



communications revolution



technology to wish upon

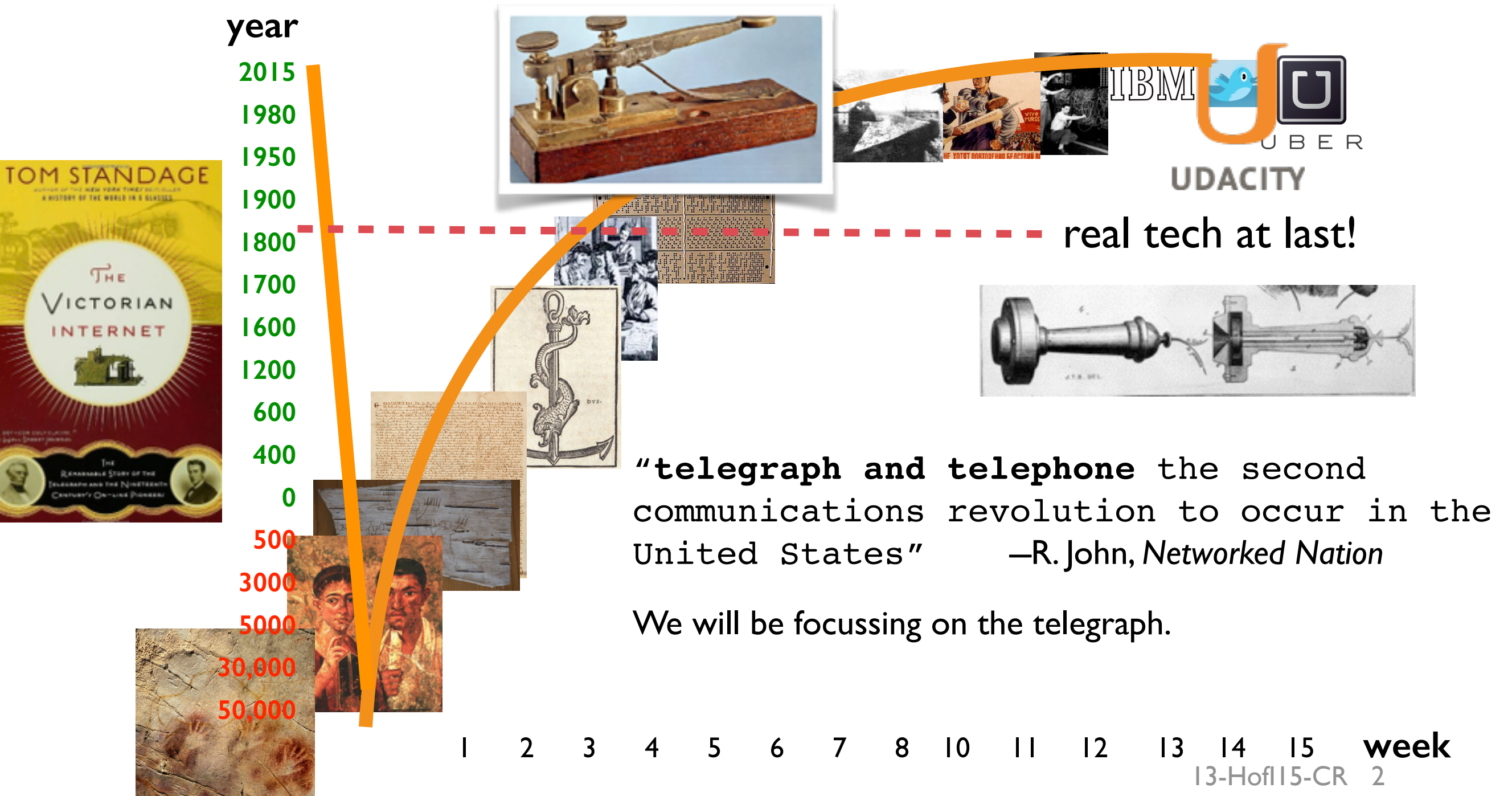
History of Information
March 3, 2015





The Progress of the Century
Currier & Ives
Philadelphia Centennial Exhibition 1876

progress: into the wired world





en route - recurring themes

wishing on technology (again)

readers respond

enthusiastic response

tech and techies

developments



en route - recurring themes

wishing on technology (again)

readers respond

Green — 48%

enthusiastic response

Hubbard — 44

(n)either — 6

tech and techies

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Miti Perez

Shannon Chu

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changing world: overland networks

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"

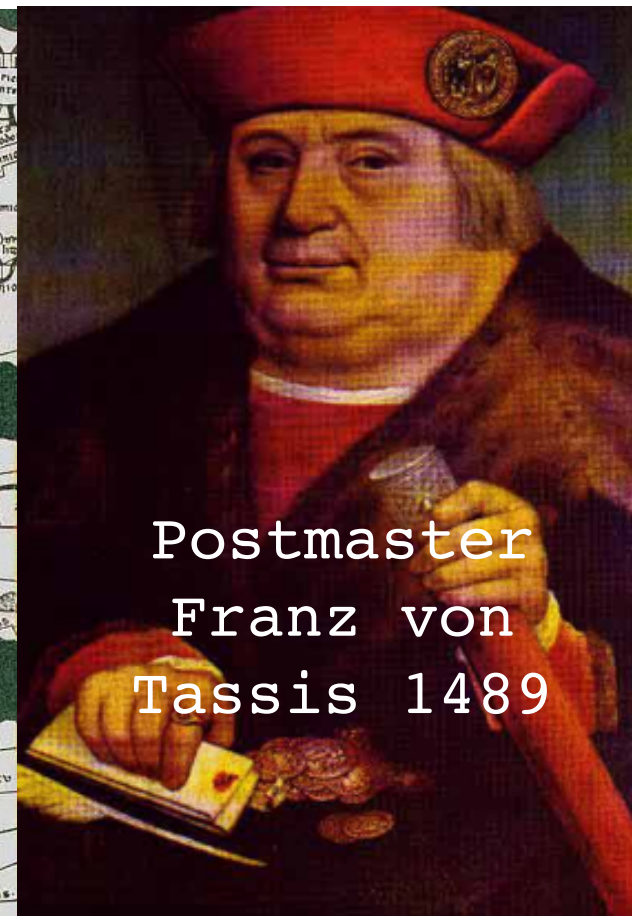




changing world: overland networks

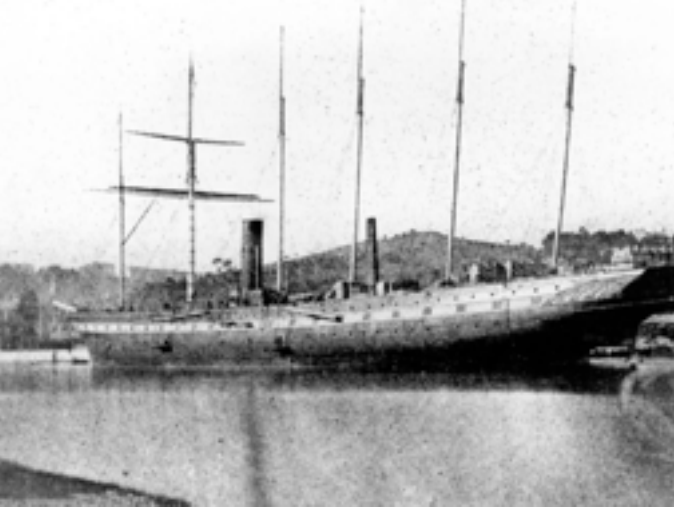
Rome to Holy Roman Empire

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



Postmaster
Franz von
Tassis 1489





changing world

messages by sea

irregular: merchant ships

regular: packet boats

speed: steam

"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."



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



Eerie
Canal
1825



Wedgwood's
Etruria

built infrastructure

Manchester-Liverpool 1830



canals

Wedgwood's distribution

railways

mail coach, c. 8 mph

early train, 20-30 mph

"The journey from New York to San Francisco consumed, formerly ... six months. It is now accomplished in seven days"

—Jules Verne, *Around the World in 80 Days*, 1873



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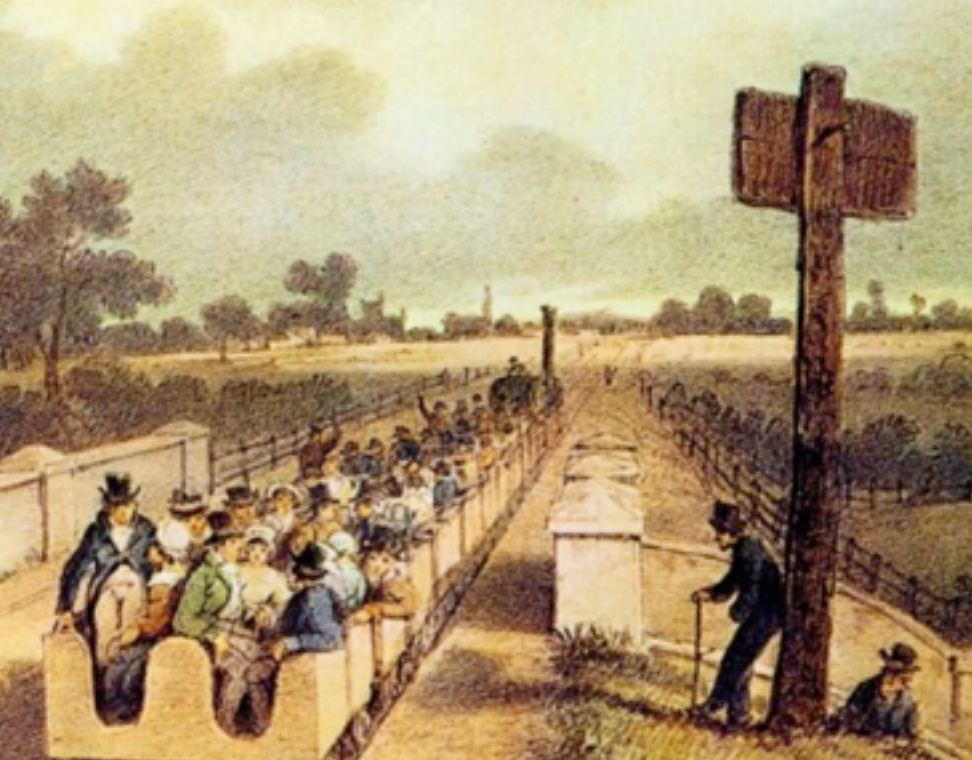
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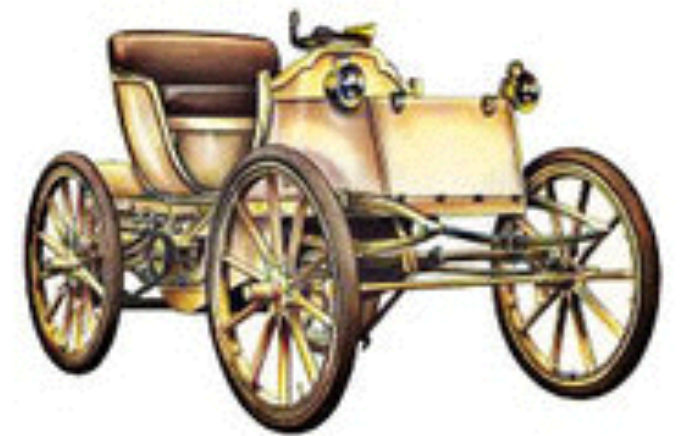
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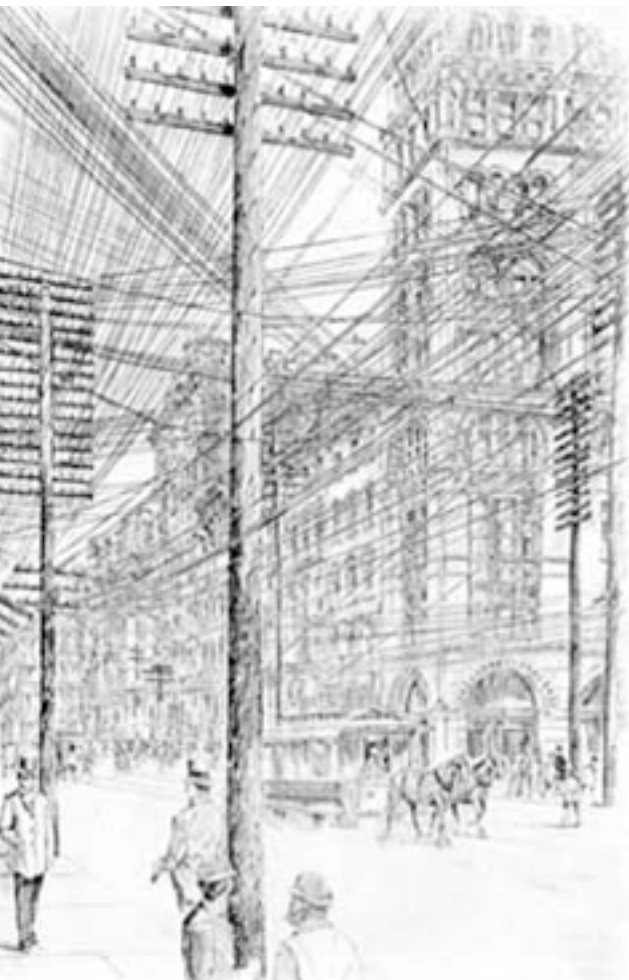
A rendering of the vehicle that set the first land speed record, 39.2 miles an hour, in France in 1898.

"The journey from New York to San Francisco consumed, formerly ... six months. It is now accomplished in seven days"

—Jules Verne, *Around the World in 80 Days*, 1873



another order of magnitude



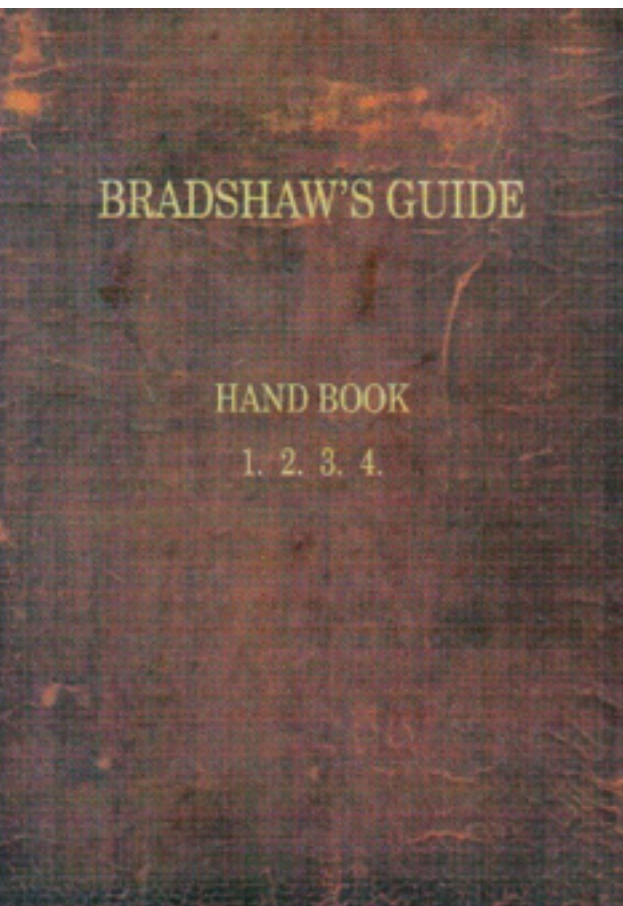
"When the line was completed, a grand celebration was held on 23 June 1870 at [John] Pender's house ... in London. The first messages were simply 'How are you?', to which came the reply 'All well'. The astonishing fact that this exchange took less than five minutes, when communication with India had previously taken several months."

Oxford Dictionary of National Biography

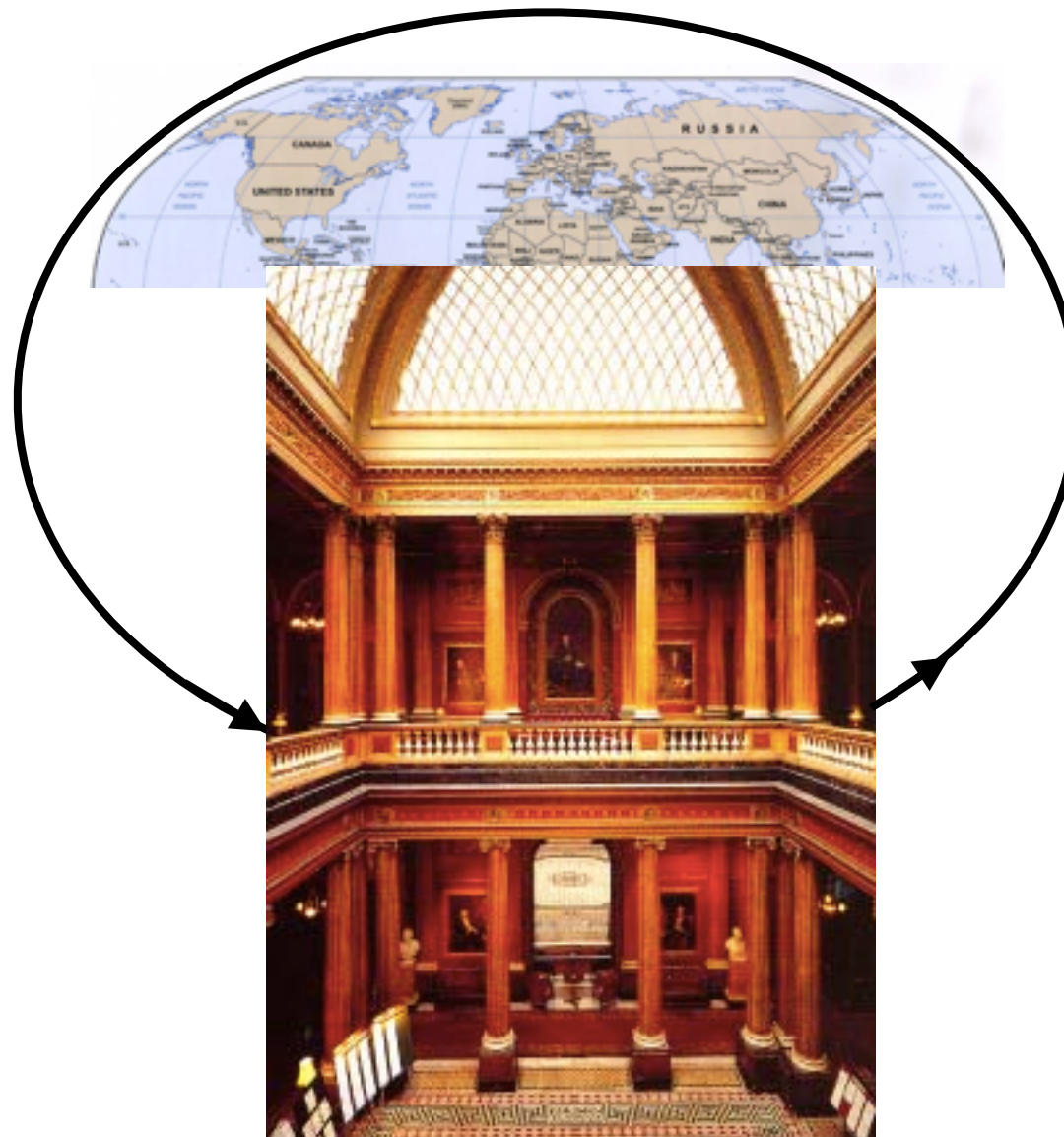


around the world

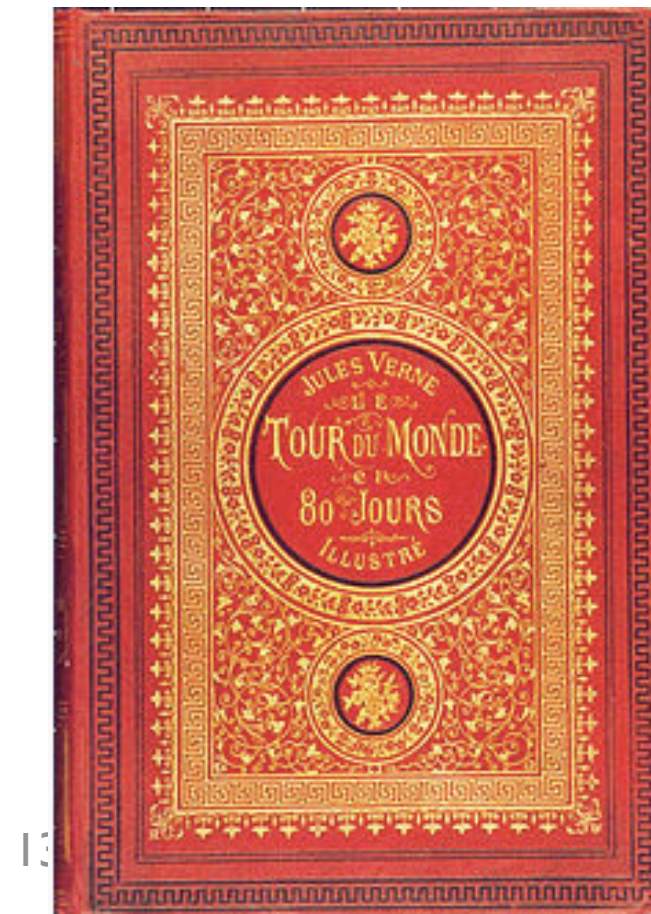
betting on interconnections

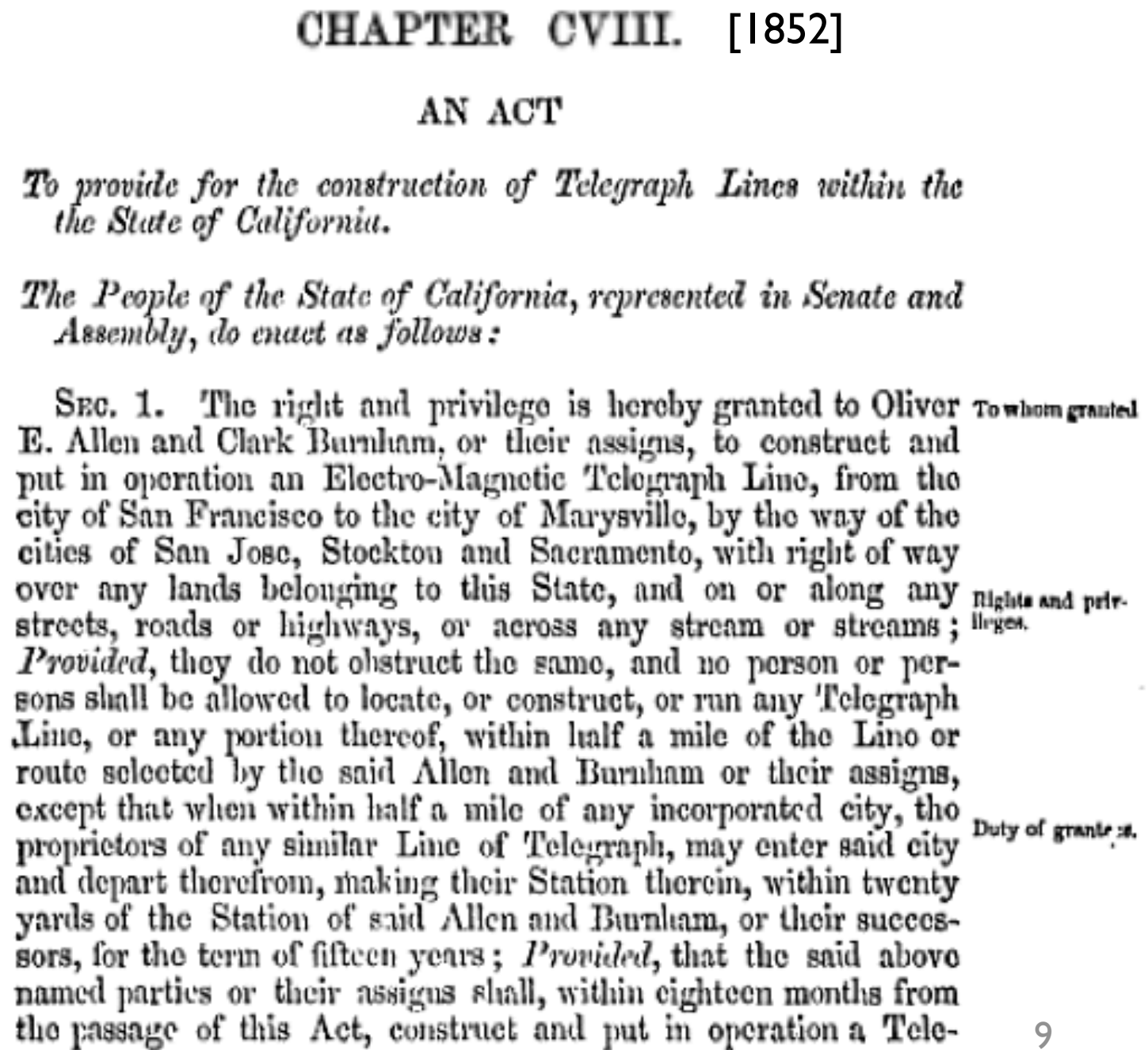


Mr. Fogg learned
all this in
consulting his
"Bradshaw"



1873







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wishing on technology (again)

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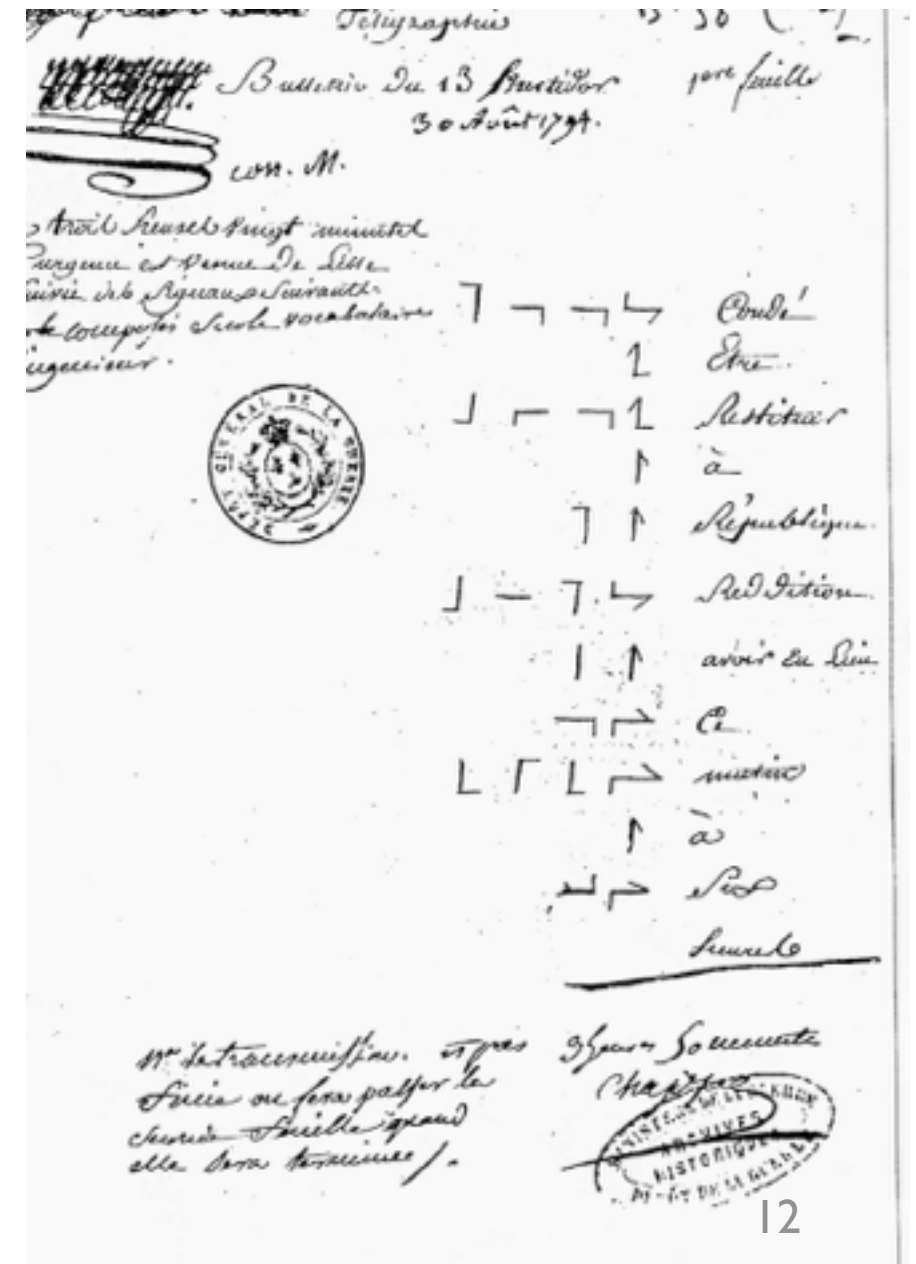
national telegraph

Claude Chappe (1763–1805)

Chappe télégraph



La Ligne Paris-Lille





"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



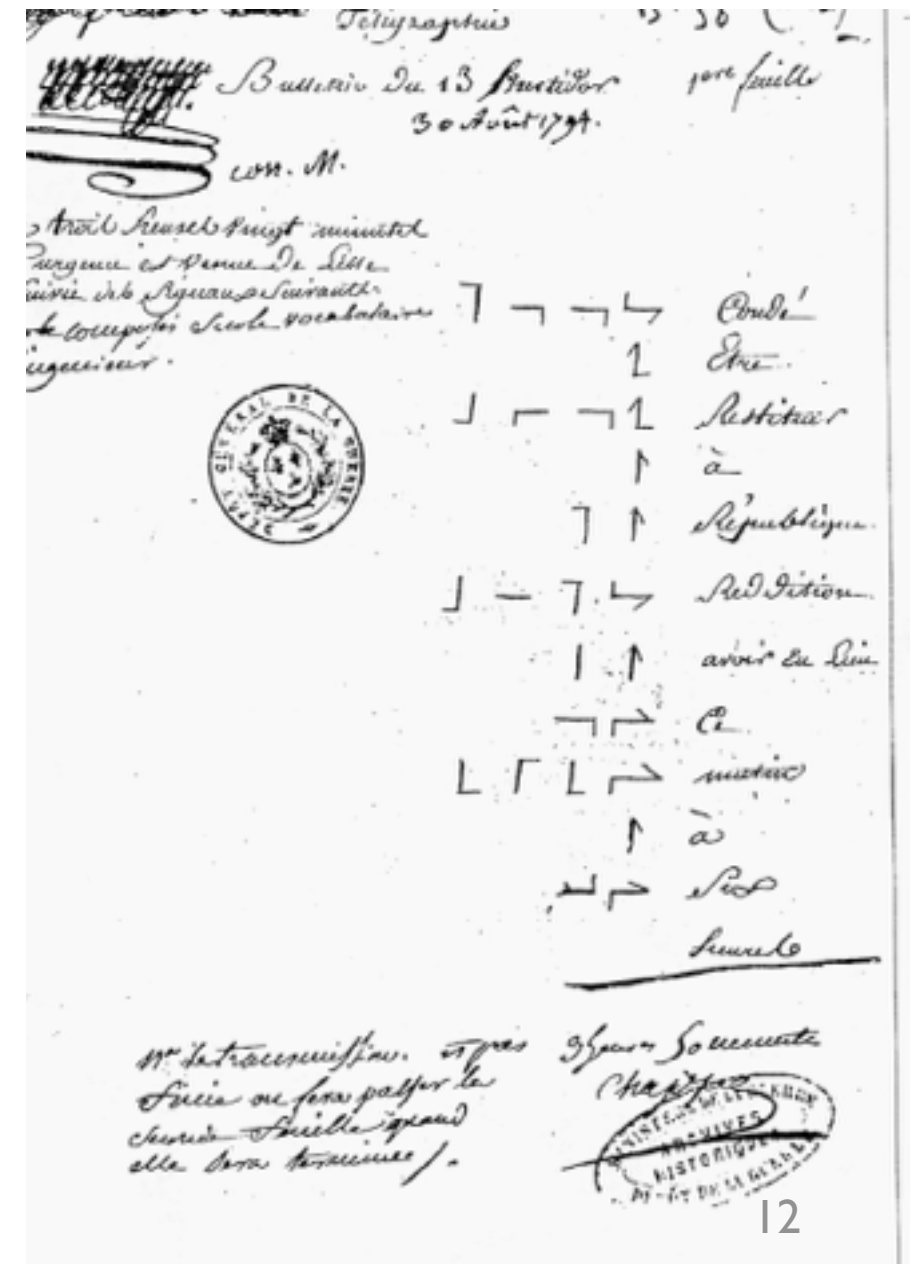
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early interconnections

national system

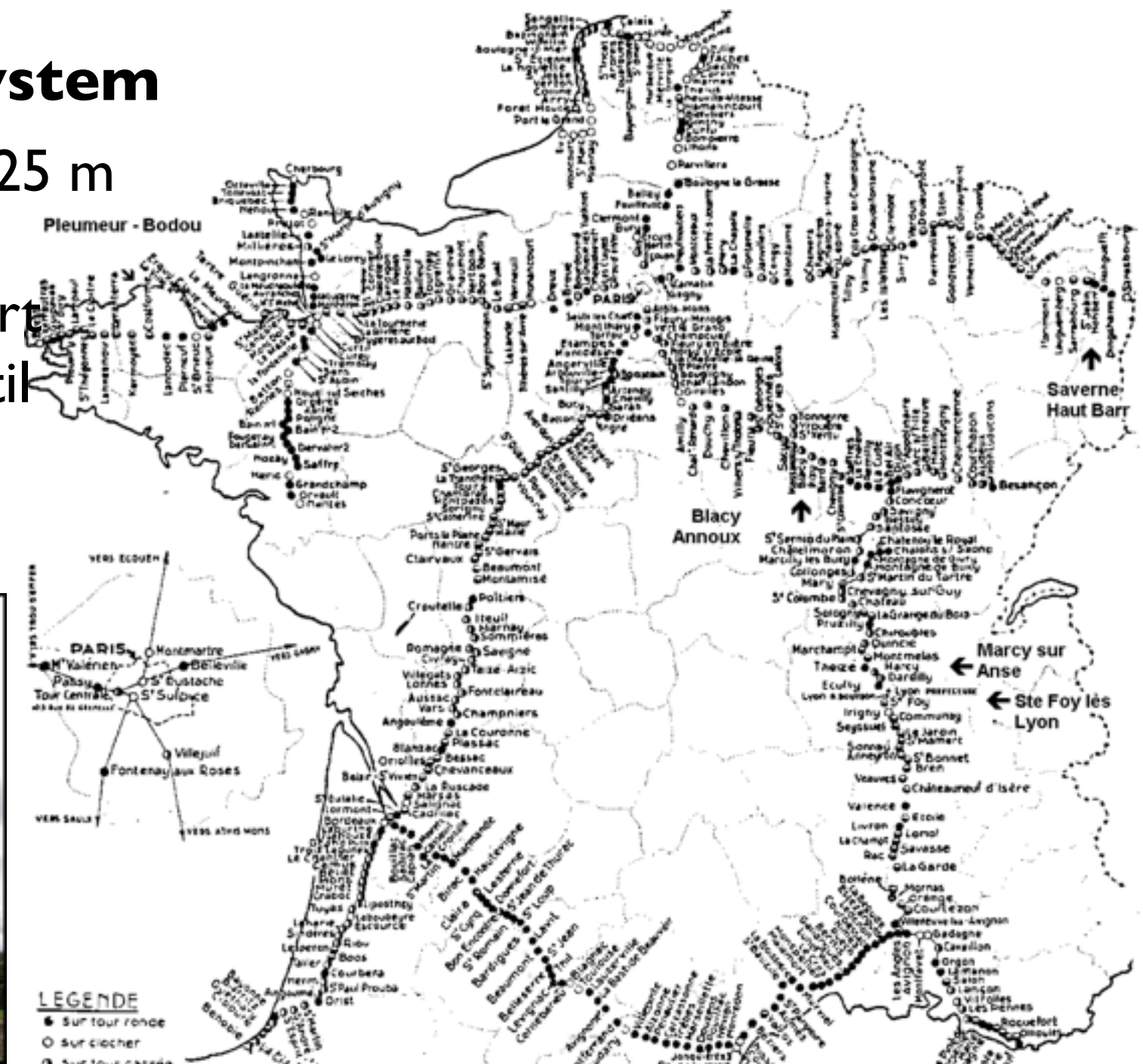
5,000 km/3,125 m

534 stations

c. 6 miles apart

in service until

c 1853





early interconnections

national system

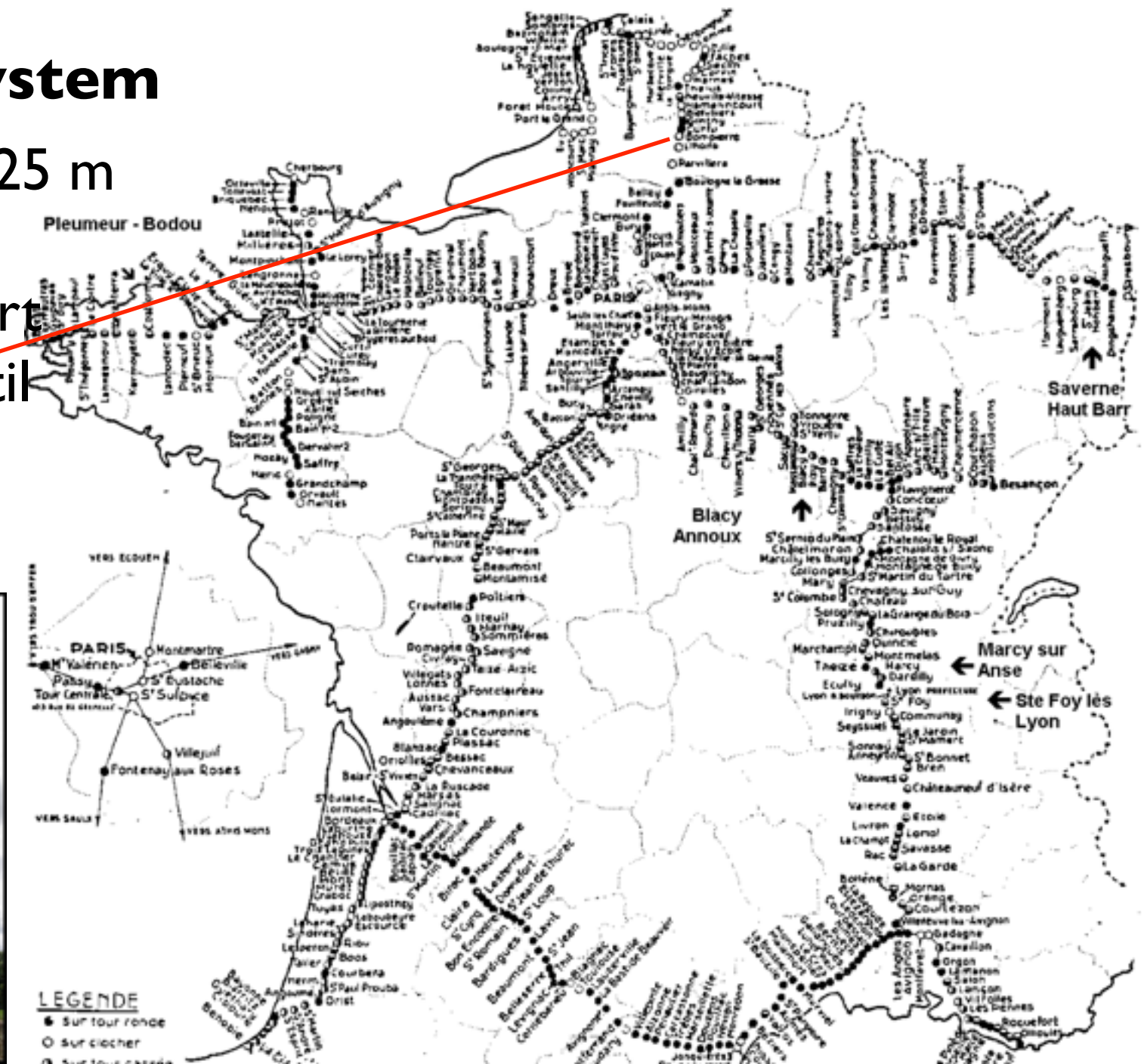
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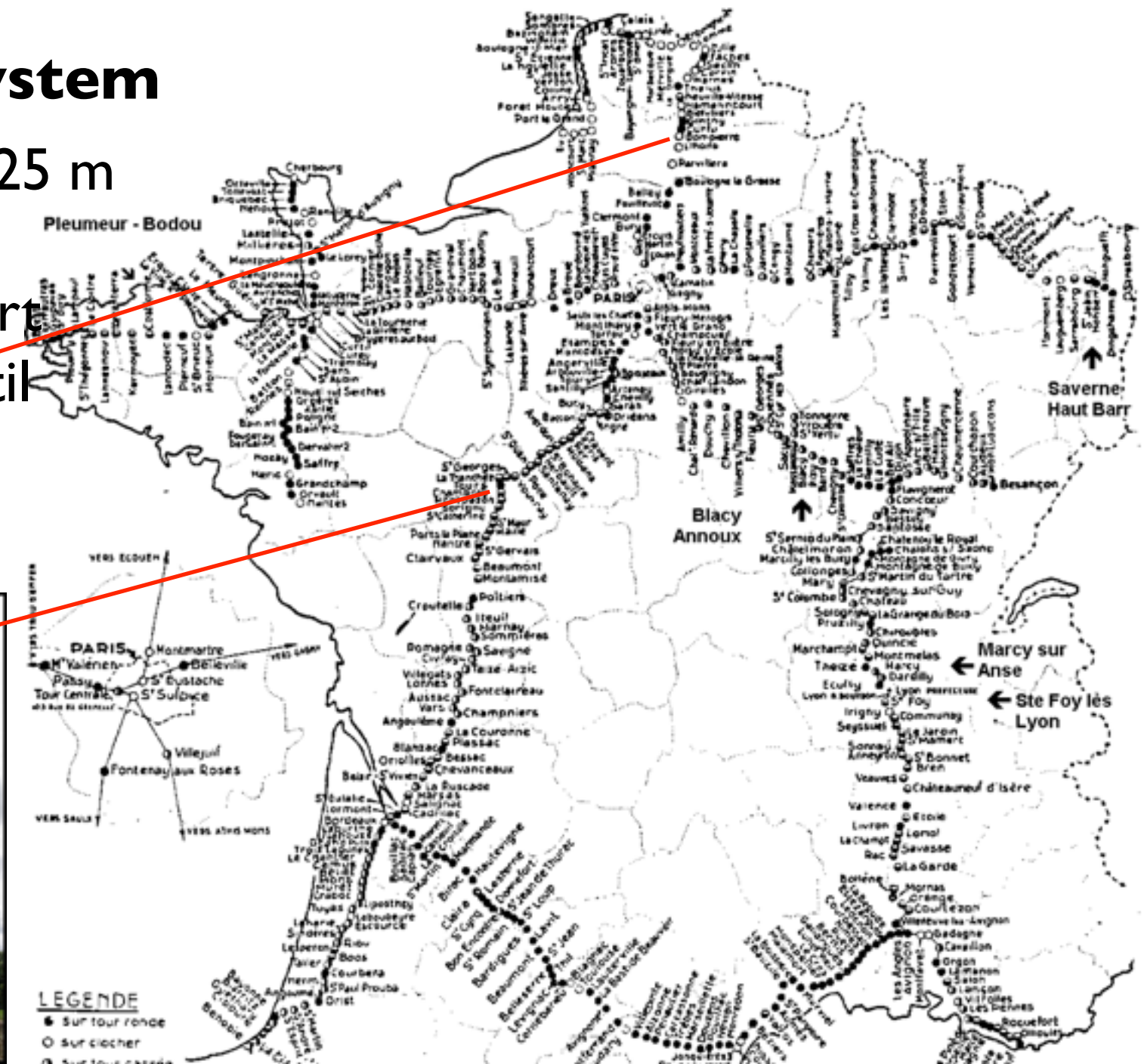
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"The towers of Saint-Sulpice are two huge clarinets, which is as good a shape as any, while the crooked, grimacing telegraph forms a pleasant accident on their roof."

—Hugo, *Notre Dame de Paris*

early interconnections

national system

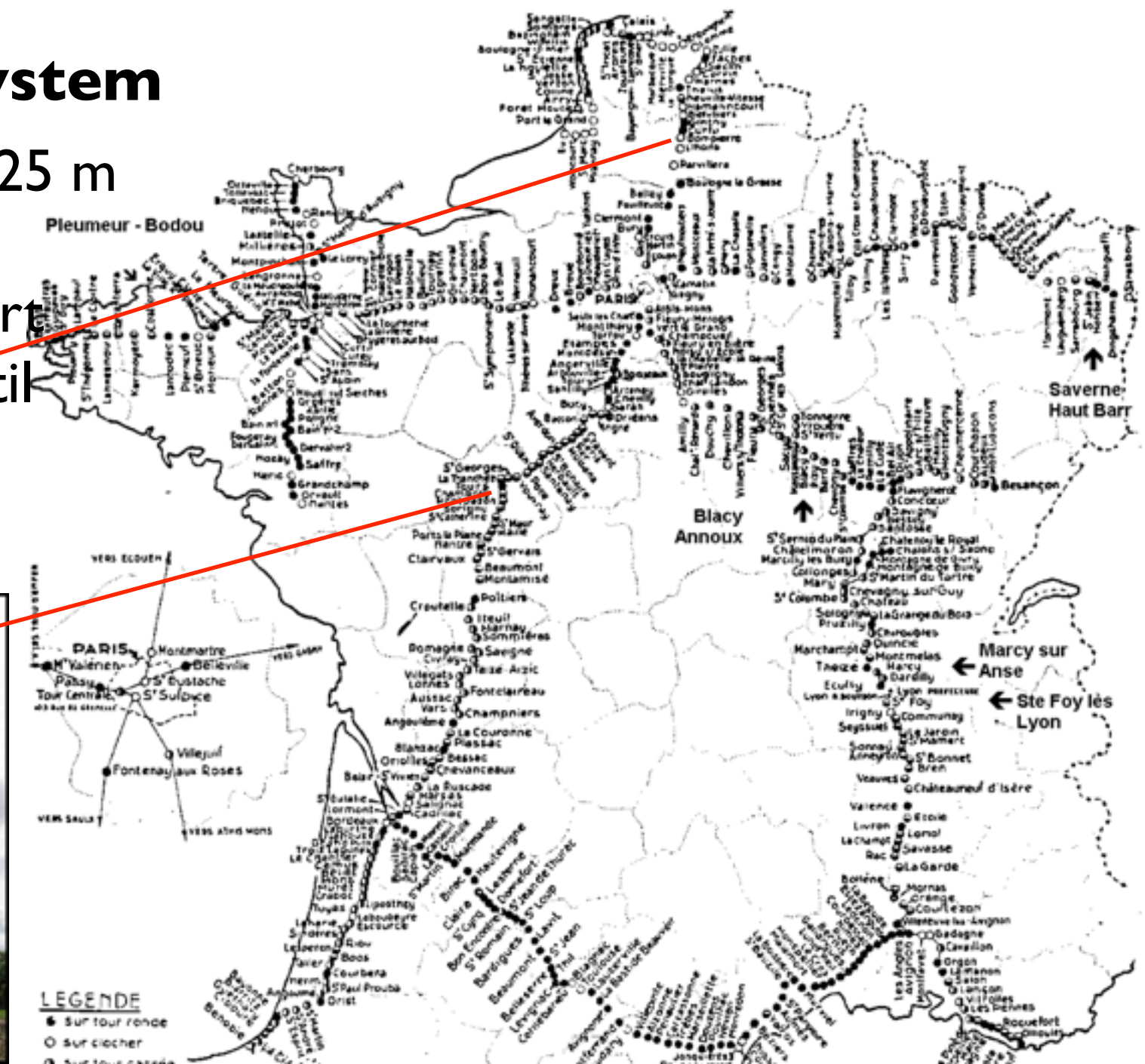
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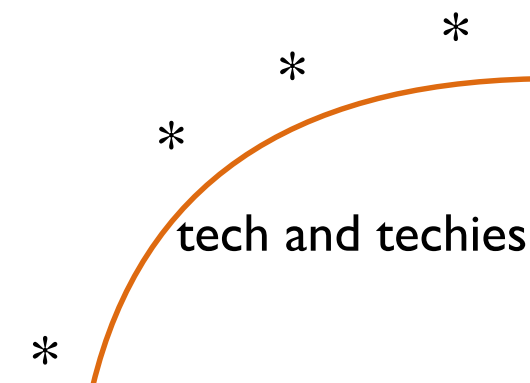
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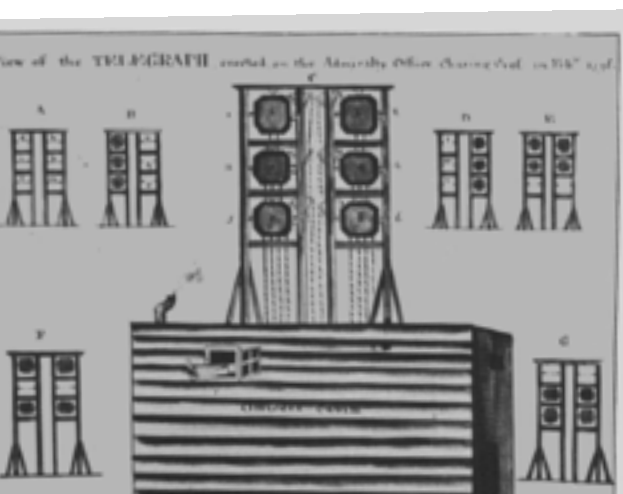
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military rivals



on land

the Admiralty "six-shutter" telegraph

Portsmouth to London (75 miles):

from 3 days to 15 minutes

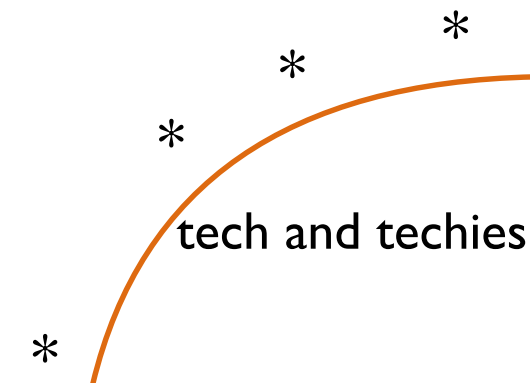
rebuilt as a

Chappe "semaphore" telegraph, 1815

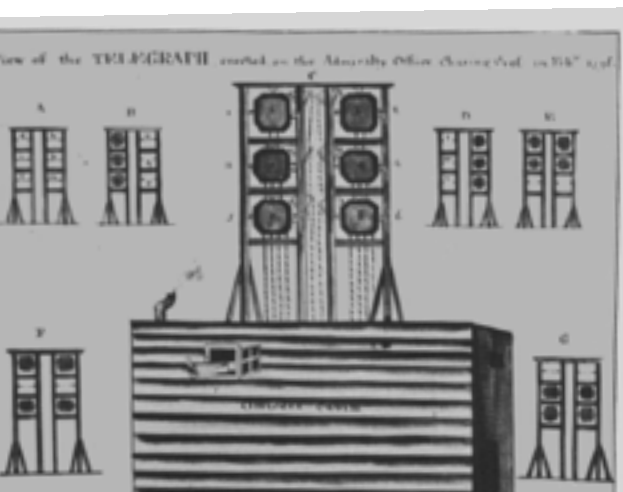
"[B]y the telegraph [man] renders himself as it were present in the same moment at distant places."

— *Monthly Review*





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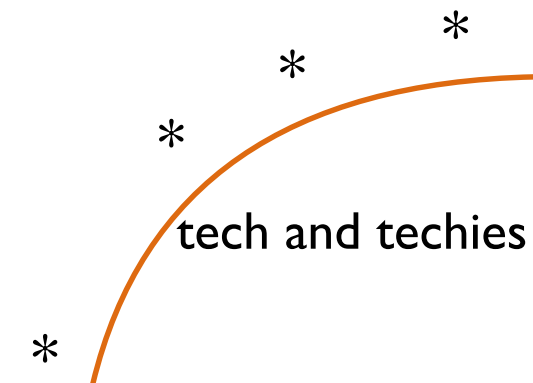
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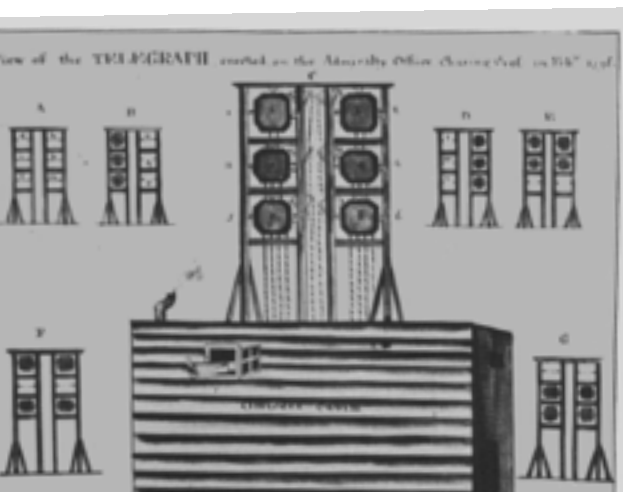
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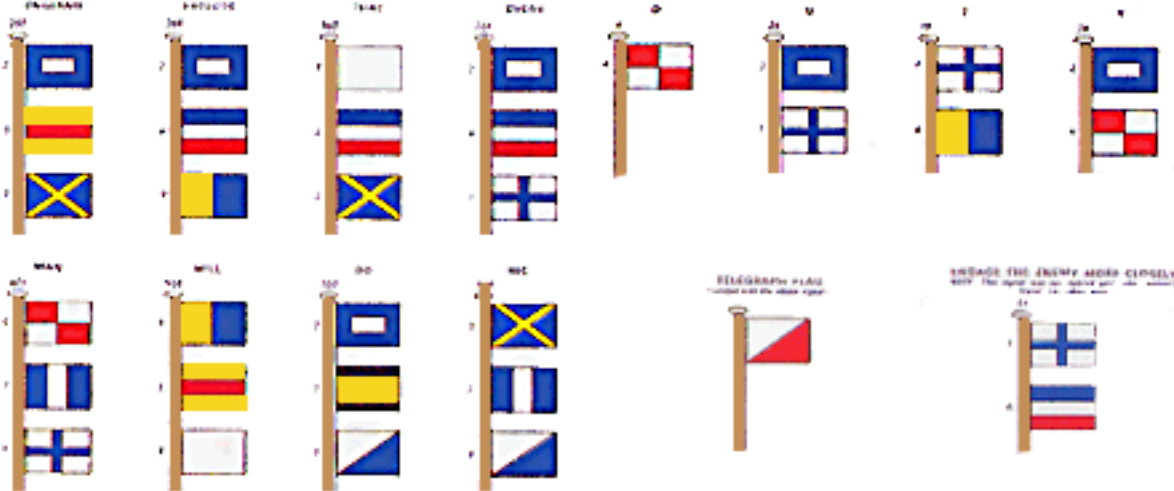
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–Home Popham
*Telegraphic Signals,
 or Marine Vocabulary,*
 1800

naval connections

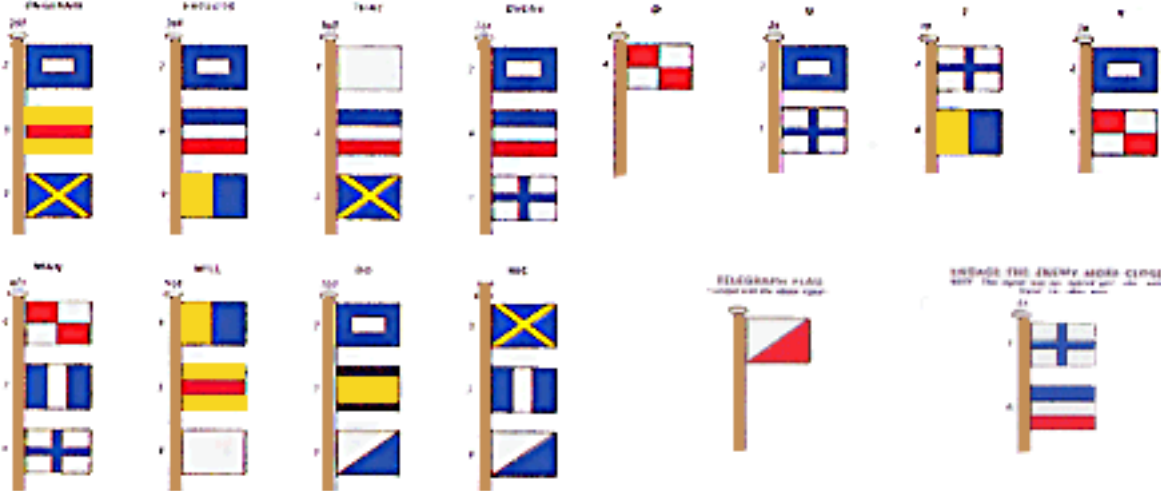


Home Popham
 1762–1820)

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."

– William Keegan, *Battle at Sea*, 1988



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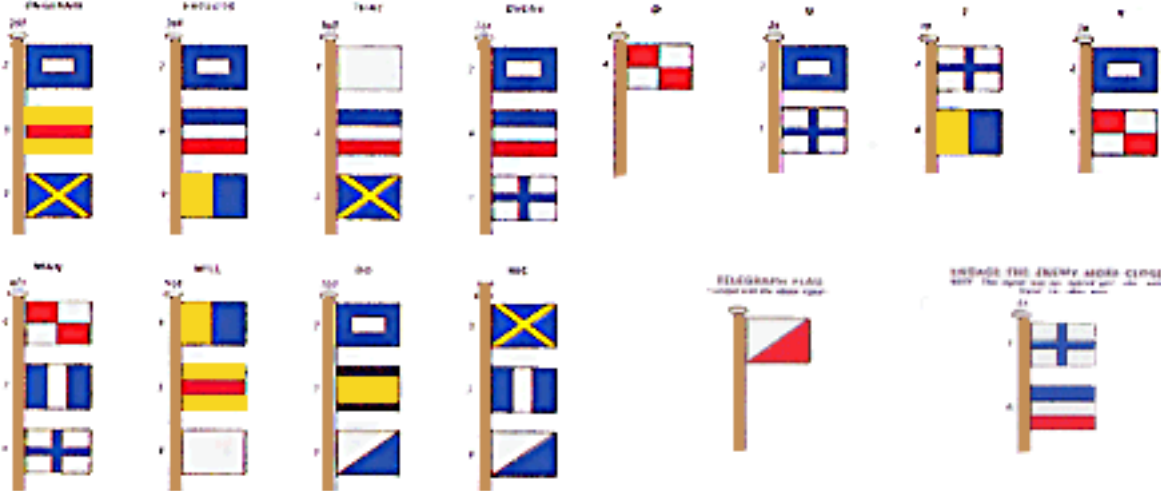


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Samuel C. Reid
US Flag, 1818



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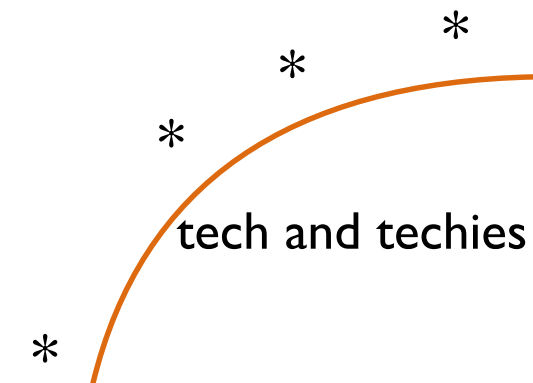


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changing perspectives



Nelson's blind spot?

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."

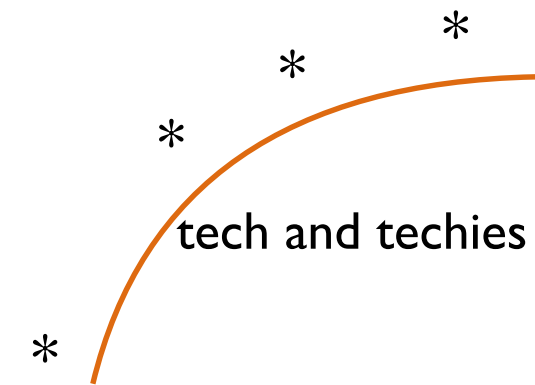
— Battle of Copenhagen, 1801

conservatism or independence?

XVII. On the Electricity excited by the mere Contact of conducting Substances of different kinds. In a Letter from Mr. Alexander Volta, F. R. S. Professor of Natural Philosophy in the University of Pavia, to the Rt. Hon. Sir Joseph Banks, Bart. K. B. P. R. S.

Read June 26, 1800.

taking charge



Abbé Nollet
1700-1770

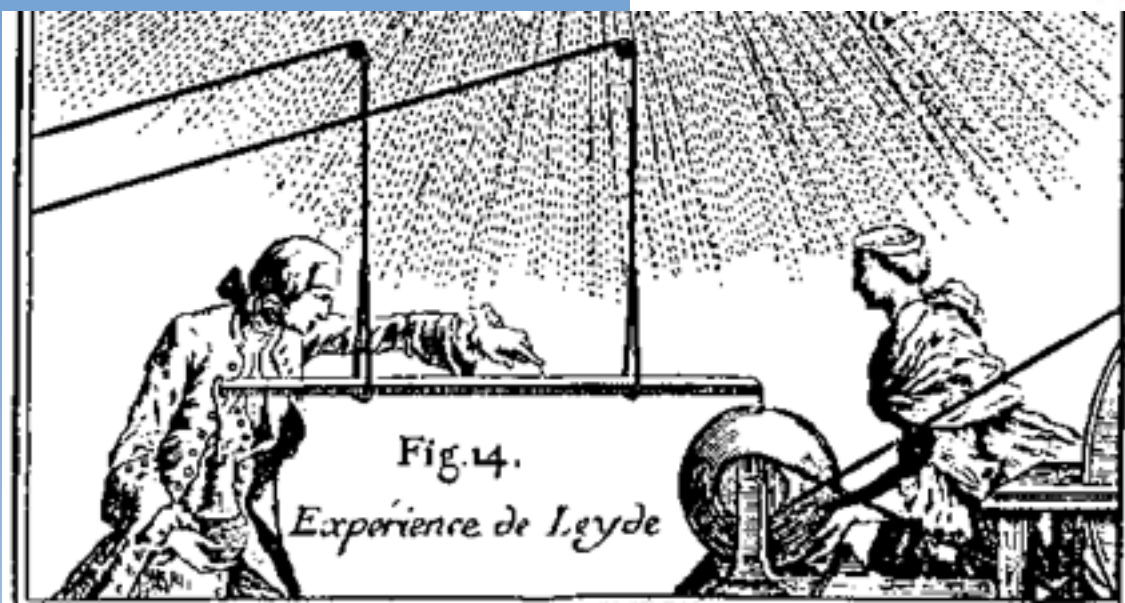
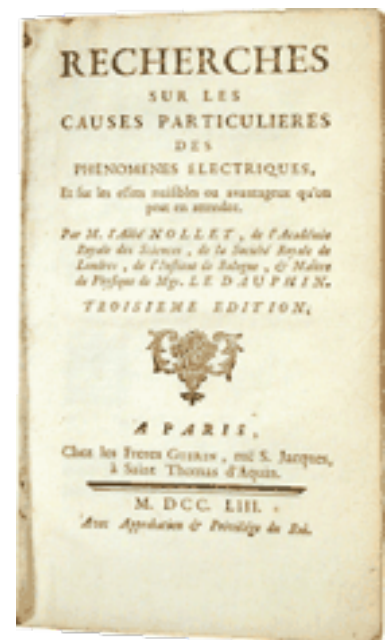
more monkish experiments

1753 Abbé Nollet's galvanism

180 Royal Guards; 1 km Carthusian monks

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

1800 Alessandra Volta's battery





along came Morse

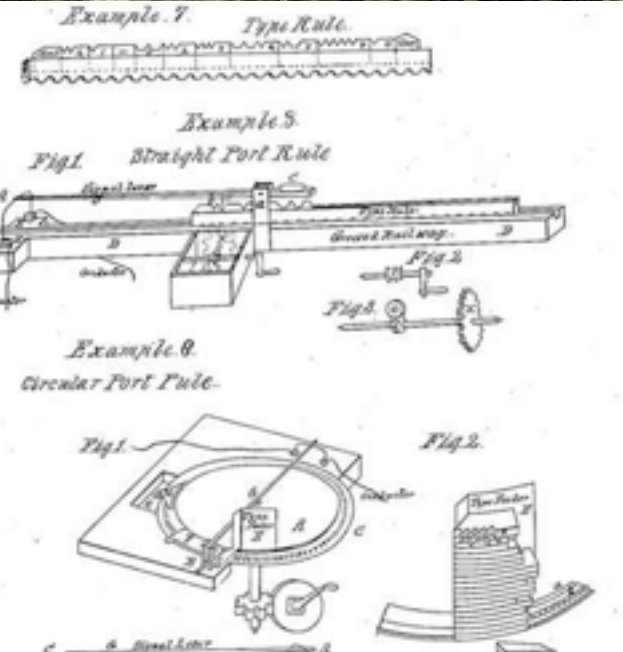
Samuel Morse (1791-1872)

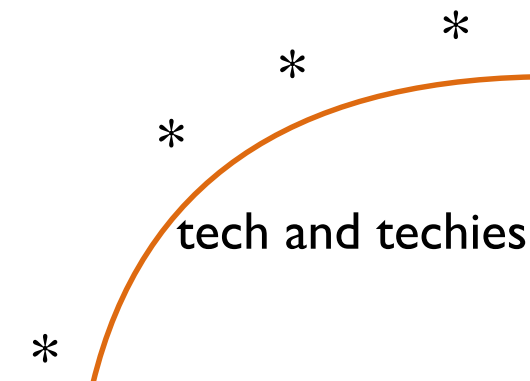
"If the presence of electricity can be made visible in any desired part of the circuit, I see no reason why intelligence may not be instantaneously transmitted by electricity to any distance."

1837, patent filing; numerical codes

1843, Washington-Baltimore line (US govt funded)

1861, transcontinental telegraph





precise information

First. The fullest and most precise information can be almost instantaneously transmitted between any two or more points, between which a wire conductor is laid; that is to say, no other time is consumed than is necessary to write the intelligence to be conveyed, and to convert the words into the telegraphic numbers. The numbers are then transmitted nearly instantaneously, (or, if I have been rightly informed in regard to some recent experiments in the velocity of electricity, two hundred thousand times more rapidly than light!) to any distance, where the numbers are immediately recognised, and reconverted into the words of the intelligence.

Second. The same full intelligence can be communicated at any moment, irrespective of the time of day or night, or state of the weather. This single point establishes its superiority to all other modes of telegraphic communication now known.

Third. The whole apparatus will occupy but little space, (scarcely six cubic feet, probably not more than four ;) and it may therefore be placed, without inconvenience, in any house.

Fourth. 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, if desired.

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

"Electro-Magnetic
Telegraphs" HR 713,
25th Congress 1838

Morse's Advantages

*First. .. fullest and most precise information
... two-hundred thousand times more rapidly
than light!*

*Second. ... communicated irrespective of ..
day or night, or .. weather*

Third. ... apparatus .. little space

*Fourth. .. record of intelligence is made in
a permanent manner*

Fifth. ... communications are secret

"Fourth. . . record of intelligence is made in a permanent manner;

Fifth. communications are secret"

—Morse to Congress

caged secrets



[Mrs Jordan, flower arranger]: "I dare say it's some of your people that *I* do."

Her companion [the telegraph girl] assented but discriminated. "I doubt if you 'do' them as much as I! Their affairs, their appointments and arrangements, their little games and secrets and vices—those things all pass before me."

... "Their vices? Have they got vices?"

... "Haven't you found *that* out?" Their homes of luxury then hadn't so much to give. "*I* find out everything."

—Henry James, "In the Cage," 1898



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35th CONGRESS,
2d Session.

[Rep. No. 753.]

Ho. of Reps.

31

ELECTRO-MAGNETIC TELEGRAPHS.
[To accompany bill H. R. No. 712.]

—
APRIL 6, 1858.
—

Mr. SMITH, from the Committee on Commerce, made the following

REPORT :

The Committee on Commerce, to whom the subject was referred, have had the same under consideration, and report :

On the 3d of February, 1857, the House of Representatives passed a resolution requesting the Secretary of the Treasury to report to the House, at its present session, upon the propriety of establishing a system of telegraphs for the United States.

To accompany of this report the Secretary of the Treasury, at an earlier

clearing the fog

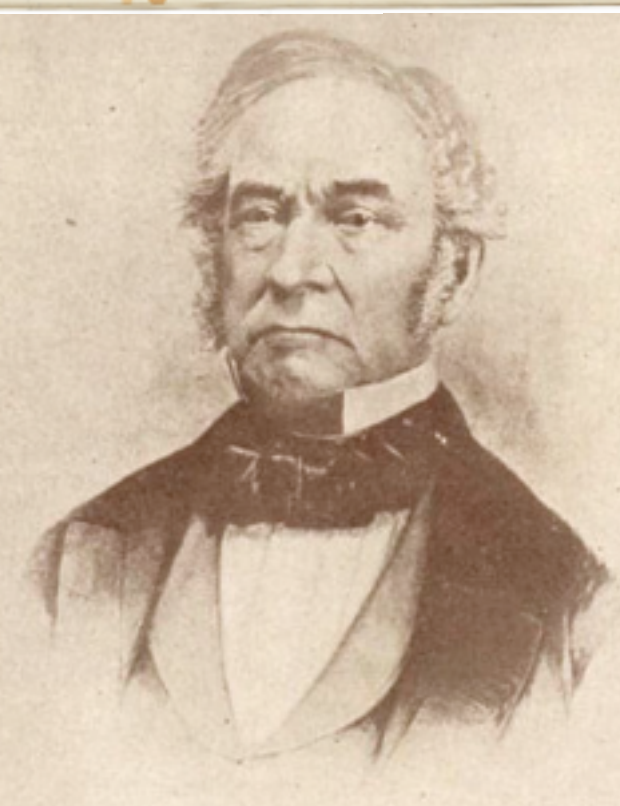
"its great and incalculable practical importance and usefulness to the country, and ultimately to the whole world ... presumptuous ... to attempt ... to calculate ... usefulness .. political, commercial, or social ... it is obvious, however, ... a revolution unsurpassed in moral grandeur by any discovery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

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

Men of Progress
Christian Schussele, 1862



patent enthusiasm



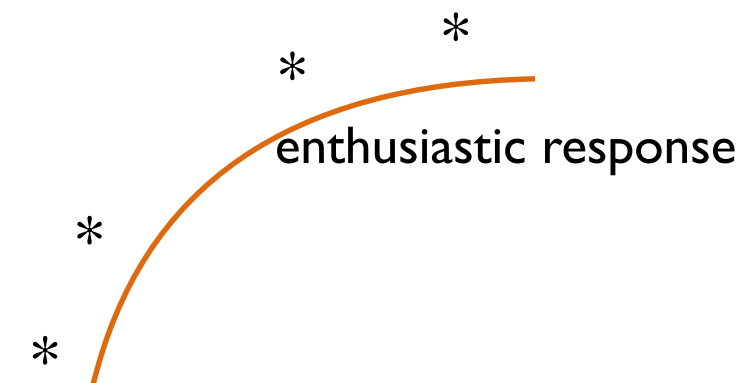
Henry Ellsworth
1791-1858

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,



the great inventor

REMINISCENCES OF MORSE

SOME ANECDOTES OF THE GREAT INVENTOR.

HOW HE DIFFERED FROM OTHER INVENTORS
—HIS BELIEF IN HIS PROJECTS—BURYING
THE WIRES—HIS RETURN FROM WASH-
INGTON—WHAT IT COST TO DEFEND HIS
PATENT—HIS CHARITY.

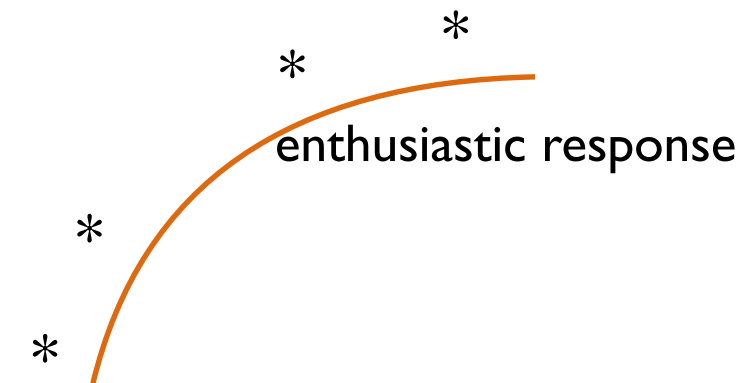
It is worth while to pick up now, while it is still possible, some few anecdotes of Samuel Finley Breese Morse, the inventor of the telegraph, and to record them. Such incidents, trifling though they may be, allow us to form some slight estimate of this remarkable man. Perhaps the most salient trait that Morse had, was the positive belief in the necessity of his invention. There was no half-heartedness about him. Such men as Bernard De Palissy, are, it is true, few in this world. The French potter was willing to burn his baby's cradle, providing it would furnish fuel for heating his kiln. Putting aside as much as we may differences of age and time, Palissy seeking to perfect his dish, or Morse to develop his telegraph, the divergence between the two is wide. The former was groping for perfection in a physical thing. Men had eaten from earthen-ware, had slaked their thirst from *paterae*, ever since the world was known. It behooved Palissy, perhaps, to invent new glazes, new forms, new ornaments. But with Morse it was to convince a world of a new method of imparting information, to project something which was in a certain measure ahead of them. It was a novel mental process, which was to be driven through

NY Times 1879

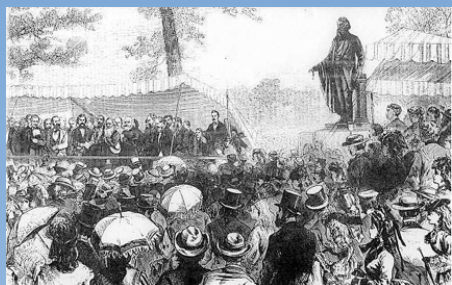
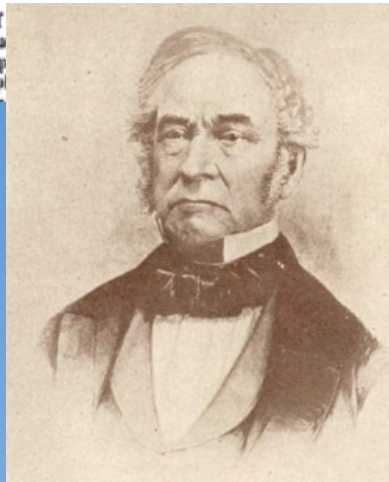
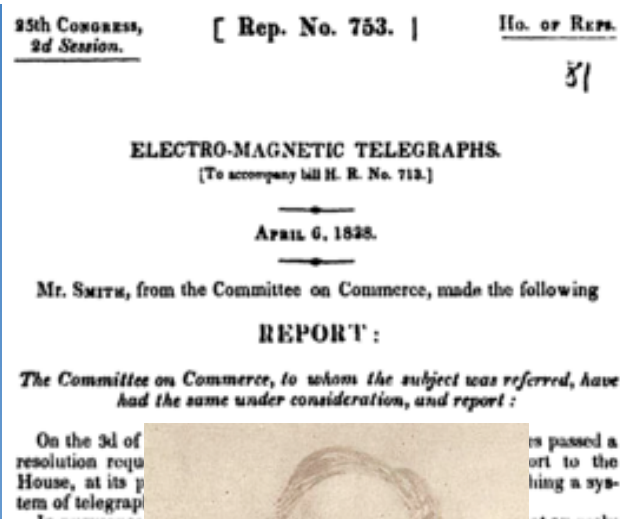
"the great inventor ... to convince the world of a new method of imparting information ... on a higher plane than that accorded to mere inventors" —*NY Times*, 1879

unveiling of
Morse's statue
June 10, 1871





reliable witnesses?



business as usual

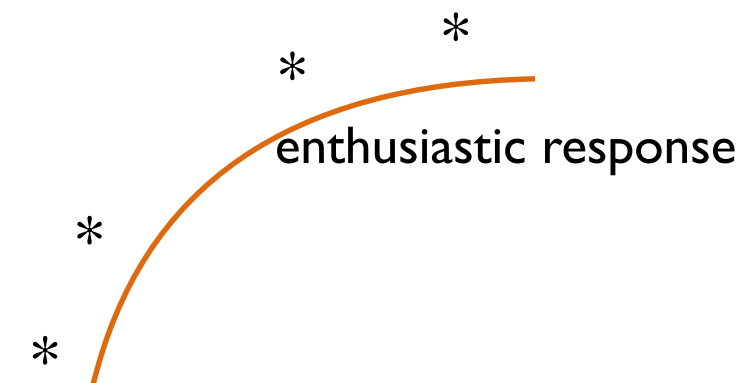
Congressman "Fog" Smith

patent partner

Henry Ellsworth

statue of limitations?

patent troubles



reliable witnesses?

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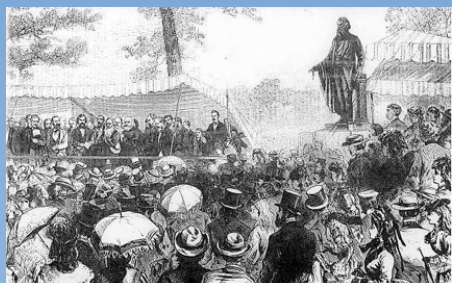
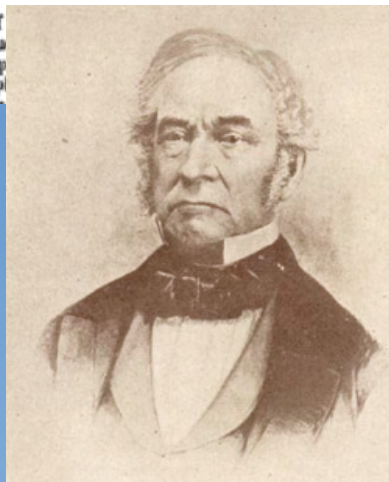
Congressman "Fog" Smith, business partner

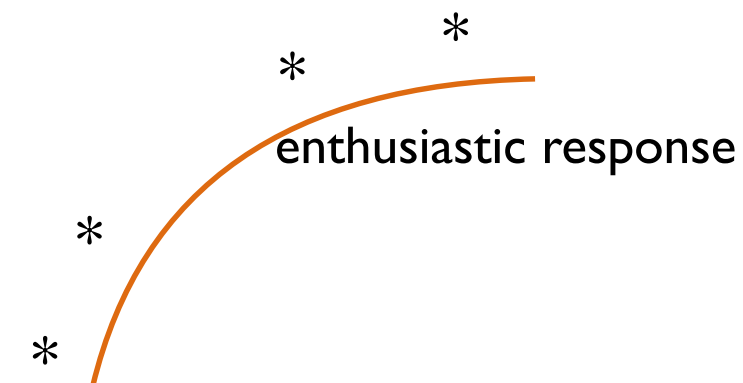
patent partner

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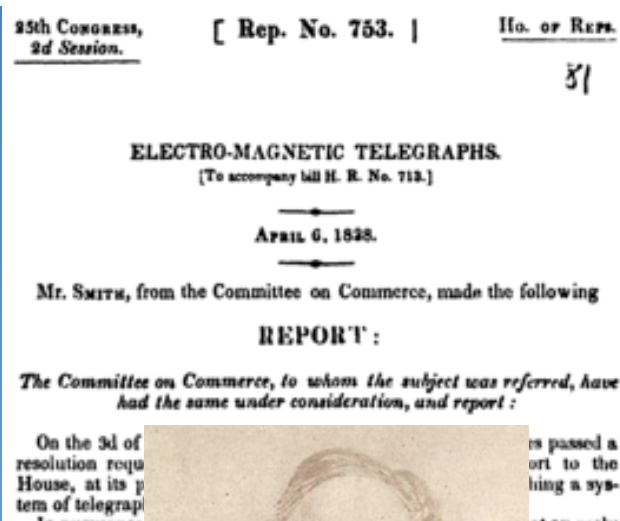
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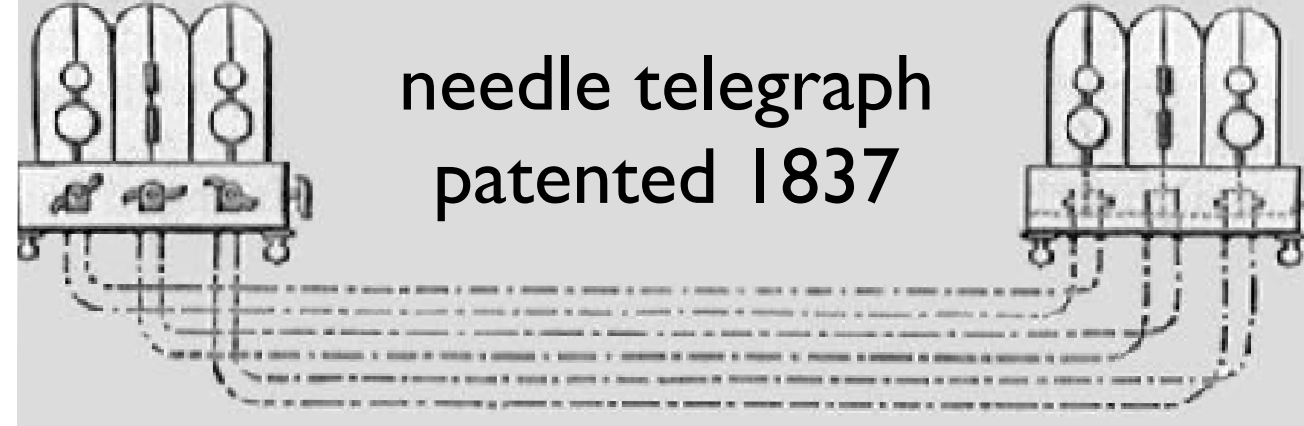
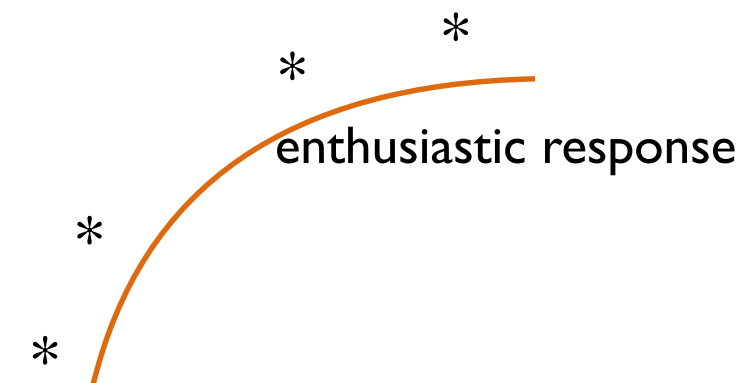
patent partner

Henry Ellsworth

old friends (Yale 1810); prospective in-laws

statue of limitations?

patent troubles



prior art



Pavel
Schilling
1780-1836

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

PO problems

Joseph Henry, 1830

patent resistance



Sir William Fothergill Cooke (1806-1879), by unknown photographer, 1870s



Sir Charles Wheatstone (1802-1875), by Samuel Laurence, 1868

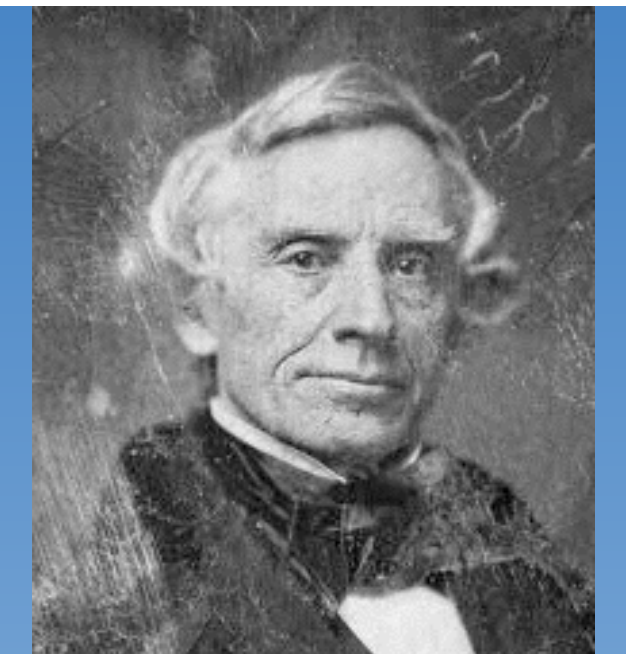




"[Theodore] De Vinne, in his book [The Invention of Printing, 1789] writes, 'The inventor of printing did not invent paper .. did not originate engraving on wood. He was not the first to print upon paper, he was not the first to make printed books, it is not certain that he made the first press, it is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

—Carter, *The Invention of Printing in China*, 1955

so what did Morse do?



"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*, 2010

The following is the alphabet for Morse's electro-magnetic telegraph:

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

NUMERALS.	
1	— — —
2	. — . .
3	. . — .
4	. . . —
5	— — —
6
7	— — . .
8	— . . .
9	— . — .
0	— — — —

what did Morse do?

(a) introduced a "binary" code?

"The cost of *printing* ... a *telegraphic dictionary* ... contain[ing] a full vocabulary ... with the numbers regularly affixed to each word ... As every word is numbered, an obvious mode of rating might be, a *charge of a certain amount on so many numbers.*"

—Morse to Secretary of the Treasury, 1837

The following is the alphabet for Morse's electro-magnetic telegraph:

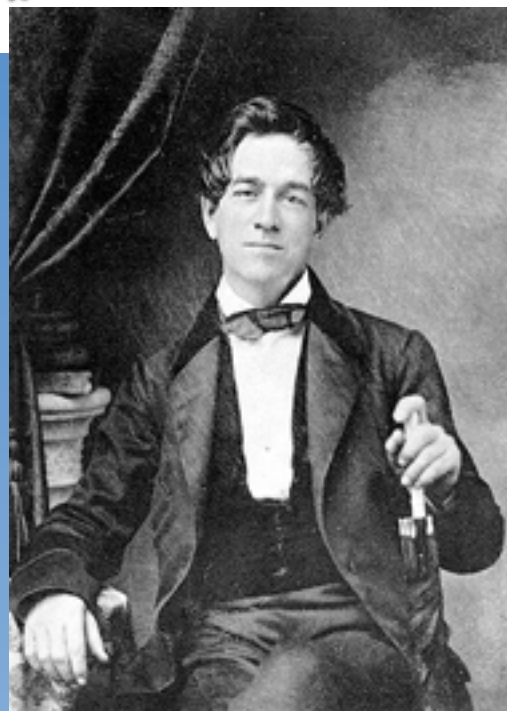
ALPHABET.		NUMERALS.	
A	- -	1	- - - -
B	- . .	2	- . - . .
C	- . . .	3	- . . - .
D	- . . .	4	- . . - -
E	-	5	- - - -
F	- . - .	6	-
G	- - - .	7	- - - . .
H	- . . .	8	- - . . .
I	- .	9	- - . - -
K	- . -	0	- - - - -
L	- - -		
M	- -		
N	- .		
O	- - -		
P	- . . .		
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what did Morse do?

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"After going through a computation, in order to ascertain the relative frequency of the occurrence of different letters in the English alphabet, Alfred was seized with sudden inspiration, and visited the office of the Morristown local newspaper, where he found the whole problem worked out for him in the type cases of the compositor. In this statement I have given the true origin of the misnamed "Morse" alphabet the very foundation and corner-stone of a new system, which has, since become the universal telegraphic language of the world."

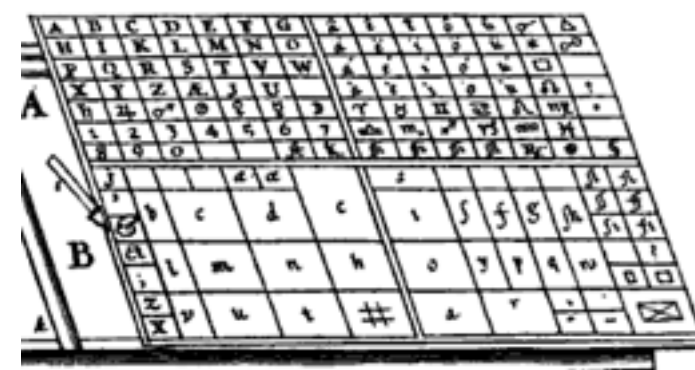
—William Baxter (Vail's assistant)



Alfred Vail
1807-1859

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D	- . . .	4	- . . - -
E	- .	5	- - - -
F	- . - .	6	-
G	- . - .	7	- - - . .
H	- . . .	8	- - . . .
I	- . .	9	- - . - .
K	- . -	0	- - - - -
L	- - -		
M	- - -		
N	- .		
O	- - -		
P	-		
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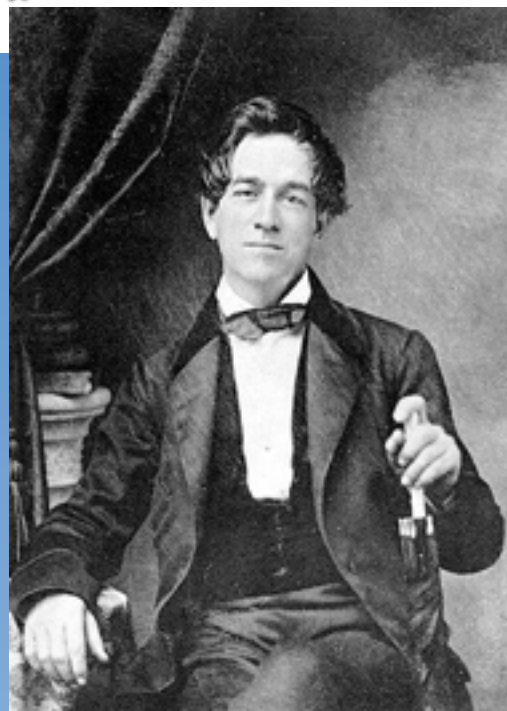


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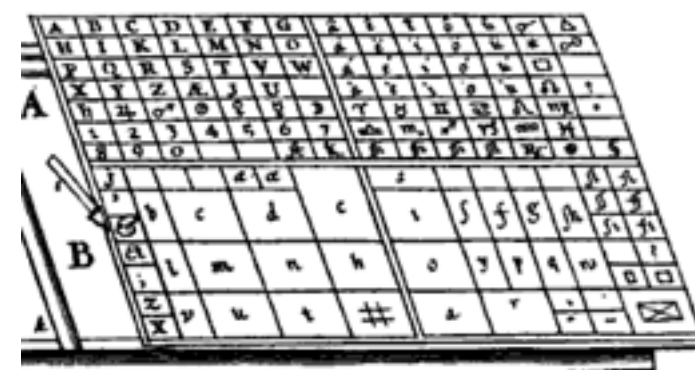
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G	- . - .	7	- - - . .
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I	- . .	9	- - . - .
K	- . -	0	- - - - -
L	- - -		
M	- - -		
N	- . .		
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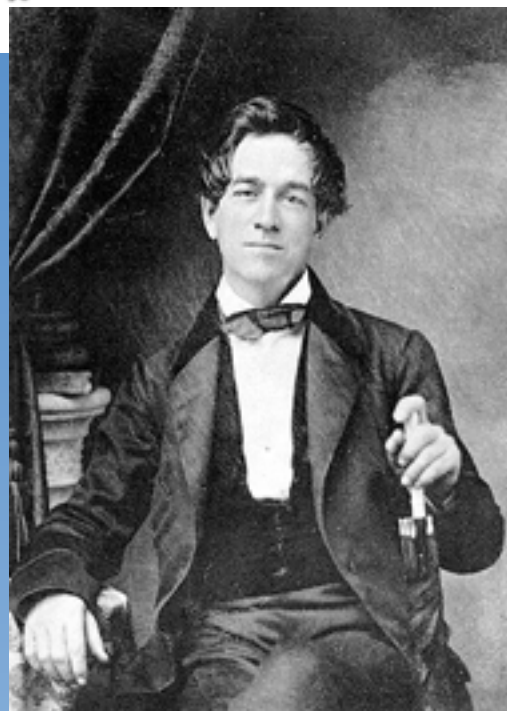


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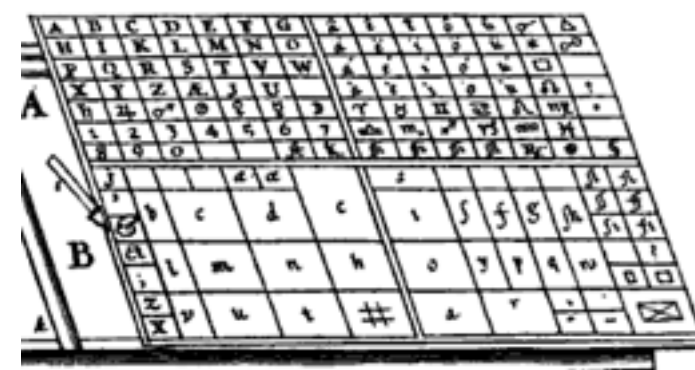
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H	- . . .	8	- - . . .
I	- . .	9	- - . - .
K	- . -	0	- - - - -
L	- - -		
M	- - -		
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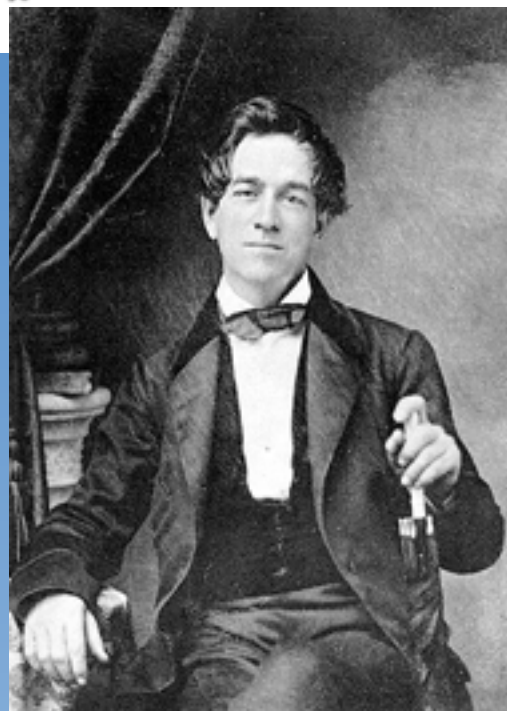
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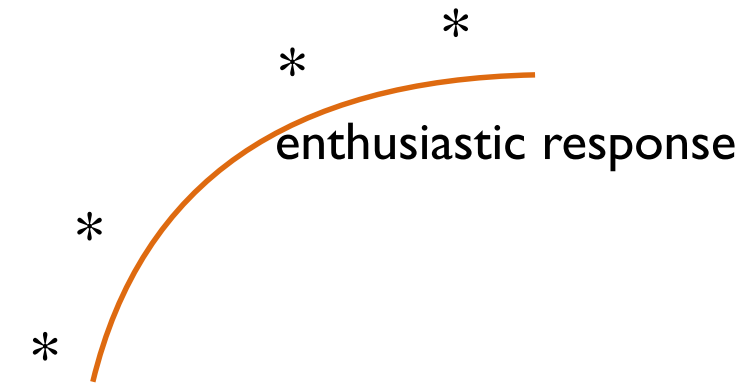
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Morse Code or "Vail Code"?



Alfred Vail
1807-1859

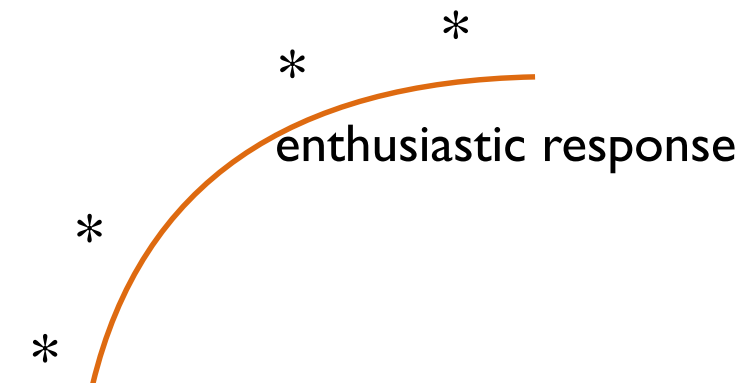
Morse Code or "Vail Code" ...



... or Gerke code?

"Morse's original code soon split (or "forked," as software engineers would say today) into two versions. American Morse ... and a revised version of Morse code created by a German, Friedrich Clemens Gerke, in 1848. ... twenty European nations ... adopted Gerke's code as the **standard International Morse**, but Americans continued to use their own version ... Railroad Morse or American Morse, for several decades."

—Russell, *Open Standards*, 2013



(a) introduce a "binary" code

what did Morse do?

(b) reintroduced European electronic signaling

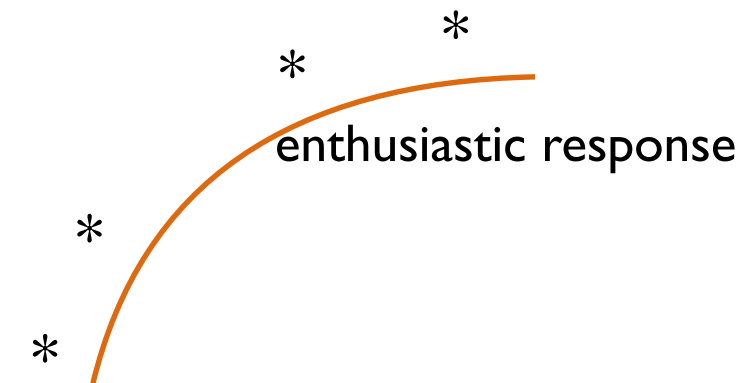
1837, 18 submissions to US government "RFP"

17 were line of sight

? worries about the Post Office monopoly

cp Harrison Dyer

cp Norvin Green



scientific viewpoint

"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.]



*

astic response

(a) introduce a "binary" code

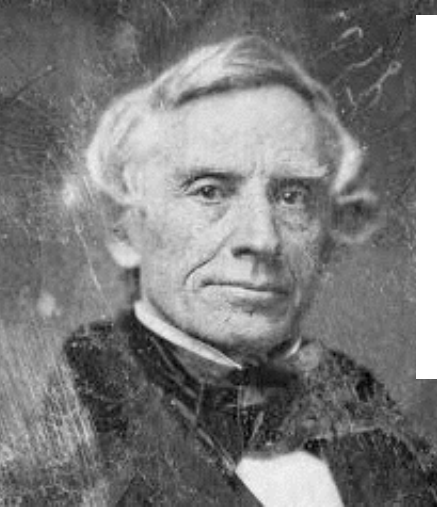
(b) reintroduced electronic signalling

what did Morse do?

(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."

—Morse to Congress, 1842



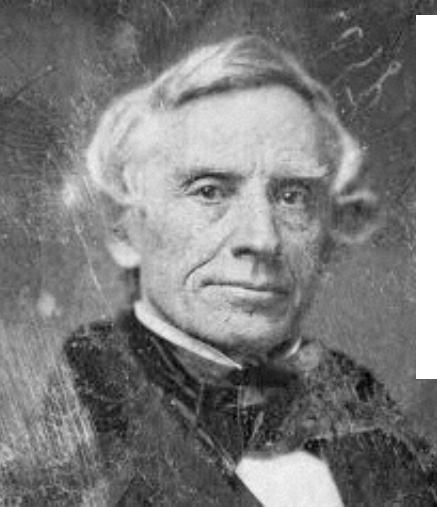
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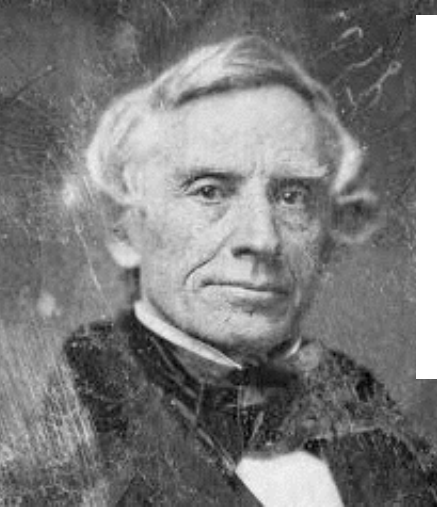
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around the world

betting on interconnections



1873



going global

international cables (but also treaties, standards)

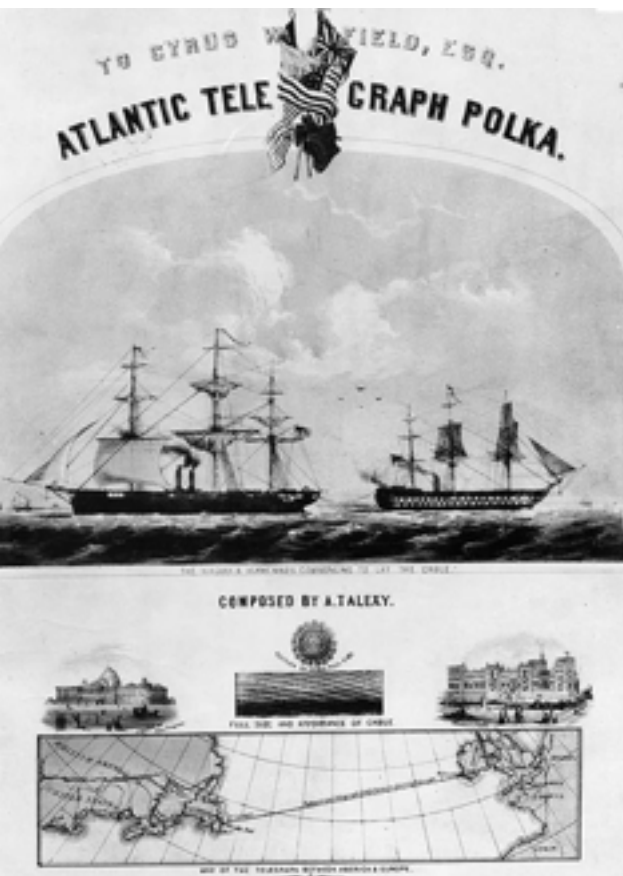
Prussia-Austria: 1849

England-France: 1851

New York-Newfoundland: 1856

Britain-North America: 1858-1866

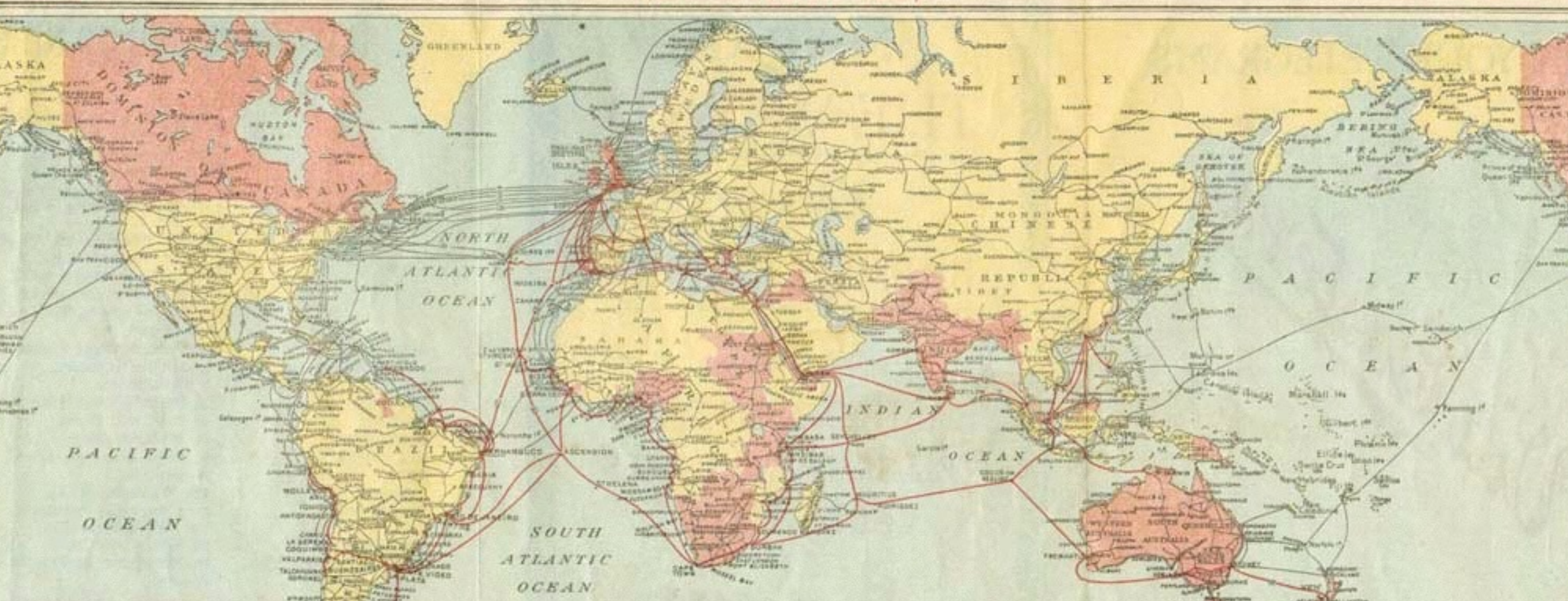
Atlantic telephone cable (TAT-1): 1956



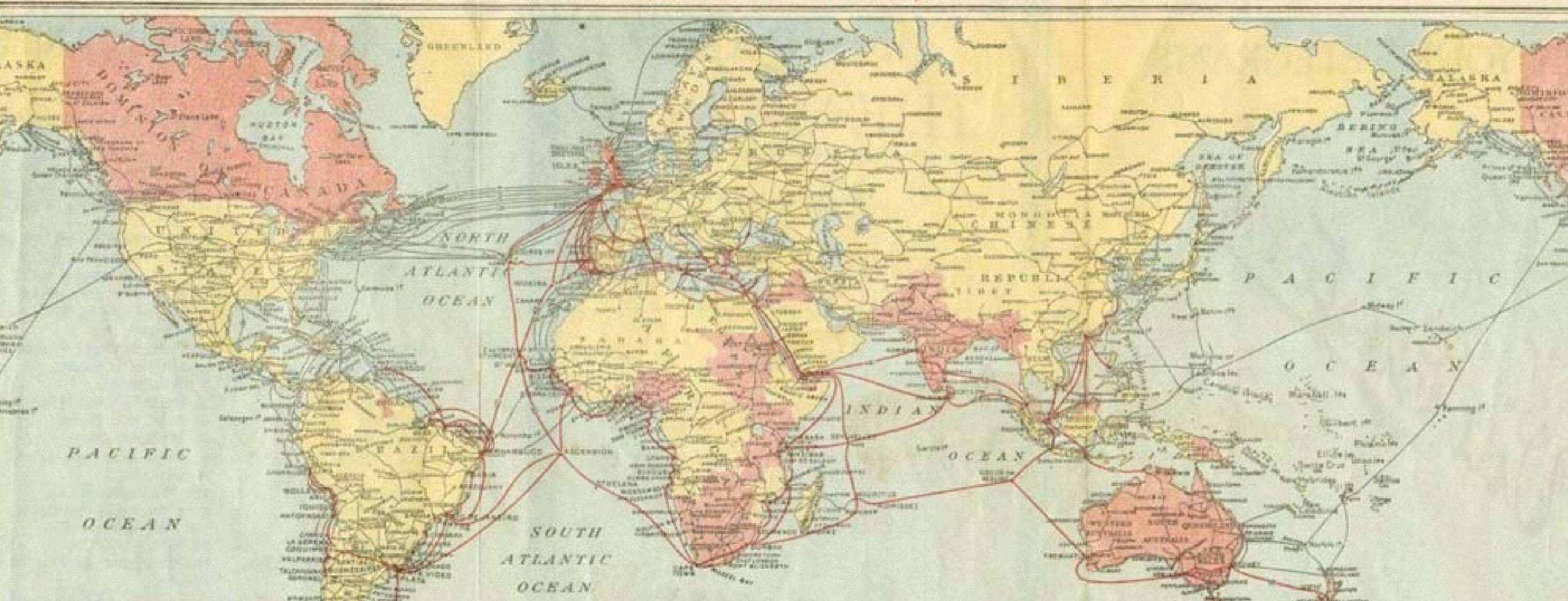
*
*
*
*
enthusiastic response

interconnections

Via Eastern THE EASTERN ASSOCIATED TELEGRAPH COMPANIES' CABLE SYSTEM. *Via Eastern*
(INDICATED IN RED.)



Via Eastern THE EASTERN ASSOCIATED TELEGRAPH COMPANIES' CABLE SYSTEM. *Via Eastern*
(INDICATED IN RED.)



The internet's undersea world

The vast majority of the world's communication is now carried by undersea but much older technology, rather than the world's oceans. All multi-continental type (see Asia-Europe-Africa), this map shows how the only collection of routes of lines that is not a network is that of all together.

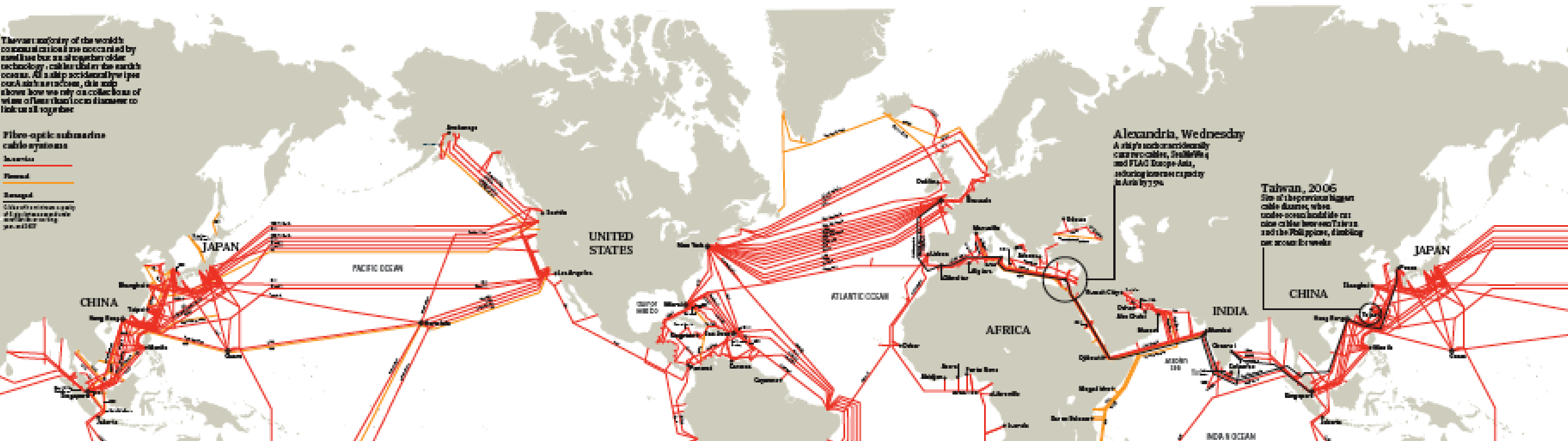
Fiber-optic submarine cable systems

Existing

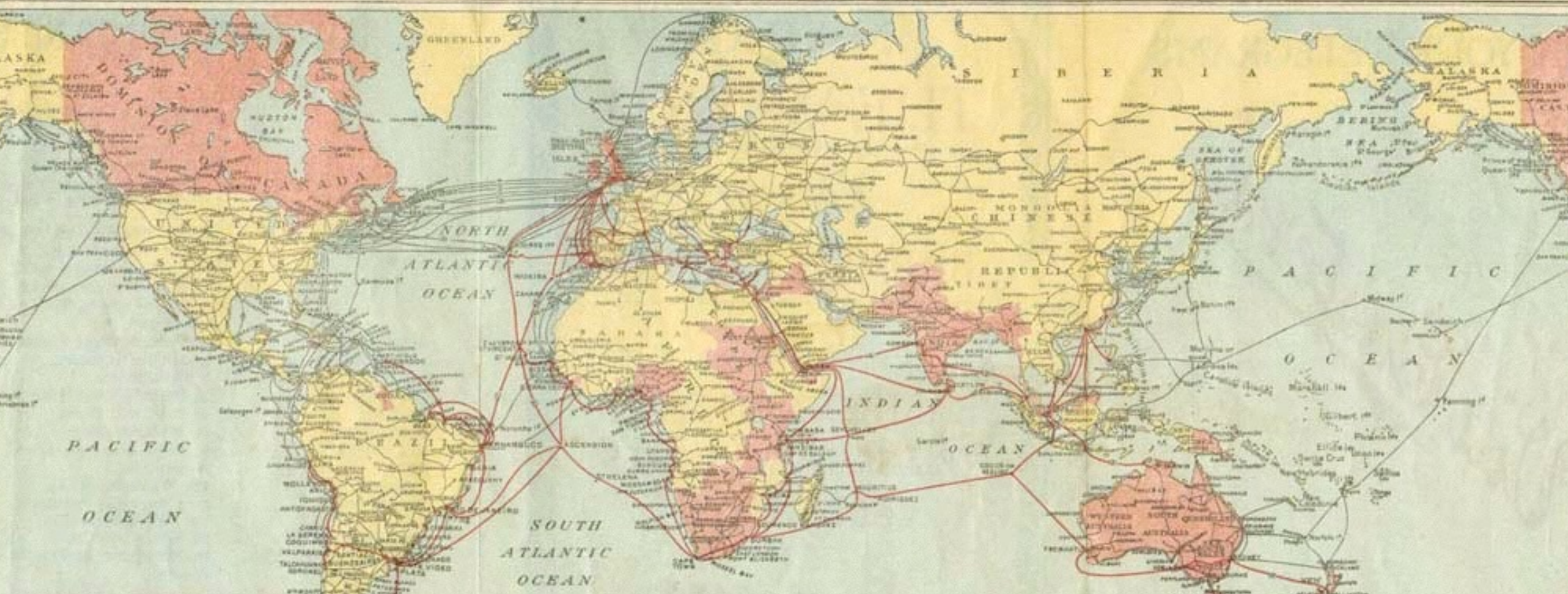
Planned

Cancelled

Other information: a map of the world's submarine cable systems, showing the routes of lines that are not a network is that of all together.



Via Eastern THE EASTERN ASSOCIATED TELEGRAPH COMPANIES' CABLE SYSTEM. *Via Eastern* (INDICATED IN RED.)





making progress

wishing on technology (again)

readers respond

enthusiastic response

tech and techies

developments



making progress

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Green — 48%

Hubbard — 44

(n)either — 6

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(n)either — 6

readers respond

Stephanie Coll

Chris Nichols

Jonathan Anstett

Miti Perez

Shannon Chu

Sofia Sheikh



"If it can be shown that the telegraph in this country ...
is ... far ahead of .. any other ... then there is no public
necessity"
— Norvin Green

public or private?

"Let the sole right ... belong, in the first place, to the Government"
— Morse to Congress

"Many persons ... advocating a government telegraph ... grave political
reason why the government should not assume and control this
important medium of communication"
— Norvin Green

"as a telegraph for the people it is a signal failure ... only
effectual remedy ... governmental control"
— Gardiner G. Hubbard

"the Telegraph ... is not merely private property ... The people's money
aided to build the overland line"
— Henry George



Green not government

Hubbard makes a good point when arguing against private control of the telegraph. He explains that the Western Union “practically monopolizes the telegraph business” in the U.S. (520). He continued to argue that the company has “unlimited control” (529) and abused its power by charging high rates and “discriminated in its rates to the press” (529). Although he makes a good point, I agree with Green that the government should not control the telegraph. Private control allows for competition and encourages businesses to grow and compete. In America, “great inventions and improvements...have been made under the stimulus of private enterprise” (432). Green makes the point that if the service is not good under the control of government, then “it is inexpedient for the Government to intervene” (429). Furthermore, it would be a “great injustice...as to establish a competing telegraph system to the detriment, or destruction, of the value of existing investments” (428). **The government would ruin existing businesses. This argument is applicable to the regulation of the internet.** If the government controlled the internet, there would not be room for it to grow. It has great potential now, and government regulation would hinder the possibilities for businesses to grow and people to make connections online.

—Stephanie Coll



Green - free and fair elections

Green's argument that the government should not have a hand in the telegraph process is the stronger argument when compared to Hubbard's.

Green implies that the trust society maintains for a fair government would be in jeopardy if the telegraph was controlled by government.

Green writes, "...any such advantage in directing or controlling the popular will... would give the administration party immense advantages in warmly contested elections." (Green, 433) Hubbard attempts to argue that a monopoly regarding the telegraph is bad and government regulation and consolidation of resources is the best way to cut costs.

With today's hot topic regarding information security and the debate over government documents and what should be transparent to the public(i.e., Snowden), Green's argument, that it is foolish to let the people trying to get elected control the flow of information, would win out due to a lack of trust that the government act scrupulously.

—Chris Nichols



Hubbard & the public

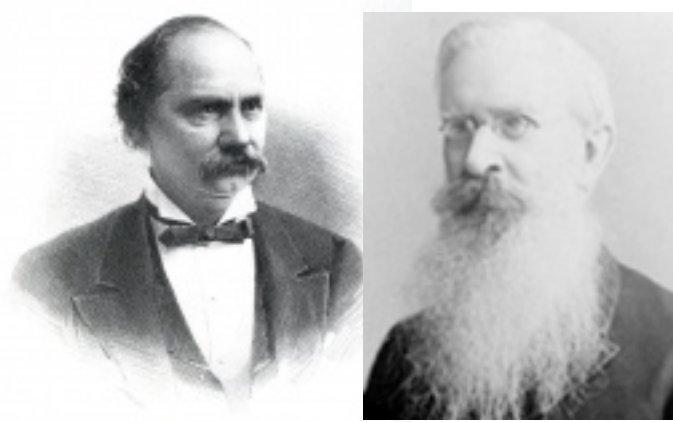
... Both Green and Hubbard agree that the private telegraph system of the United States provided faster and more accurate service than its government-owned counterparts in Europe. However, Hubbard is concerned that only businesses receive the benefits of this progress, as local correspondence rates are still higher than in European countries. **Green points out that only 500,000 Americans use the telegraph, arguing that this is not enough to warrant government control.** Hubbard would use that same statistic to argue **that the private system has failed to serve the public at large as a communication and information service.** Hubbard's call for government regulation over the telegraph is relevant to the recent "Net Neutrality" decision by the FCC. Hubbard is concerned that the telegraph can manipulate the press with varying rates. He is also concerned that a large company can thwart competition by not allowing smaller companies to connect to their lines, thus reducing the telegraph's usefulness to the public while securing a monopoly. Today there is debate over ISP's choosing what content to send and ability to use preferential pricing. Hubbard's warnings over the abuses of a means of communication apply to this current debate.



Hubbard(?) & government protection

Green argues that private industry is better suited to protect communication channels. He criticizes the government's control in telegraph operations, "Government can do business at a loss by increasing taxation to make up that loss; and has not hesitated to do the postal service at great loss to meet the public outcry for cheap postage" (427). Hubbard on the other hand believes that the government has a better role protecting channels from abuse. He believes that the government can control against high rates, monopolies, inflation, controlling cable lines, management of the economy, railroad/commercial interests and unlimited control (533). Although the government has created taxes for the telegraph to reach the people necessary, it does a better job to keep the private interest in their place. The government has a better role in protecting communication from abuse than would the private interest groups. **The Federal Communications Commission (FCC) is a good example of why we need the government's protection from abuse. Through the FCC there is control of private interest such as Comcast or AT&T from monopolizing the television industry and the internet. If we did not have such governmental control these companies would be able to charge a public good like the internet as a commodity.**

—Miti Perez



(n)either

While the Western Union had not experienced government regulated telegraphic system from which they could directly compare the service and productivity with the privatized system of the time, Green's comparative and quantitative data between the telegraph systems of the Western Union and various European countries show the benefits of a largely privatized system. Green's data clearly shows how the Western system has developed more rapidly and widespread over time, "showing greater results", maintaining accuracy throughout and "stimulat[ing] ... competition" (434); all the while also reducing costs (Green 434).

Although Green brings up many strong points advocating for private industry control, Hubbard has legitimate concerns about "the unrestricted and almost despotic power of the Western Union Telegraph Company" (529). In particular, Hubbard discusses how the Western Union sabotaged the business of a competing telegraph company and also discriminated against the press (529). Both the government and private enterprises have the power to abuse their control over the communication channels for their respective interests. The people of the nation themselves who act in the people's interest would do good to fight for regulations on the telegraph system that protect the communication channels from abuse, fighting through government and the private system.

— Shannon Chu



for George

I believe Hubbard has the better argument, but to be completely honest, I was most swayed neither by Green nor Hubbard, but by George's outcry about the press. Hubbard's story about the cotton farmer who was ruined by the profit-hungry Western Union (529) only solidified my opinion. The fact that things like this occurred when private industry had control of the telegraph makes me think that government control would be less detrimental. Green's argument is based on a few points: comparative efficiency/cost of the current system, the danger of absolute control, and unconstitutionality. The first point is disputed by Hubbard, the second I address below, and the last is, for the purposes of this question, somewhere between irrelevance and pedantry: the Constitution was written in a time without a telegraph, so it probably won't apply very well to matters concerning the telegraph. This is equally true now, concerning the internet. Giving any one entity – be it government *or monopoly* (for monopoly always seems to be the end result) – control of the flow of information (telegraph or internet) is dangerous. Given Hubbard and George's anecdotes, democracy plus a less central profit motive seems to be the safest way to proceed. —Sofia Sheikh

Net Neutrality Prevails In Historic FCC Vote

Posted: 02/26/2015 1:02 pm EST | Updated: 22 minutes ago

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209

121

49

0

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FCC to prevent states from impeding broadband competition

current
interests



WASHINGTON -- The Federal Communications Commission voted Thursday to approve strong net neutrality rules in a stunning decision that defies vocal, months-long opposition by telecom and cable companies and Republicans on Capitol Hill.

Democratic Commissioners Jessica Rosenworcel and Mignon Clyburn joined Chairman Tom Wheeler to approve a rule

The FCC announced today that it will overrule state legislators who seek to impede competition between incumbent broadband providers and newer rivals. The decision is supposed to target North Carolina and Tennessee, but the FCC has also “reserved the right to intercede on behalf of municipalities on a case-by-case basis.” [Source: [Engadget](#)]

that reclassifies consumer broadband as a utility under Title II of the Communications Act.

In Net Neutrality Victory, F.C.C. Classifies Broadband Internet Service as a Public Utility

By REBECCA R. RUIZ and STEVE LOHR FEB. 26, 2015

Going Viral

How John Oliver Transformed the Net Neutrality Debate Once and for All

Feb 26, 2015 7:00 AM PST

WASHINGTON — The [Federal Communications Commission](#) voted Thursday to regulate broadband Internet service as a public utility, a milestone in regulating high-speed Internet service into American homes.

The new rules, approved 2 to 2



Net Neutrality Prevails In Historic FCC Vote

Posted: 02/26/2015 1:02 pm EST | Updated: 22 minutes ago

2 March 2015 Last updated at 11:52 ET

Share  

Reduced BBC bad for UK, says director general Tony Hall



Tony Hall: "People in this country want the BBC to thrive"

A BBC "reduced in impact and reach" will leave Britain "diminished", the BBC's director general has warned.

In a speech at New Broadcasting House in London, Tony Hall said "a sleep-walk into decay for the BBC" would mean "a UK dominated by global gatekeepers, partial news and American tastemakers".

"A strong BBC", he said, would "bind the country together at home" and be "a British creative beacon to the world".

How John Oliver Transformed the Net Neutrality Debate Once and for All



Feb 26, 2015 7:00 AM PST

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[Source: [Engadget](#)]

current
interests

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IP or Open Source?

- 1486 Marcantonio Sabellico — privilegium [©]
- 1496 Aldus Manutius — patent, Greek type
- 1498 Aldus - © Demosthenes, Plutarch, Xenophon ...
- 1501 Aldus Manutius — patent
- 1507 Aldus - legal battles for
- 1507 *Adagia* I: "Amicorum C

earlier thoughts

solutions

legal control

"provided by law that no man should sew a shoe
.. or make a cupboard, unless
approved by his trade guild

Punishment ... for the man who
in England from cloth dyed in
free to profit from mere text
corruptions .. under the label
authors"

public subsidy

"I must suggest a remedy ... grants from either
princes or from bishops and abbots or from the
public treasury if only the princes on our
side of the Alps encouraged liberal studies"

or private philanthropy?

"I will not put on record here how many ways
our magnates have of wasting money, how much
is absorbed by gaming, wenching, drinking,
needless travel, pageants, wars .. ambition,
favourites, players, or fools"

solutions



making progress

wishing on technology (again)

readers respond

enthusiastic response

tech and techies

developments



making progress

wishing on technology (again)

war and peace

readers respond

enthusiastic response

tech and techies

developments



THE FIRST MESSAGE.
—
ENGLAND GREET'S AMERICA
—
QUEEN VICTORIA
TO
PRESIDENT BUCHANAN.

perpetual peace

"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."

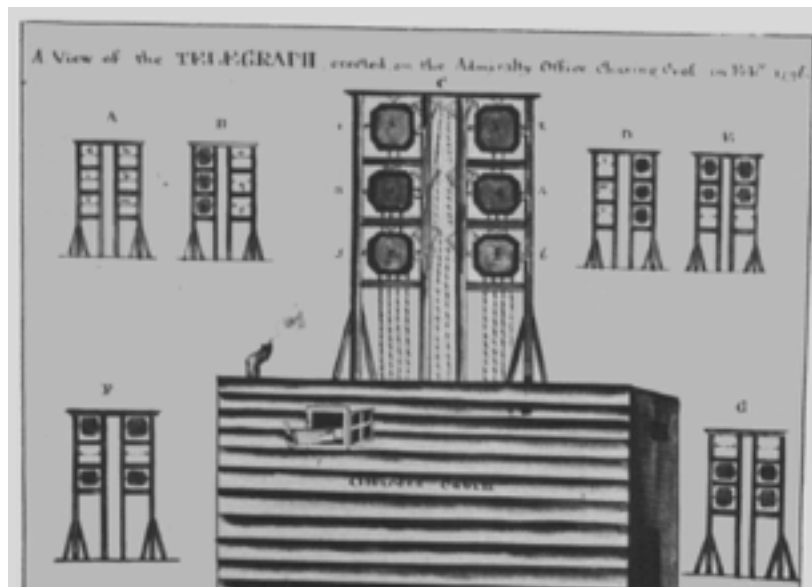
-- Ambassador Thornton, 1858

"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

lest we forget

military interests



The French Optical Telegraph, "one of the mightiest of agents by which Napoleon transformed himself into a military despot."

"Magnetic Telegraph," *Niles's Register*, 1846



"Who can say that sooner or later there would not be an espionage of telegrams."

—Norvin Green

a communications war?

battling empires:

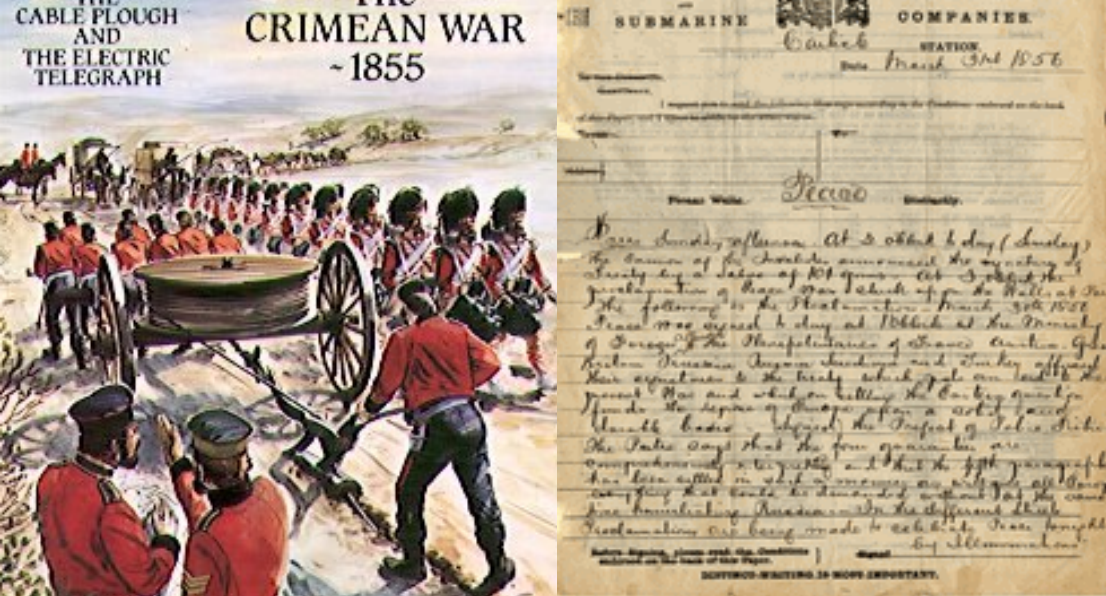
Russian

Ottoman

British

French





military arbitrage

tech and war

"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

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 this 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 Spain. The *Constitutionnel* publishes an extraordi-



Otto von Bismarck
1815-1898

"à Berlin, à Berlin," —Zola

tech and despots

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.**

July 1871



4458	opmentum
17149	Friedensschluß.
14471	⊙
6706	reichlich
1550	finanziell
12224	unterstützung
6929	und
14991	Einverständnis
7382	unsererseits.
158517	Pa/3
67893	Mexico.
14218	in
36477	Texas
5870	⊙
17553	neu
67893	Mexico.
5870	⊙
5454	AR
16102	IZ
15217	ON
22501	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	opmentum
17149	Friedensschleifs.
14471	©
6706	reichlich
1550	finanziell
12224	unterstützung
6929	und
14991	einverständnis
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GERMAN PLOT TO LINK JAPAN AND MEXICO
 IN ALLIANCE OF WAR AGAINST AMERICA.



4458
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opmentum
Friedensschloß.
©
reichlich
finanziell
unterstützung
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Einverständnis
amerikanische
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war again

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the following basis: make
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support and an understanding
that Mexico is to reconquer
territory in Texas, New Mexico
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received, Mexico, Jan 17,
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PLOT AWAKENS CONGRESS

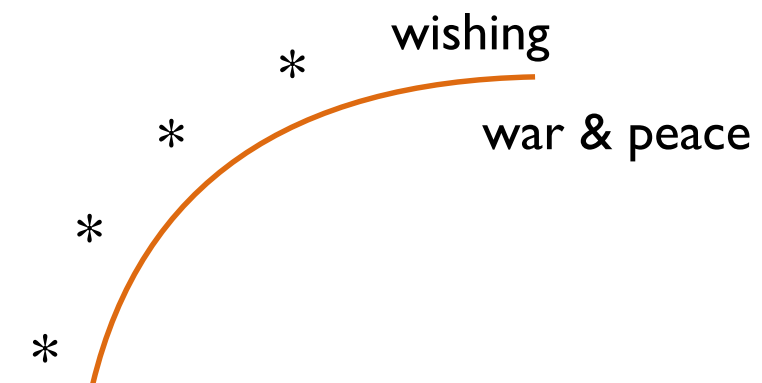
Party Spirit Engulfed in
Patriotic Zeal to
Back Wilson.

SENATE DEBATE WAXES HOT

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

FEW DETAILS DISCLOSED

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

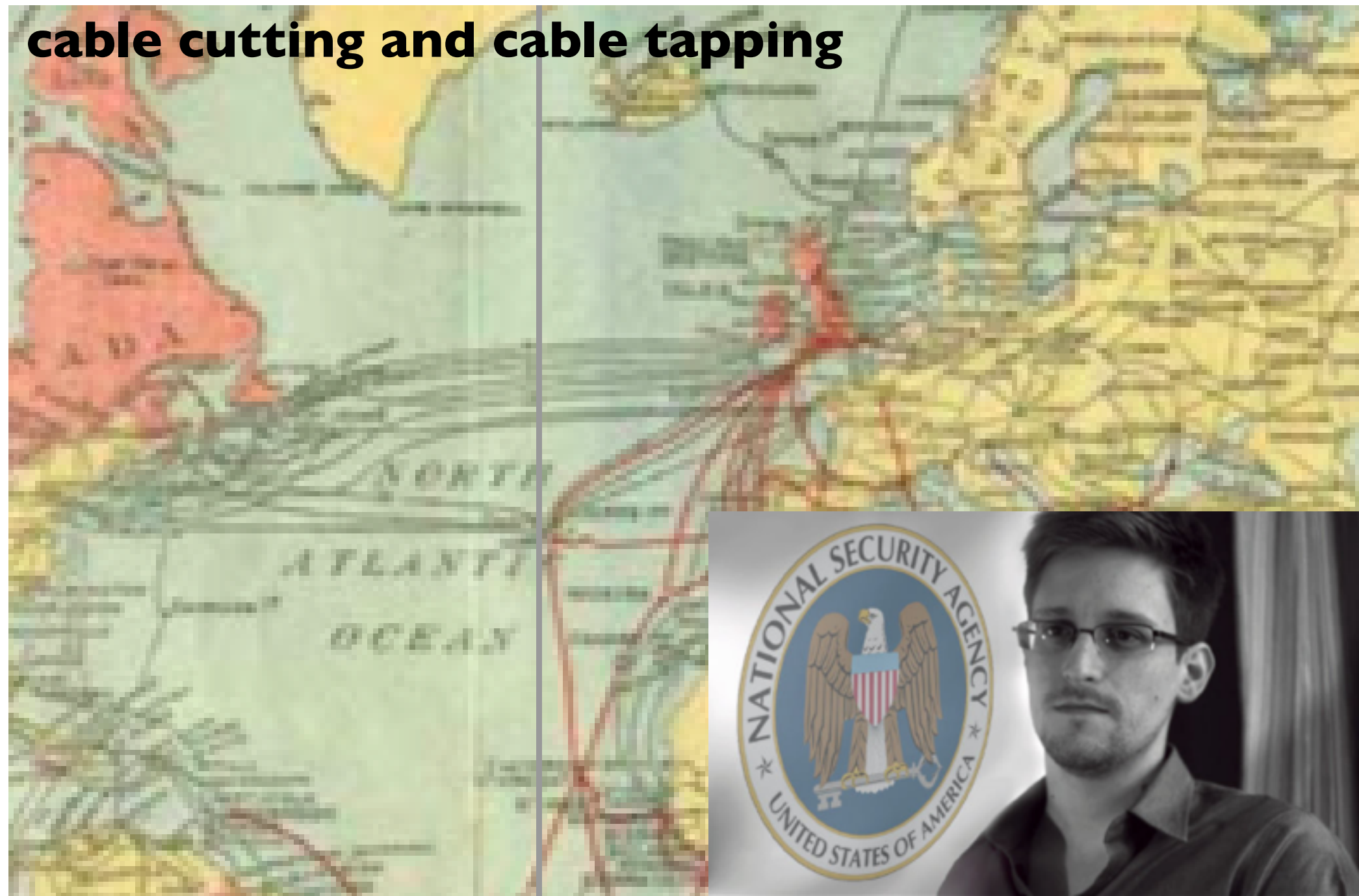


familiar story?

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

--Peter Hugill

cable cutting and cable tapping





making progress

wishing on technology (again)

readers respond

the marketplace

enthusiastic response

tech and techies

developments

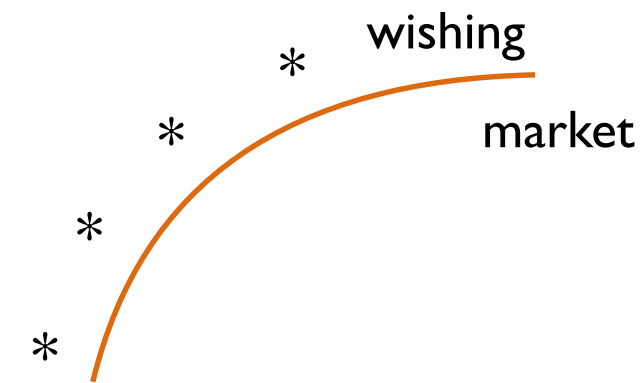


sea to shining sea

would Henry George agree?

"No ten days will hereafter elapse before the news of each day on the Atlantic is known on the Pacific. ... They are *no longer strangers*, for the lightning has annihilated a continent as an obstacle to *intellectual communication*. By the wonderful invention of Morse the incidents of to-day on the Atlantic mid in the upper Mississippi valley will be transmitted the width of a continent and published in our daily papers of to-morrow... The Orient and the Occident are united by the click of the telegraph."

—*Sacramento Daily Union* - October 24 1861



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

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,

speculative precedents



Thomas
Cochrane
1775–1860

Admiral Cochrane

"Napoleon is dead" 1814

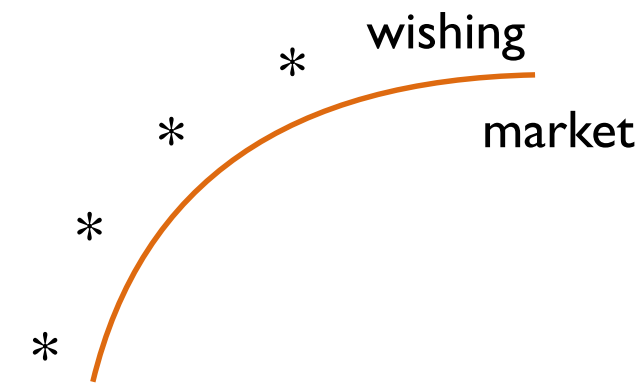
Omnium from 26-1/2 to 33

Stendhal

The Telegraph, 1835

Dyer's telegraph





getting ahead of the news

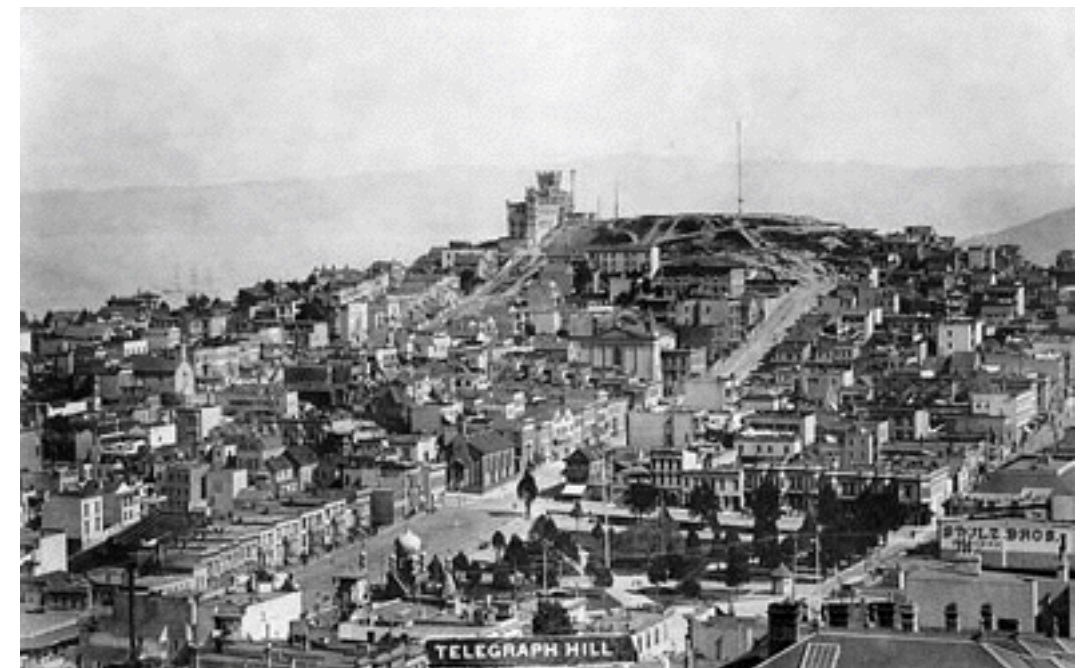
telegraph hill(s)

1801-1807: Boston

c1812: New York

1833-4: Boston

1849: San Francisco





Samuel Colt
1814–1862

“in the hands of a company of speculators ...
enriching the corporation at the expense of the
bankruptcy of thousands” —Morse

speculative alliances

patented revolver, 1835



Colt & Morse, 1843

naval mine

NEW YORK AND OFFING LINE OF MAGNETIC TELEGRAPH.

TO THE PUBLIC.

THE undersigned, SAMUEL COLT and WILLIAM ROBINSON, are the proprietors of the right to construct and use exclusively the ELECTRO-MAGNETIC TELEGRAPH, invented by PROFESSOR SAMUEL F. B. MORSE, from New York City, to any point or points on the shores of Long Island and New Jersey.

We have already succeeded in crossing the bed of the East River at Hurlgate with our Telegraph wires in leaden tube, and have completed and put into successful operation a line of Telegraph as far as the lower Bay, for Commercial purposes, and deeming it of great importance to our City, not only in a commercial, but in a humane point of view, that these lines be extended, at as early a period as possible, along the entire coast of Long Island to Montauk Point, and along the New Jersey Coast, to the Capes of Delaware, making Stations and Observatories at prominent points, such as the Highlands of Neversink, Squam Beach, Barnegat and Cape May, on the New Jersey shores, at Rockaway shoals, Fire Island Inlet, and Montauk Point, on the shores of Long Island, and such other places, on both shores, where there are inlets or dangerous shoals, as may be found necessary, keeping at the several stations suitable Life, Surf, and other Boats, for the purpose of rendering all the relief possible to vessels in distress, saving of life, property, &c.

By the aid of instantaneous communication over the Electric Telegraph to the City, not only the tales of suffering and shipwreck can be told and relief furnished sooner than by any other means, but when not thus employed, and with the aid of suitable News Boats, all vessels from Foreign ports of later dates can be boarded and news of interest and importance to the Commercial community can be sent to the city in all weathers, night and day, with the quickness of thought. With a Boating establishment properly arranged at the outer stations, an Atlantic Steamer can be boarded and all her news of importance sent over the line of Telegraph hours before it can be known in New York by any other means that she is even on our coast. A Packet Ship may often be reported days before her arrival at our harbor.

In consequence of the amount of Capital requisite to carry out the above purposes being greater than the undersigned proprietors of the Telegraph have at their disposal, they applied to the Legislature of this State and have obtained a charter for a Joint Stock Association, with \$100,000 capital, to complete said lines of Telegraph, Boating Establishment, &c., and they feel warranted in asserting, that, independent of the great relief such an association may be to the distressed voyager, a judicious employment of commercial news furnished by this means, will, at an early day, not only pay all expenses and cost of constructing the several lines, but holding, as it does, the keys of trade of the greatest commercial city on the continent, must soon pay large dividends on the stock.

The cost of constructing the lines of Telegraph in a suitable manner will amount to \$150 per mile, and can be accomplished at all the points proposed to be reached, before cold weather, if commenced at an early day. The sources of revenue to the establishment, when in full operation, will be numerous: all vessels which arrive on the coast within the limits of these lines, it is proposed to board immediately, and report the news brought by them over the line of Telegraph to this city. It is the custom for owners and consignees of vessels to pay a small premium to the parties first reporting the arrival of their vessels off the Harbor; the revenue from this source, estimating the amount of shipping which arrives annually at 800,000 tons, and allowing that only one-half a cent per ton is paid, would amount to \$3,000.

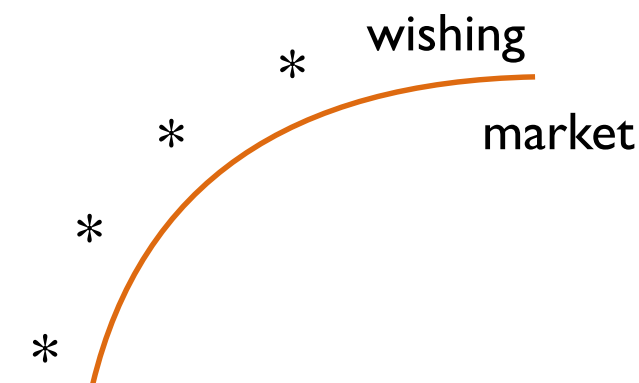
The Newspaper Press of this city keep aloft, in all, five news-boats for collecting commercial news in the lower Bay, at a cost of about \$1,500 each—making in all \$7,500. This duty will all be done by the Telegraphic news-boats quite as correctly, and sent over the lines of Telegraph with greater despatch than by any other means.

The income from subscribers to our news-room is at present at the rate of \$10,000 per annum, and may be greatly increased when the lines are extended to more distant points. We may safely calculate upon having this amount increased to \$20,000, as every person desiring early information from abroad must become a subscriber, and consult the Books of this room.

The income from owners of Vessels and Insurance Offices for assistance rendered vessels in distress—for early information given them of such facts—for saving property from wrecks, must every year be considerable, and may amount at times to very large sums of money. Other sources of revenue, such as private communications over the line from the various stations, may be added to the above estimate; but the great and principal source from which a profit will be derived, will be the Correspondence formed with Commercial Houses and the Newspaper Press in all parts of the Union, it being contemplated to dispatch all important information in every direction where persons will subscribe and pay for it. 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. Who in New Orleans, for instance, would subscribe to New York newspapers, and wait eight or ten days for the receipt of commercial news brought by an Atlantic steamer, when they can be in possession of it in as many minutes by our Telegraphic Correspondence. We beg leave to state, in this connection, that contracts have already been made for constructing a continuous line to New Orleans, and in twelve or eighteen months it will be finished and in operation.

The Offing Telegraph Association, having exclusively all the Foreign news brought to this port either by ship or steamer, can instantly dispatch the same over the other Telegraphs to every city in the Union where the lines extend.





supersession & control

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"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



telegraph neutrality?

"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"



The Landlord's Game, which became Monopoly, was created by Elizabeth Magie Philips. The Strong



telegraph neutrality?

Henry George, a politician, economist and proponent of the idea of shifting the tax burden to wealthy landowners, provided inspiration for The Landlord's Game.

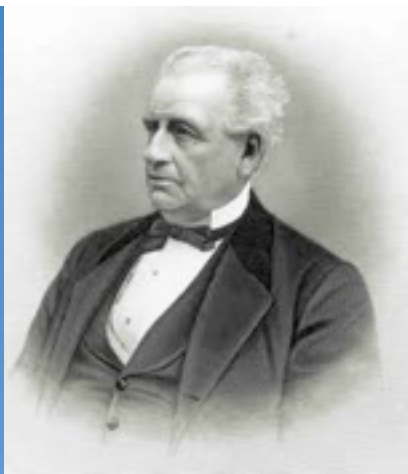
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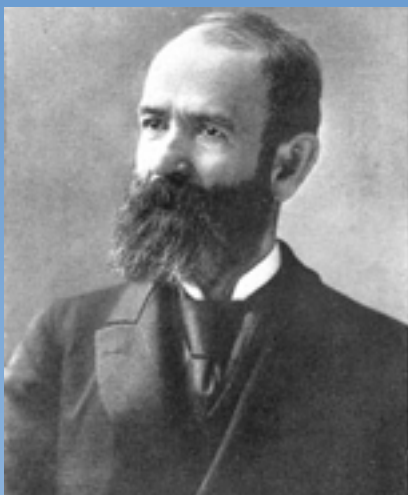


James Gordon Bennett
1795–1872

speculative control in action



Hiram Sibley
1807–1888



Jay Gould
1836–1892

New York Associated Press

James Gordon Bennett
New York Herald

Moses Beach
New York Sun

consolidation:

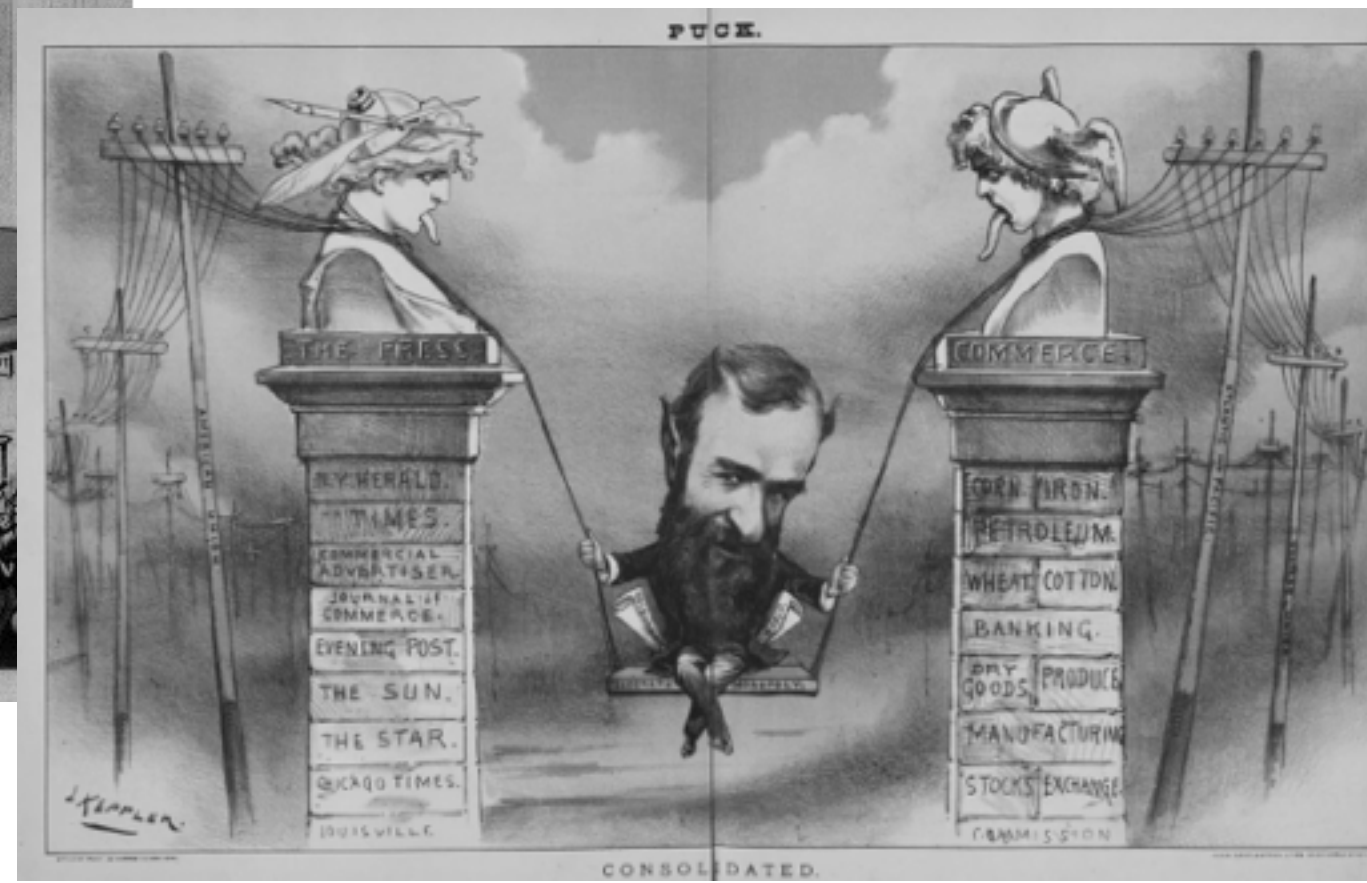
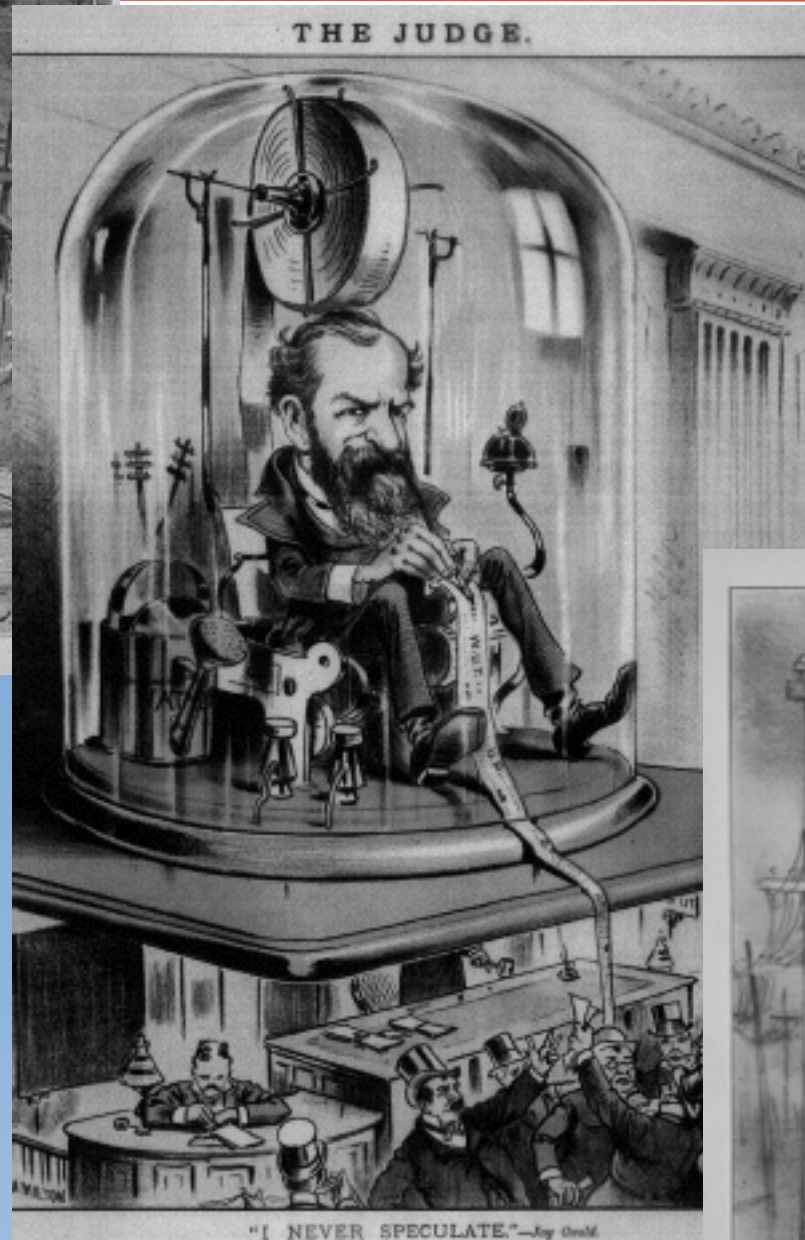
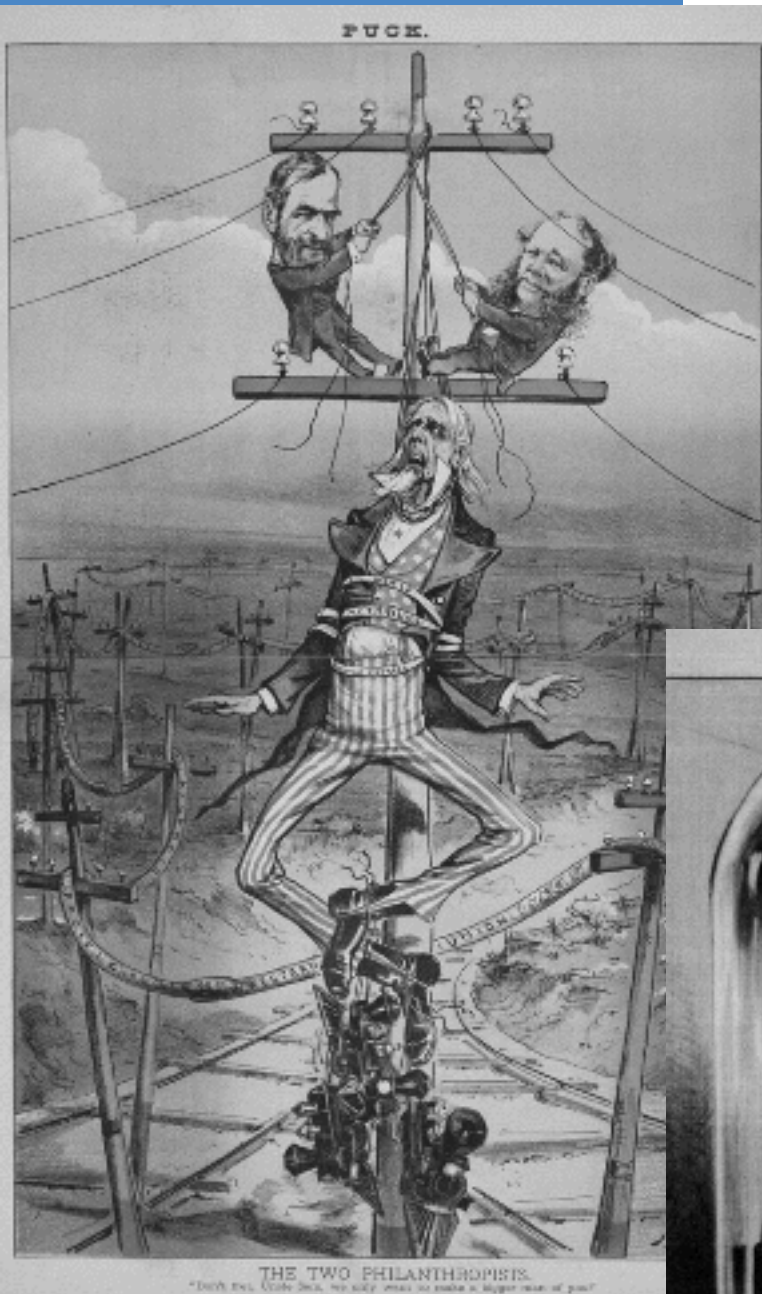
Sibley's Western Union, 1855

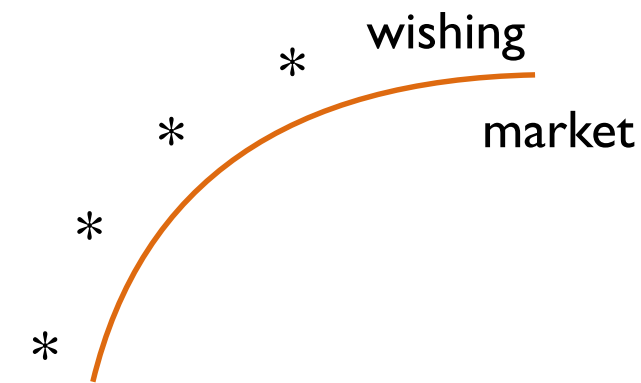
Telegraph Act, 1865

Gould's Western Union, 1881

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

contemporary views



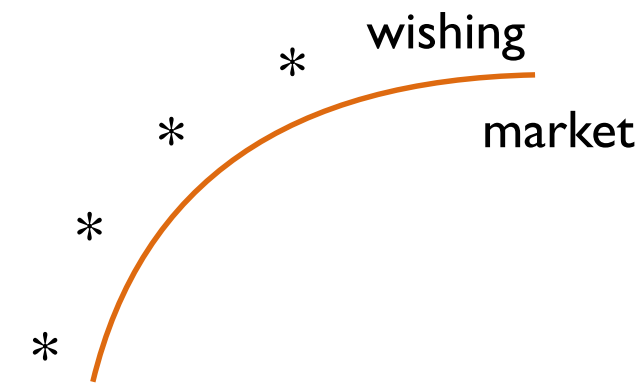


competitive markets?

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

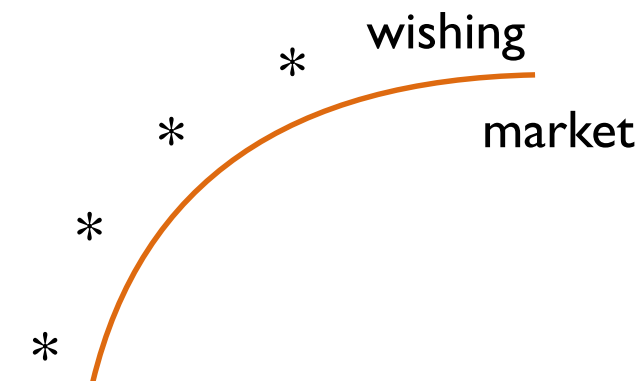
1910 AT&T buys Western Union

1913 Kingsbury (monopoly) Commitment

1915 AT&T San Francisco

1927 transatlantic telephone

1982 break up: the Baby Bells



natural monopoly?

Ma Bell

1876 Bell Telephone

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1899 AT&T incorporates Bell

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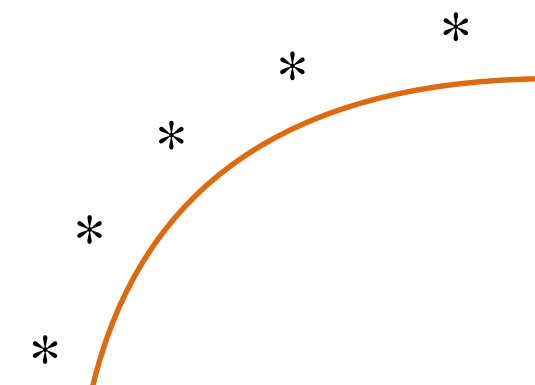
1913 Kingsbury (monopoly) Commitment

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

2014 Comcast buys Time Warner

Bill Gates is named world's richest person again



Bill Gates has been named the world's richest person for 16 of the last 20 years

Bill Gates has been declared the richest man in the world for the 16th time by Forbes magazine's annual ranking of global billionaires.

The Microsoft founder once again beat Mexican businessman Carlos Slim to the top spot.

Mr Gates' net worth rose by just over \$3bn (£1.94bn) in the year to 13 February, to \$79bn.

Related Stories

[Bill Gates is world's richest person](#)

[Slim tops Forbes rich list again](#)

[The world's wealth](#)

reassembly?

now AT&T

now Verizon

now AT&T

now AT&T

Southwestern Bell - now AT&T

US West - independent

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The Washington Post

Comcast confident in Time Warner Merger, analysts less so



By Cecilia Kang February 24 [Follow @ceciliakang](#)



reassembly?

now AT&T

now Verizon

now AT&T

· now AT&T

Bell - now AT&T

dependent

attempts to buy Verizon, T-Mobile

it buys Time Warner

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reassembly?

now AT&T
now Verizon
now AT&T
- now AT&T
Bell - now
dependent
attempts to
t buys Tim

Google to launch own 'virtual' mobile phone network

Subscribers to Nova will be able to switch seamlessly between mobile phone and Wi-Fi signals, and between masts of competing networks

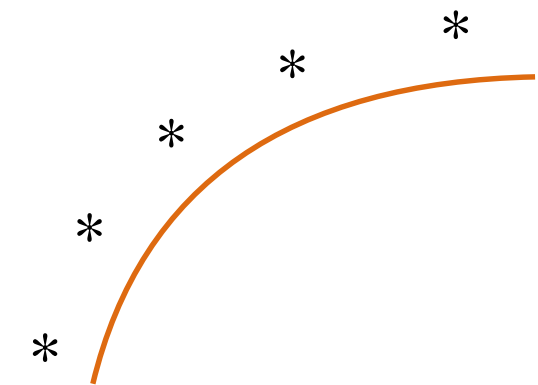


Sundar Pichai, Google's senior vice president of Android, Chrome and Apps, talks during a conference during the Mobile World Congress. Photograph: Manu Fernandez/AP

Juliette Garside

[@JulietteGarside](#)

Monday 2 March 2015 15:53 GMT

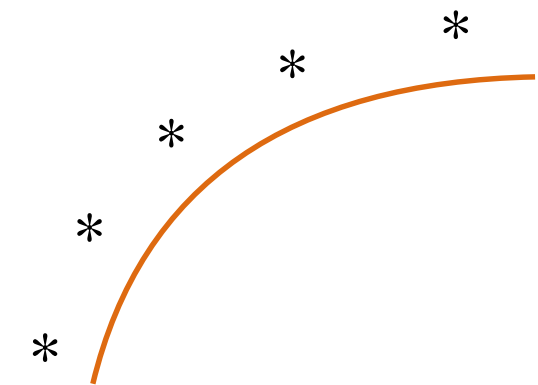


in sum

stories about information technologies and technologists are (like truth) rarely pure and never simple

communications systems may favor monopolies as much as markets

what's “registered” may be read



coming up

5 March: Advertising

Required Reading

Johnson, Samuel. 1761. "On Advertising." *The Idler* 40 (Jan 20): 224-229.

Source: ECCO [[hyperlink](#) ↗]

McKendrick, Neil. 1982. "Josiah Wedgwood and the Commercialization of the Potteries," pp. 100-145 in McKendrick et al. (eds.) *Birth of a Consumer Society*. Bloomington, IN: Indiana University Press.

Source: Course reader.