OF WAR AGAINST AMERICA.

GERARD IS HONOR GUEST

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TELEGRAM SENT TO PRESIDENT

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4458
17149
14671
6706
12229
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14991
7352

PLOT AWAKENS CONGRESS

Party Spirit Engulfed in
Patriotic Zeal to
Back Wilson.

SENATE DEBATE WAXES HOT

Republicans and Democrats As-
sail Stone, Insisting on Asking
President's Source of Facts.

FEW DETAILS DISCLOSED

But Lansing Has Zimmermann
Note—Secret Means of Com-
munication with Bernstorff.

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tween Germany and U. S.

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war again

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Mexico, and Arizona.

Received. Mexico. Jan 17. 1917

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

[illegible]

4458
17149
14471
6706
12324
6929
14991
7382

PLOT AWAKENS CONGRESS

Party Spirit Engulfed in Patriotic Zeal to Back Wilson.

ZIMMERMANN EXPLAINS.

Herr Engelmann paints what all his 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 the kindest regard for our feelings; it was done with the utmost secrecy. Washington, with a coarseness which revolts him, obtained and published these confidential instructions—"in a way that was not unobjectionable," as he puts it with much self-restraint.

Mexico, and Arizona.

GERARD IS HONOR GUEST

Envoy 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."

SENATE DEBATE WAXES HOT

Republicans and Democrats Assail Stone, Insisting on Asking President's Source of Facts.

FEW DETAILS DISCLOSED

But Lansing Has Zimmermann Note—Secret Means of Communication with Bernstorff.

Available in The New York Times

Received, Mexico, Jan 17, 1917

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dictatorship



Albert Speer
1905-1981

"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.

Hof10-Narrow- 66



breaking barriers?

"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

"The political unity... imposed by the British sword, will now be strengthened and perpetuated by the electric telegraph."

Karl Marx , "The Future Results of British Rule in India," *New York Daily Tribune, 1853*



speculators?

"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*

"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



commercial telegraph

Rothschilds & Napoleonic Wars

Admiral Cochrane

"Napoleon is dead"

Omnium from 26-1/2 to 33



Thomas Cochrane
1775-1860

LONDON,
TUESDAY, FEBRUARY 22, 1814.
Never, perhaps, was greater agitation produced in the Metropolis by any foreign news, than was yesterday occasioned by a fraud of the most impudent and nefarious description. An express arrived from Dover,

Stendhal
The Telegraph



confidentiality

Morse firmly believed that every communication via telegraph would be "secret", meaning it was only accessible by those for who it was intended, but telegraph messages were sometimes intercepted.

Aaron Gonzalez

*"The record of intelligence is made in
a permanent manner*

...

*Communications are secret to all but
the persons for whom they are
intended."*

--Morse



someone on the line



Henry James
1843–1916

"as if I had no more feelings
than a letterbox"
--Henry James, "In the Cage," 1898



someone on the line



Elizabeth Bowen
1889–1973

"It's bound to be so unintimate--unless she does not consider the postmistress, and I do think surely she ought to because it is our postmistress...

"I should write at once ... I'm not sure I shouldn't even telegraph, if it were not for the postmistress.

--Bowen, *The Last September*, 1928



medium and message

information infrastructure
from telegraph to telephone
interested parties
wishful thinking



in conclusion

**don't get distracted by the
technology**

users

businesses

governments