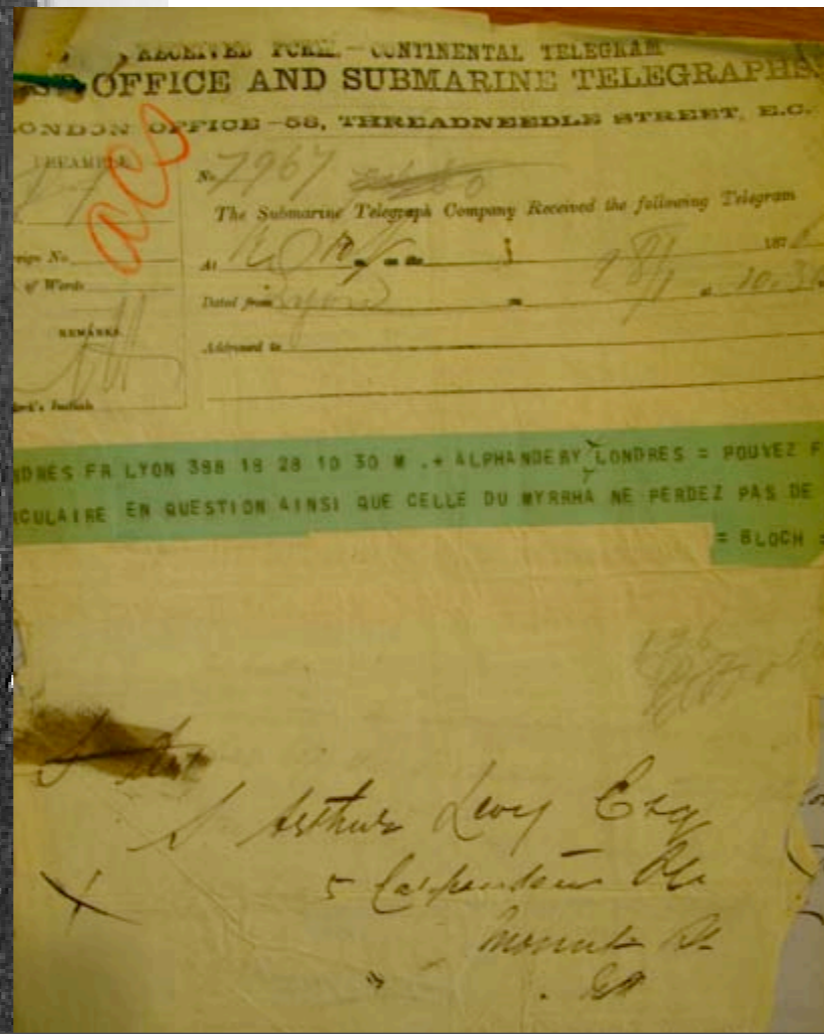
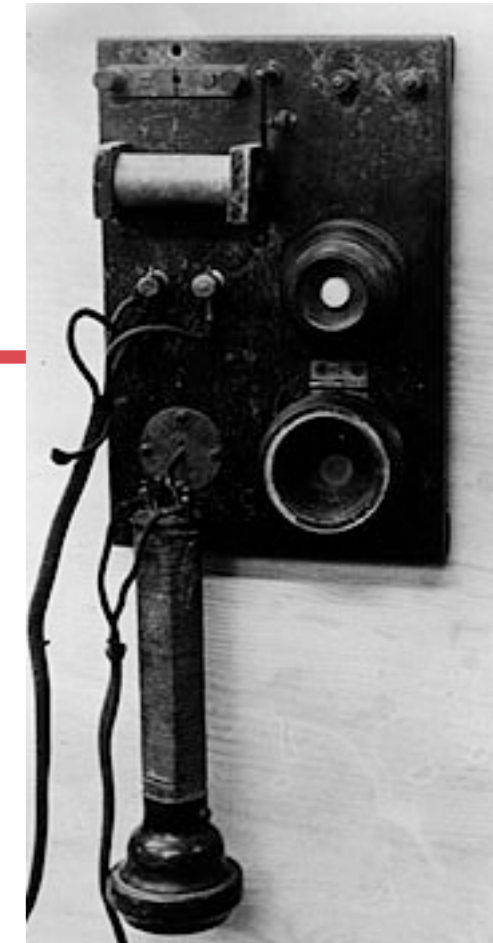


point to point

telephone & telegraph

History of
Information
March 10
2009



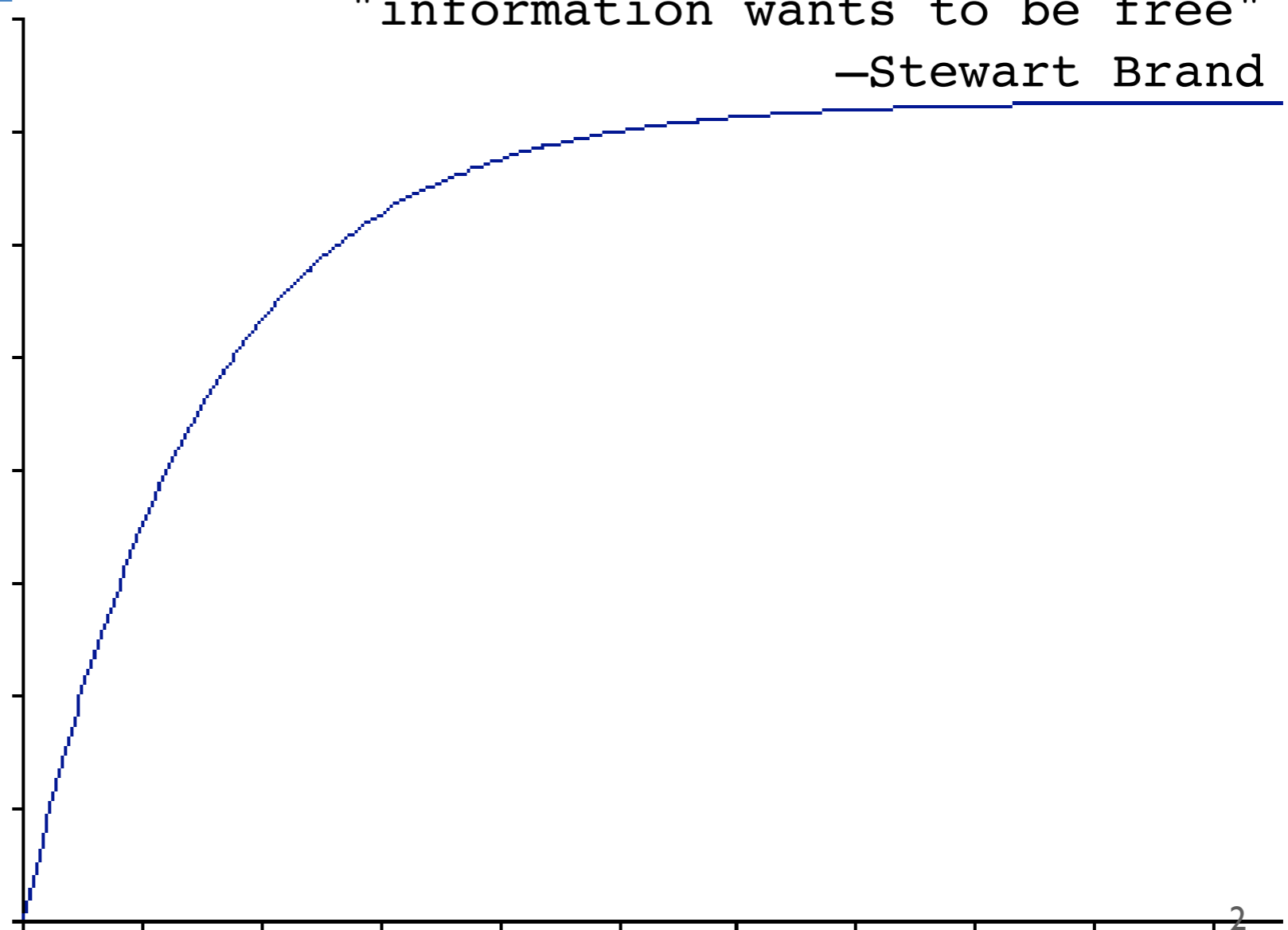


turning the corner

liberation technology

"information wants to be free"

—Stewart Brand





turning the corner

liberation technology

"information wants to be free"
—Stewart Brand

"an industry shaped by law"
—Christopher Beauchamp,
"The Telephone Patents"

and by business

Western Union
Bell Telephone
AT&T

and by users

"It was the demand for rapid communications
that created the telecommunications systems,
not the other way around"

Daniel Headrick



overview

point to point

differing interests

techno-enthusiasms

unintended consequences

~graph to ~phone



distinguish by use



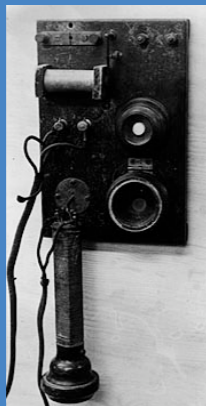
point to point vs broadcast

post office

telegraph

telephone

radio



invention vs interpretation

national variation

US, UK, Europe





long-distance interests

Newman & Co,
1660ff

Dartmouth
Bournemouth
London
Vianna
Porto
Bilbao
Newfoundland
Concepcion
Zanzibar
Madagascar

politics

growing empires, growing nations

business

& growing businesses

common interests

conflicting interests



common dilemma

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 (clxxi. 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.
Harriot, Capt. Geo. Oake.
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,





message methods

carry

foot

horse

carriage

sail

train

send

smoke

flag

light

pigeon

telegraph

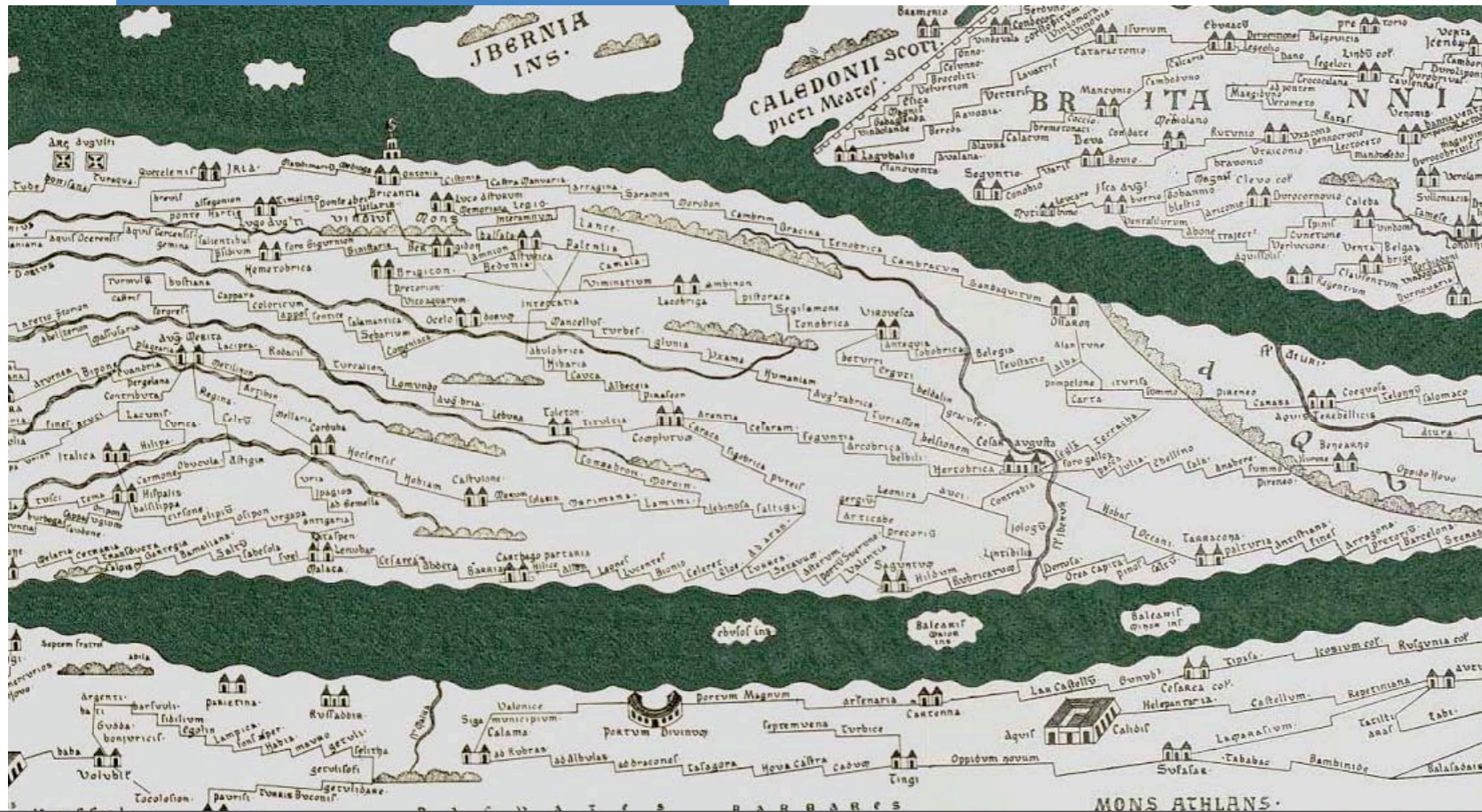
telephone



carry

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





carry

mail coach

speed, 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 by stagecoaches"

—Schivelbusch, "Railroad Space & Railroad Time"

infrastructure issues

distribution systems

Bury, 'View of Railway across Chat Moss', 1831

Hofl P2P - 9

Turner, 'Rain, Steam, Speed', 1844





send

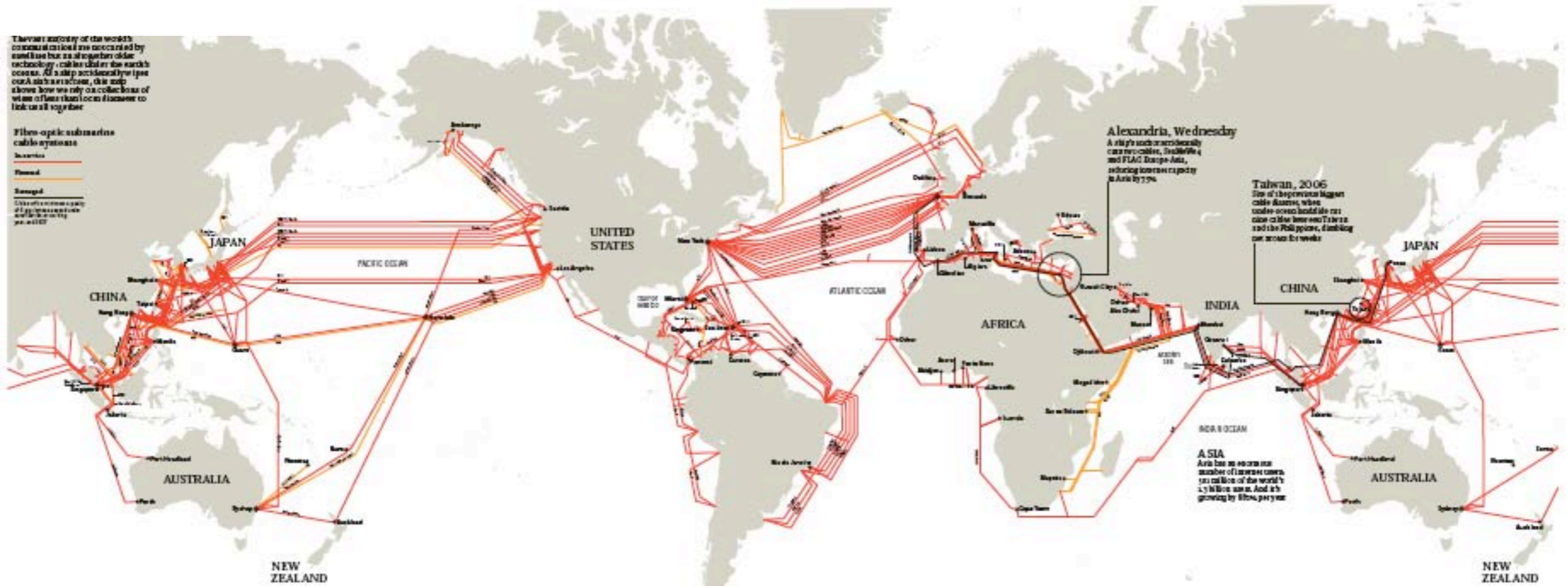
Via Eastern THE EASTERN ASSOCIATED TELEGRAPH COMPANIES' CABLE SYSTEM. *Via Eastern*
(INDICATED IN RED.)



The figures inserted on certain cables indicate the number of cables between the points connected.



change?





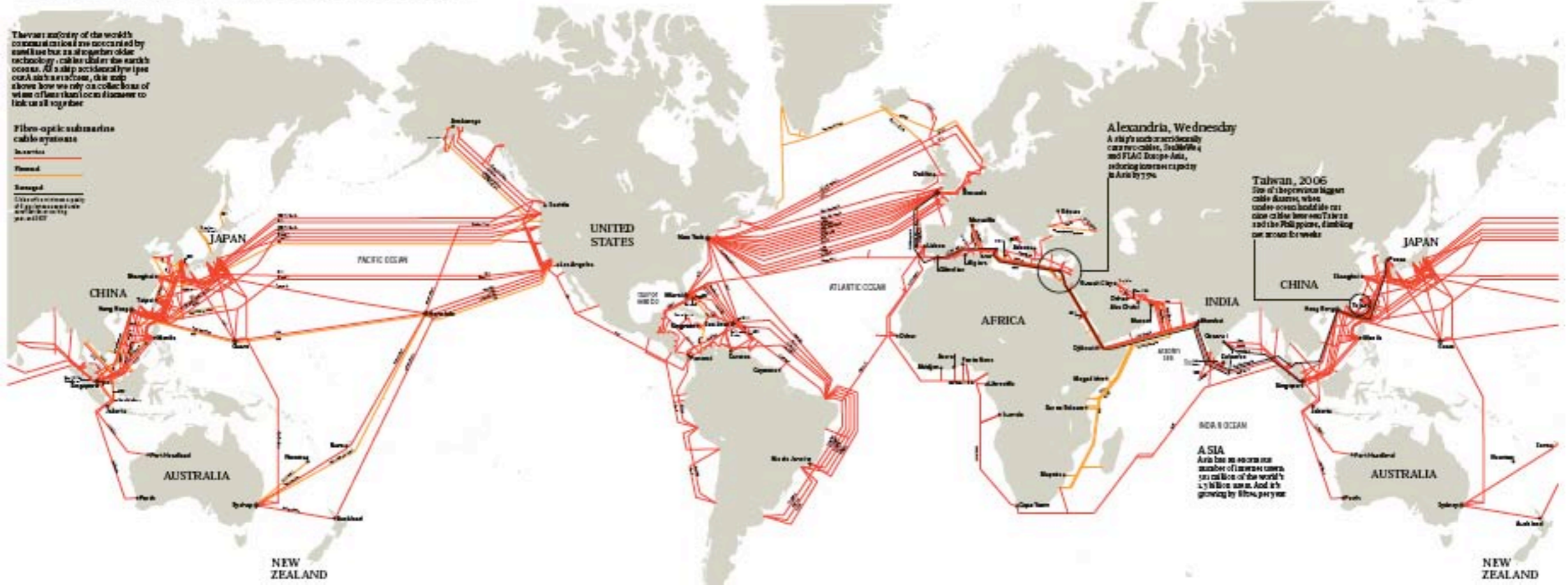
change?

The internet's undersea world

The vast majority of the world's communications are carried by undersea cables. It's not just the technology, cables that are the earth's veins. At a ship accident type like our A ship accident, this map shows how we rely on collections of wires of less than 1 cm in diameter to link us all together.

Fiber-optic submarine cable systems

Operational
Planned
Cancelled



Alexandria, Wednesday
A ship's cable accidentally cut two cables, SeaMeWe 4 and FLAG Europe-Asia, reducing internet capacity to Asia by 75%.

Taiwan, 2006
One of the world's largest cable systems, when under attack by a typhoon, it cut off the internet to Taiwan and the Philippines, doubling our access to the world.

INDIAN OCEAN
A SIA Asia has an enormous number of internet cables, 500 million users. And it's growing by 100m per year.



determinism again

"What hath God wrought?"

"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

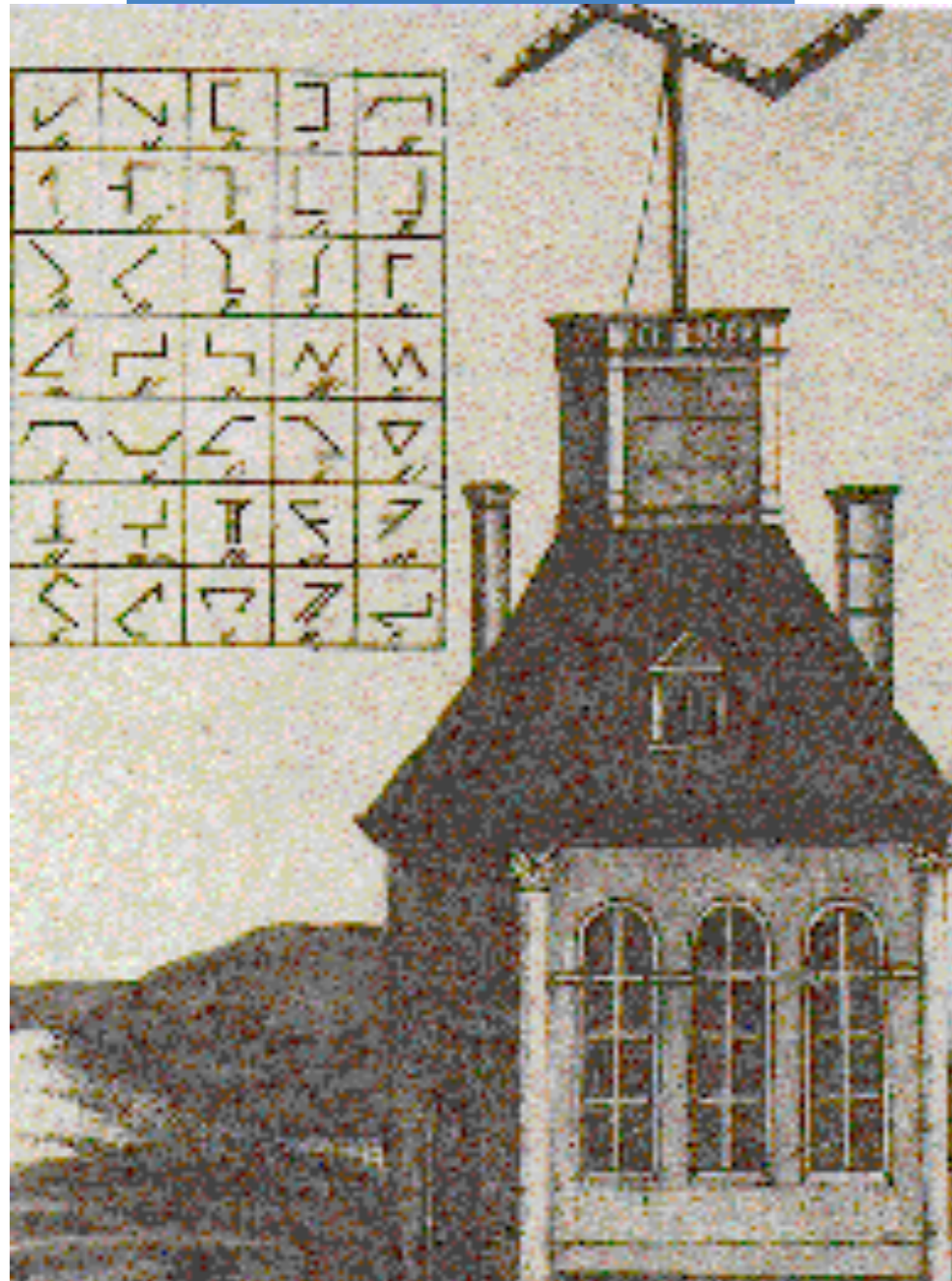


Claude Chappe
(1763–1805)



telegraphic history

La Ligne Paris-Lille 1794 semaphore



Telegraphie 30

Bulletin de la Société 10^e feuille
30 Août 1794.

Com. M.

Arrière fusils huit minutes
Purgée et venue de Lille
avec les signaux suivants.
Le coup de secle vocabulaire
ingénieur.

┌ ┌ ┌ ┌	Code
└ └ └ └	Arrière
┌ ┌ ┌ ┌	Restituer
└ └ └ └	à
┌ ┌ ┌ ┌	République
└ └ └ └	Rédaction
┌ ┌ ┌ ┌	avoir eu lieu
└ └ └ └	à
┌ ┌ ┌ ┌	ministre
└ └ └ └	à
┌ ┌ ┌ ┌	Sur
└ └ └ └	Sur

M. de Tréviseau. après
l'avis ou fera passer la
seconde feuille quand
elle sera terminée.

Joseph Soumault
Chapelle

13



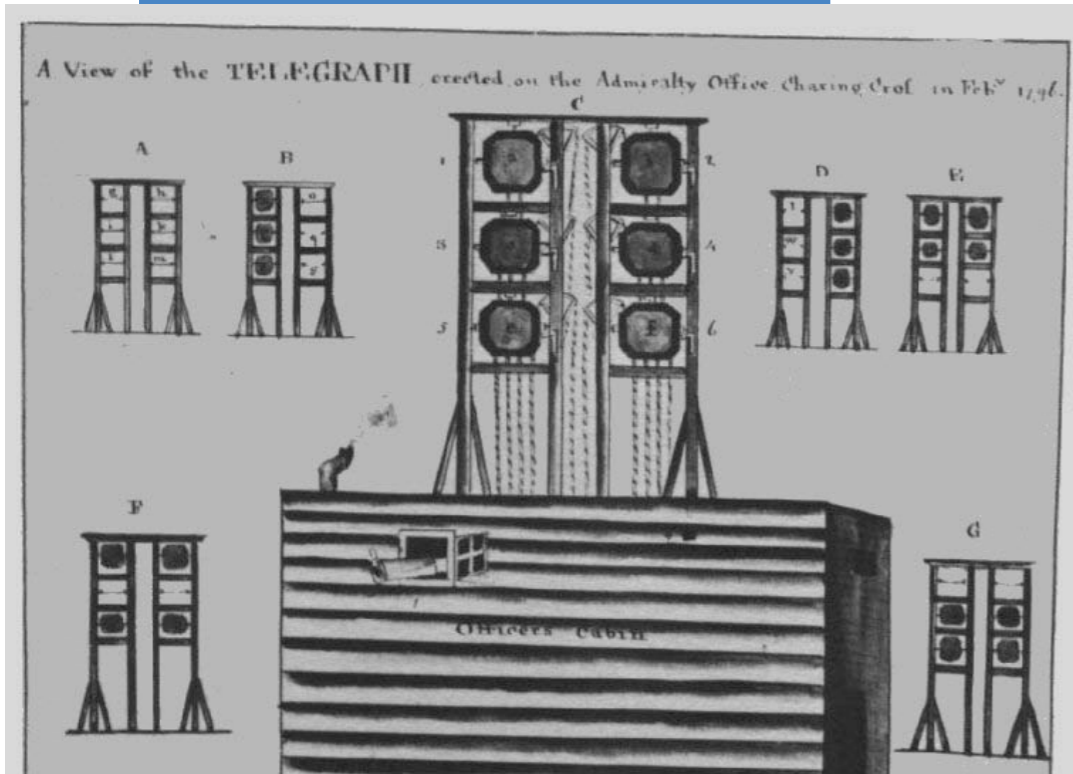
national aspiration

1793: "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



military aspiration



on land

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

Great Yarmouth, Plymouth, 1806

from three days to fifteen minutes from Portsmouth to London

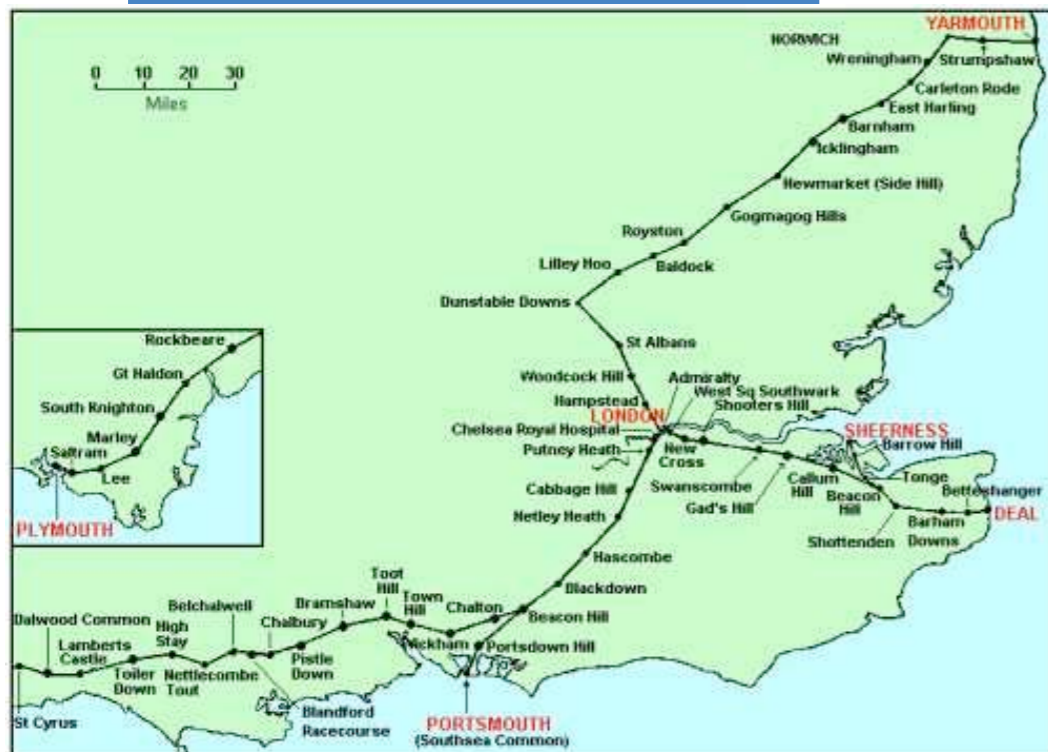
abandoned, 1814

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."

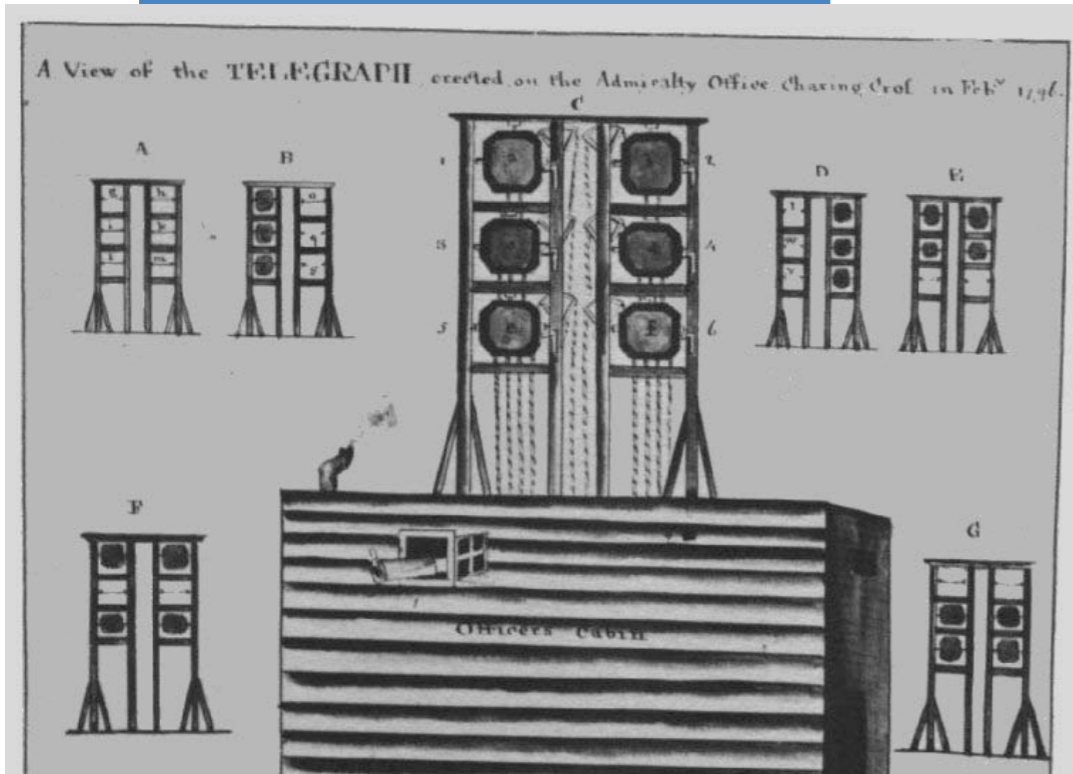
Monthly Review

Hofl P2P - 15





military aspiration



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the Admiralty "six-shutter" telegraph
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Great Yarmouth, Plymouth, 1806

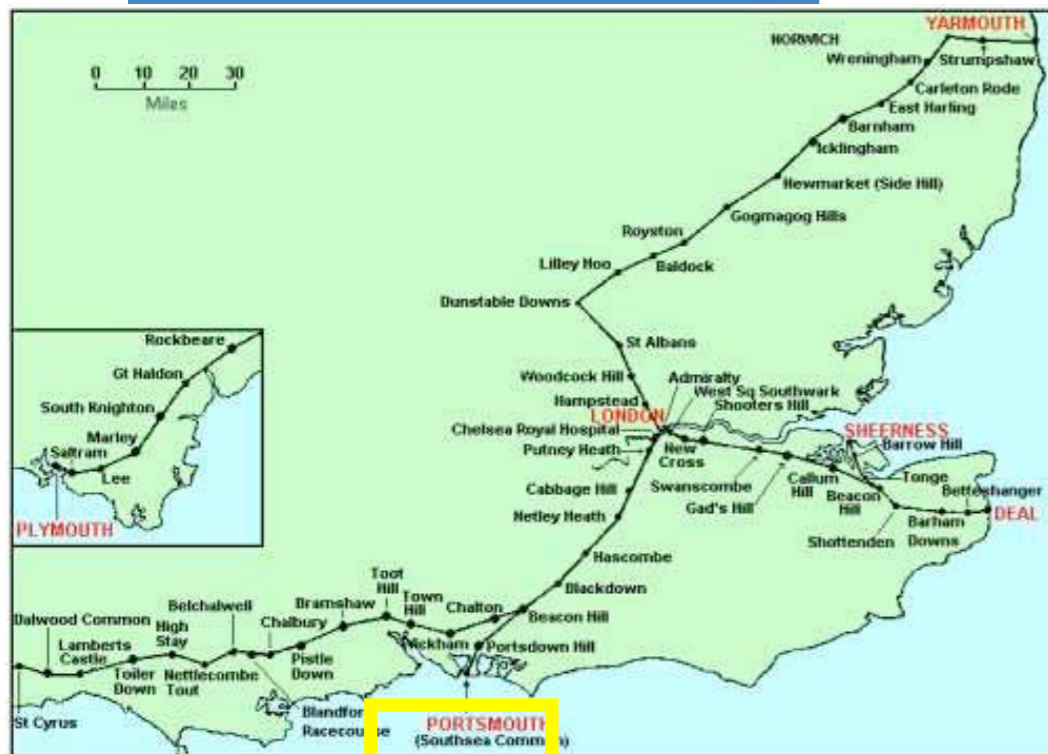
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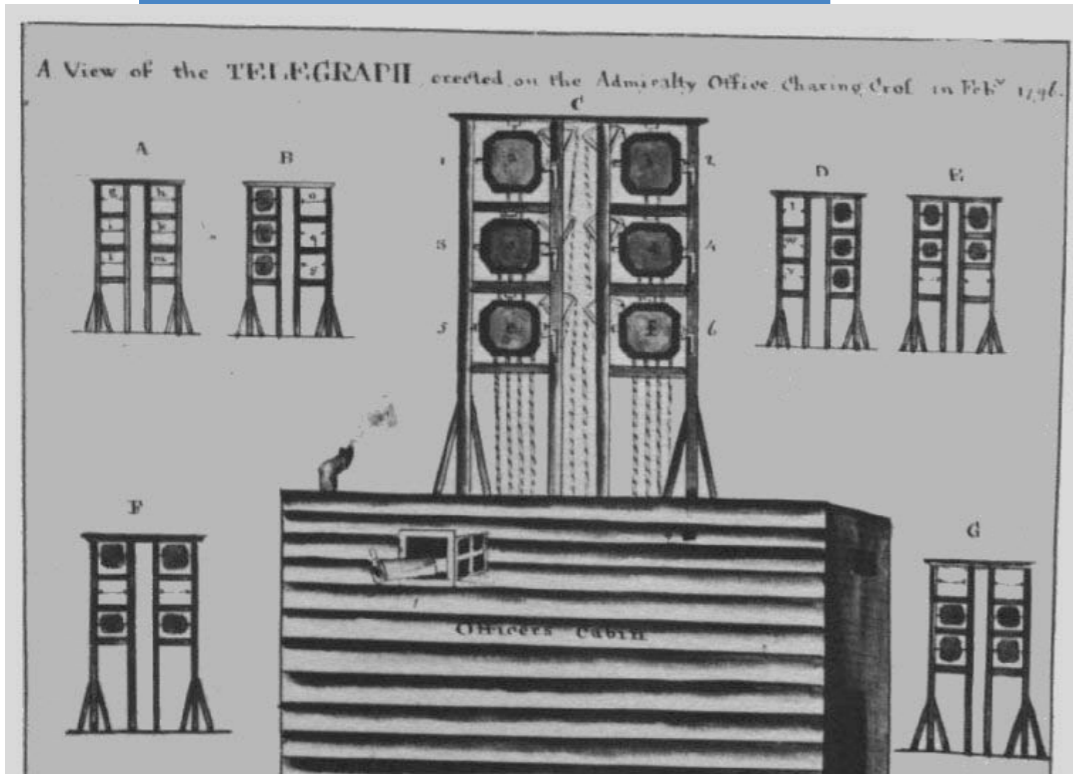
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Hofl P2P - 15





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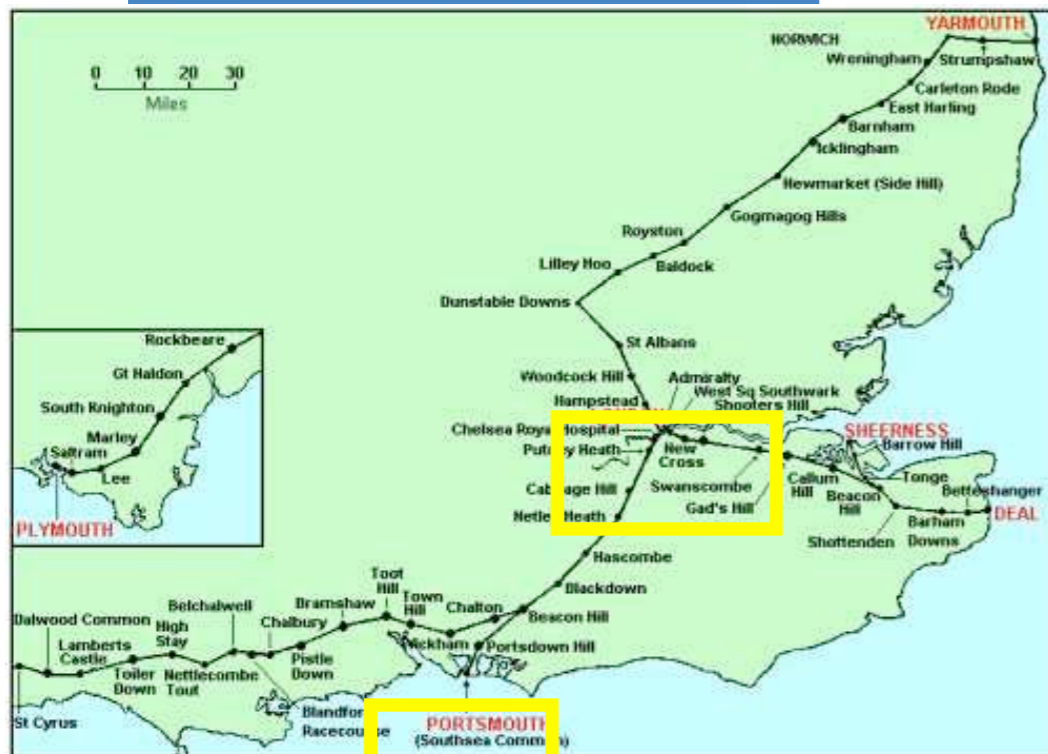
abandoned, 1814

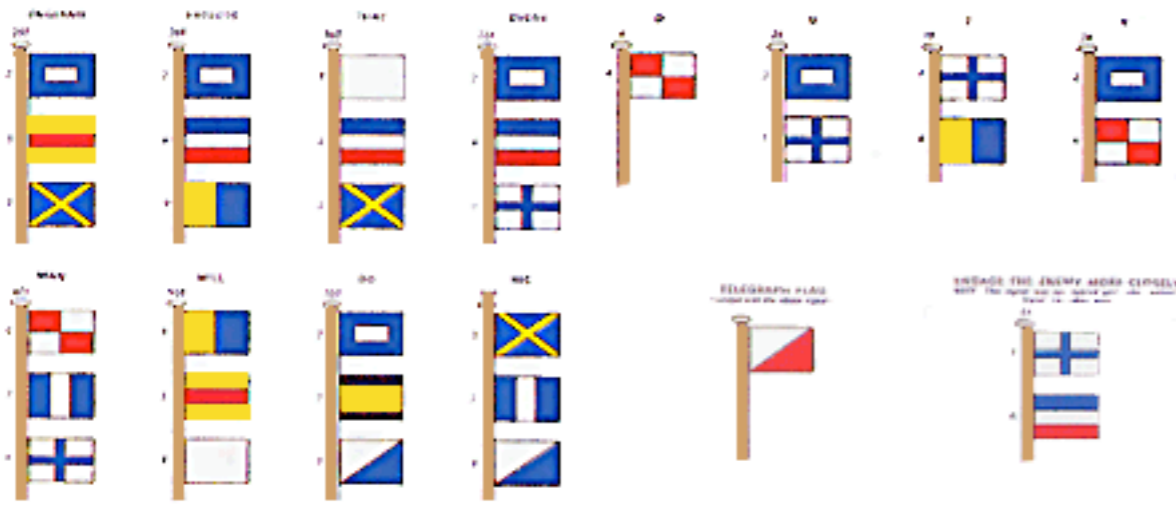
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1815

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

Monthly Review

Hofl P2P - 15





military aspiration



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".

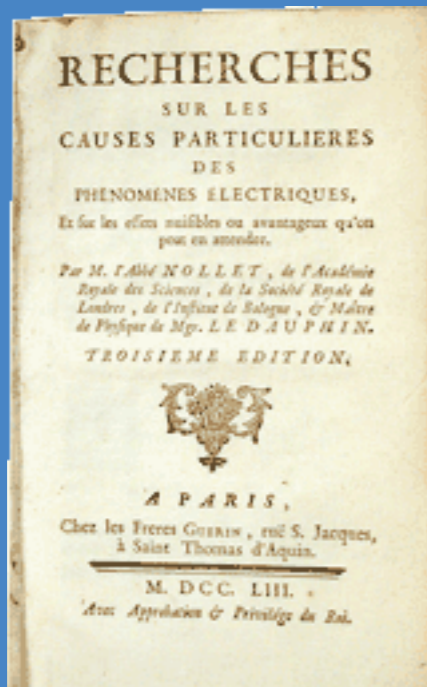
William Keegan

Home Popham (1762-1820)

Telegraphic Signals, or Marine Vocabulary, 1800



Abbé Nollet
1700–1770



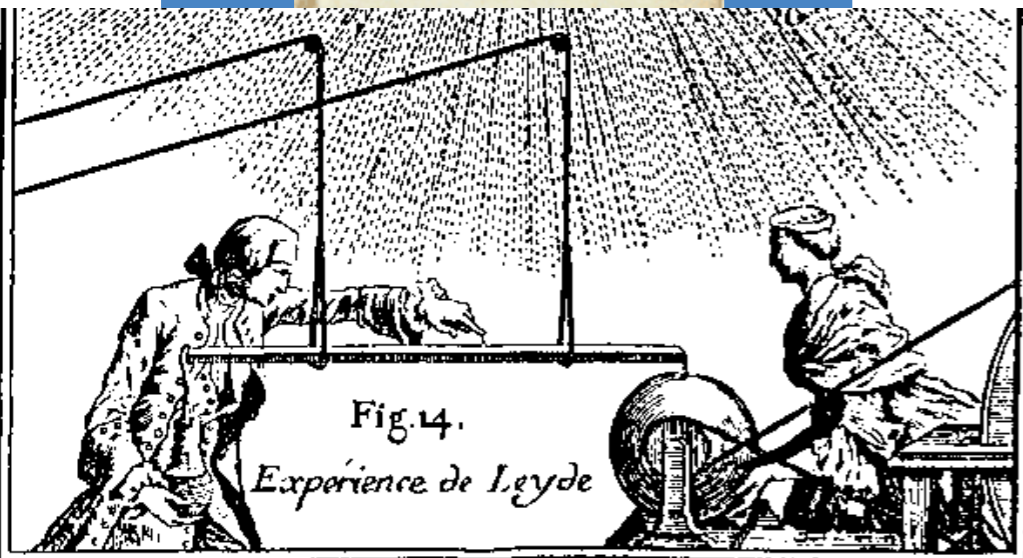
beyond line-of-sight

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"

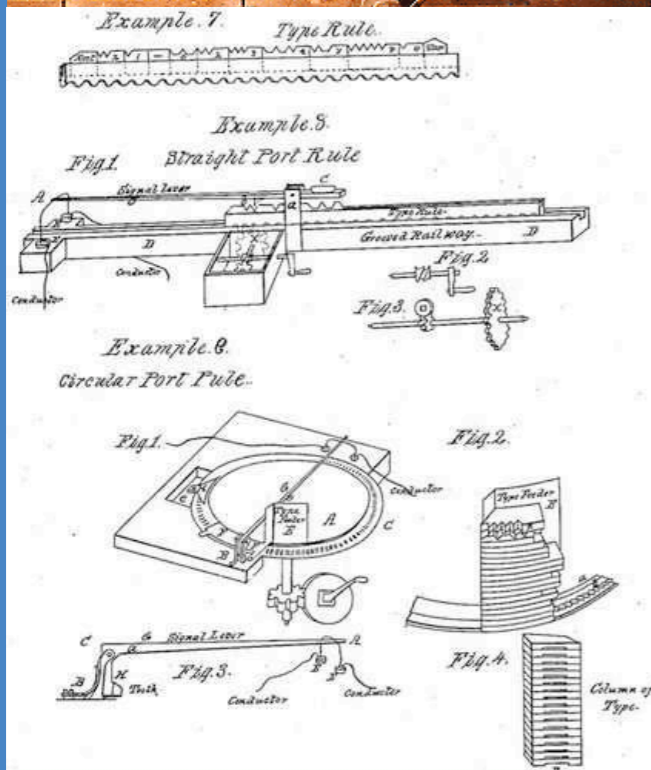
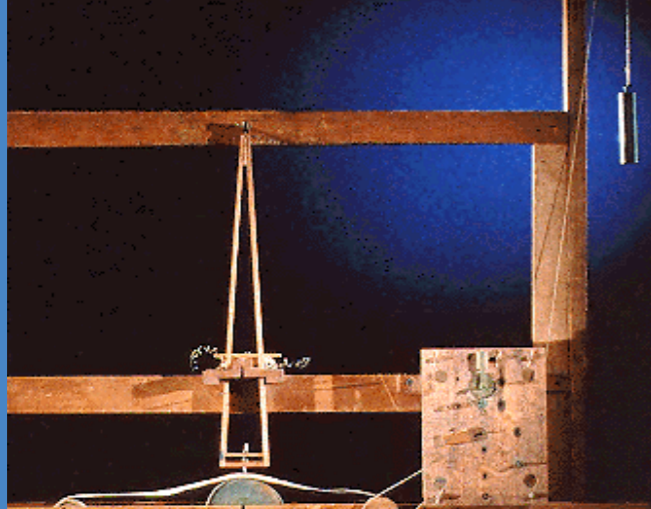




electric telegraph

Samuel Morse (1791-1872)

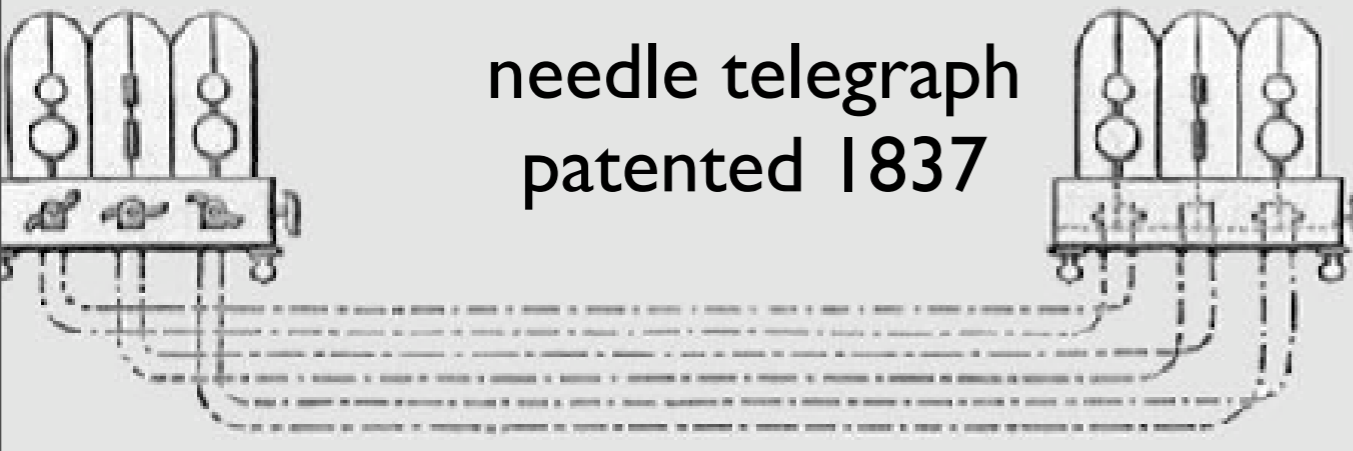
"If the presence of electricity can be made visible in any desired part of the circuit, I see no reason why intelligence may not be instantaneously transmitted by electricity to any distance."



1837

Morse, patent
Daguerre, fixed image

Hofl P2P - 18

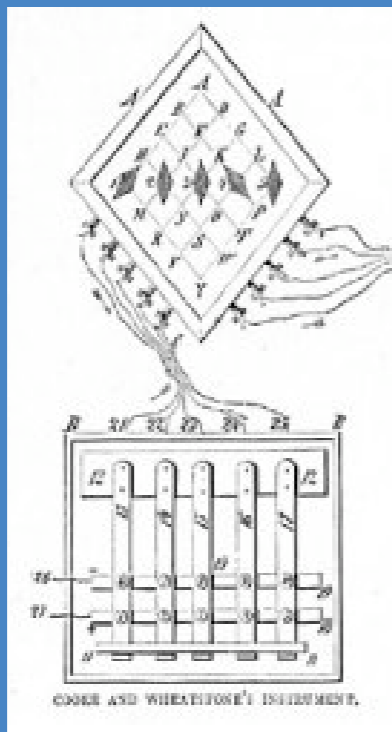


needle telegraph
patented 1837

transatlantic race



Pavel Schilling
1780–1836



COOKE AND WHEATSTONE'S INSTRUMENT.

Pavel Lvovitch Schilling (1780-1836)

William Cooke (1806-1879)

Charles Wheatstone (1802-1875)

Faraday

Roget

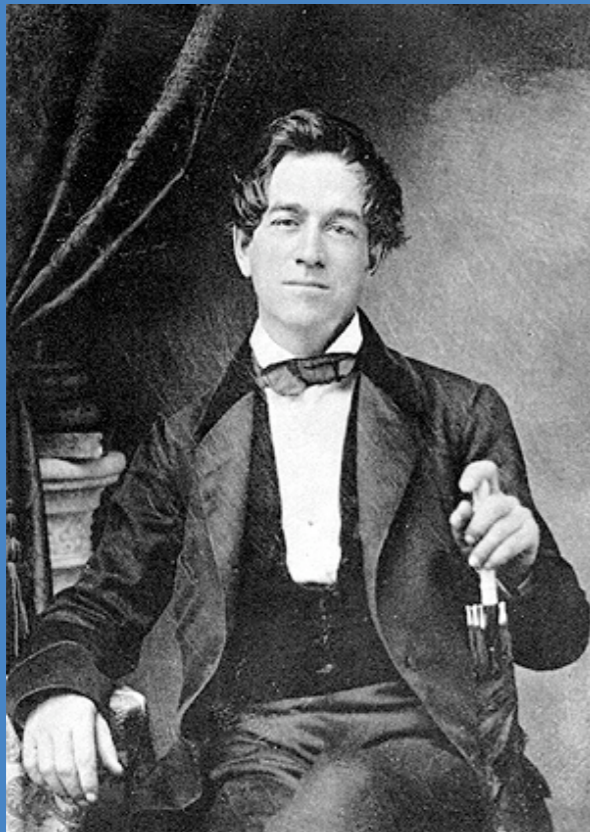
Thomson

"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 **GWR telegraph, 1837**
which the English patent
was granted ... on the 12th of June, 1837."

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



morselization



Alfred Vail
1807–1859

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: —···	"International Morse Code, 1851"

Vail's code?

"a patient waiter
is no loser" [1838]

"Morse" code
patented 1840

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

World

The end of the line for Morse Code



interconnections



Prussia-Austria: 1849

England-France: 1851

New York-Newfoundland: 1856

Britain-North America: 1858-1866



first movers



Paul Reuter
1816–1899

Reuters

1849: pigeons & "the last mile"

1851: moves to London

"follow the cable"

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*

THE FIRST MESSAGE.

ENGLAND GREETES AMERICA

QUEEN VICTORIA

TO

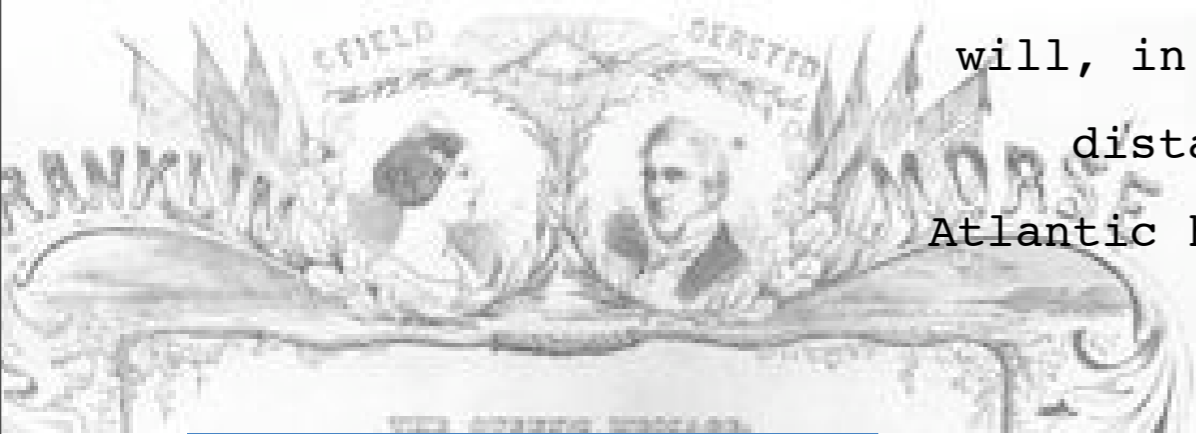
PRESIDENT BUCHANAN.

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."





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

Commercial and Financial Chronicle, 1865.

Hofl P2P - 25



"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



innocent expectations

wishful thinking

peace, emancipation, decentralization

... and unintended consequences

the press & public debate

international cooperation

diplomacy & peace

commerce

love



public sphere

raising the level of debate

THE

ACCOUCHEMENT

OF

HER MAJESTY.

BIRTH OF A PRINCE.

public sphere

raising the level of debate

[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 going 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 :—]

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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 had been with her at the time of her death.

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The deceased had few or no friends.

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.

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[1855]

THE

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"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

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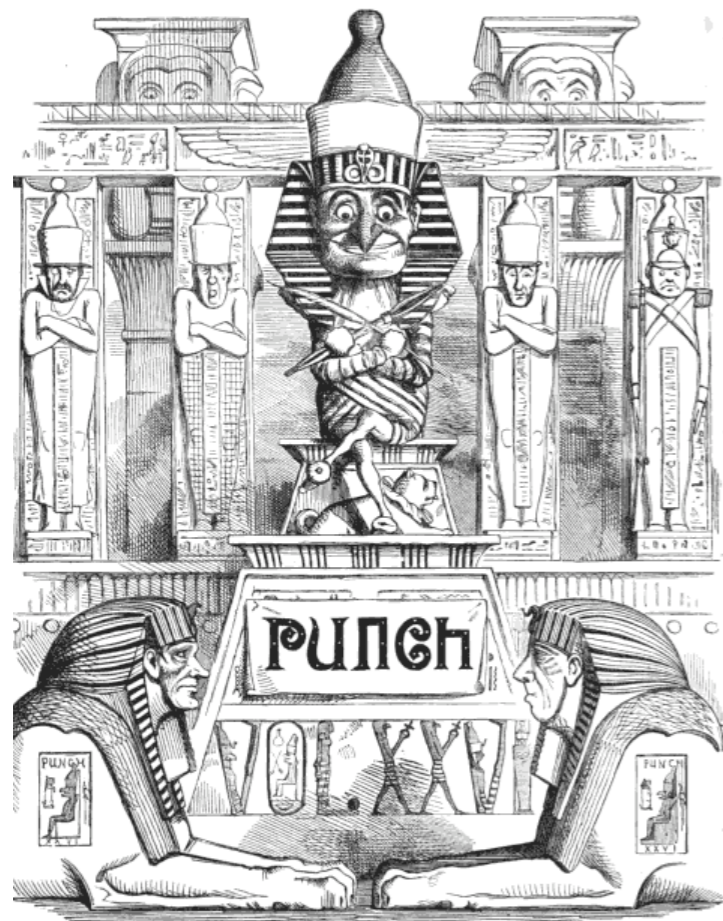
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OFFICIAL DESPATCH. [1843]



lies like truth



LONDON:
PUBLISHED AT THE OFFICE 85, FLEET STREET.
AND SOLD BY ALL BOOKSELLERS.

"We regret to perceive the Electric Telegraph becoming so very sadly addicted to falsehood, that we never know when the fluid is speaking the truth... we find it telling lies at the rate of hundreds of miles in half a second. ... As we find our contemporaries are in the habit of producing immense effect by news manufactured expressly for them at the offices of the Electric Telegraph, we have some idea of establishing a little electric telegraph of our own, for the production of startling intelligence."

—*Punch*, 1848



"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?

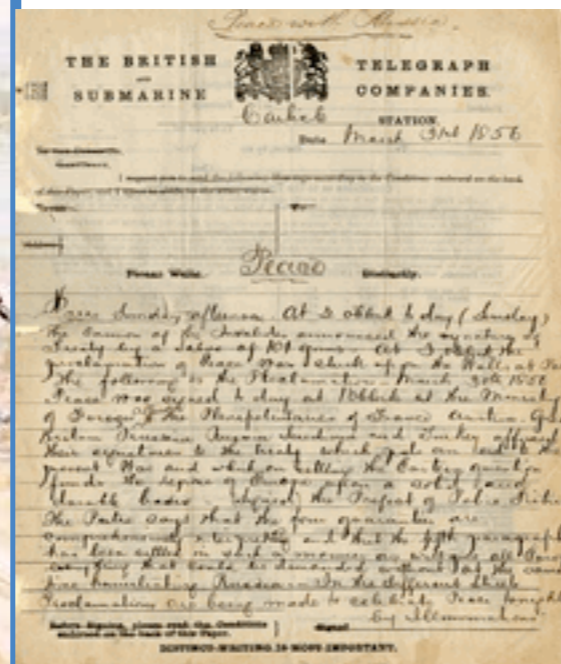
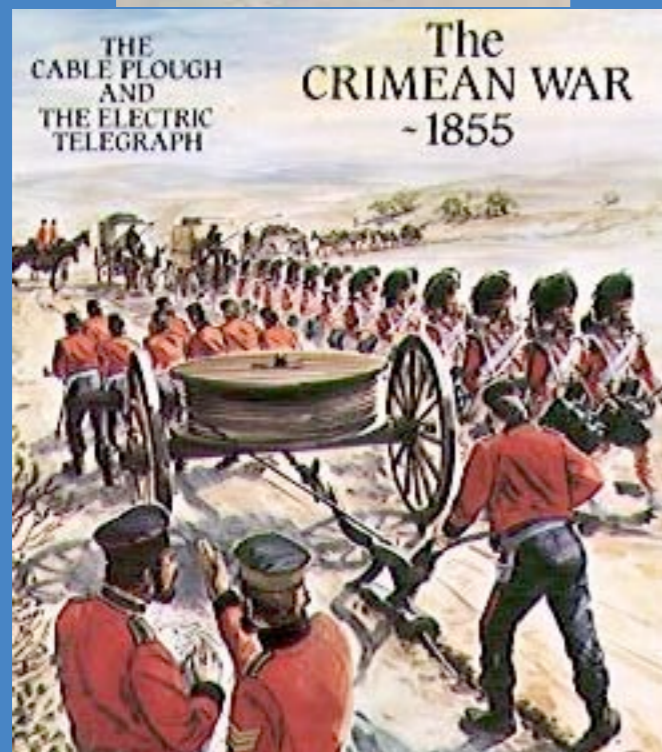
Crimean War, 1855

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

Earl of Clarendon,
British Foreign Secretary

the road to embeds?

"I counted them out ..."





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?

commercial

the "second industrial revolution"

Alfred Chandler, *Scale & Scope*
from family to managerial capitalism

Harold Innis, *The Bias of Communication*

a prime example: 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",



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

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.

No 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 of the addressee 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

la Tour de la Tour (cabinet) le 27 7 1870 a 9 h 20 m. Ch. Sp. 135 B
0136 3133 5229 1709 Rhona 5605 2453 2215 0542 0649 0136
3463 4262 0136 3059 0119 2007 2477 0119 1920 0134 3743
0136 0676 3117 0136 parts 1453 3703 1623 3210 2651
2 9142 4091 0134 5242 0136 2534 4307 3239 0136 0142
0136 5612 3457 2067 5705 0136 5451 1922 0136 dans la
qui il 3215 0136 0490 4022 1722 0136 ja. l'œuvre 3592.
1247 0133 4310 1453 0136 2980 3053 0133 2202 4335
0136 4370 ja. demandais 0142 2412 1824 ja. vais lui donner
une 2569 4225 ce matin general C. a Orleans 0136 5219 2635
0136 qua apres amener
les trois derniers
et qu'on de vant
leur infanterie.
0136 1651 2082
12 4060 0134
1 et 1324 0133
561 2284 4569
0136 5670 4303





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1585/7 Pa/3
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14218 in
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67893 Mexico.
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22801 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



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

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



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 17149 Frieden schloß.
 14471 ©
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GERMAN PLOT TO LINK JAPAN AND MEXICO IN ALLIANCE OF WAR AGAINST AMERICA.



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PLOT AWAKENS CONGRESS

Party Spirit Engulfed in Patriotic Zeal to Back Wilson.

GERARD IS HONOR GUEST

Envoy Sees Cordial Relations Between Germany and U. S.

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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.

Special to The New York Times

war again

Zimmerman telegram

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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.

ZIMMERMANN EXPLAINS.

Herr ZIMMERMANN paints what all his admirers here and in Germany will consider a damning picture of the contrast between American and German methods. "Our behavior con-
"trasts considerably with the be-
"havior of the Washington Govern-
"ment," he truly says. And he ex-
plains. When he instructed the Ger-
man 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.

GERARD IS HONOR GUEST

Envoy Sees Cordial Relations Between Germany and U. S.

TELEGRAM SENT TO PRESIDENT

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ived, Mexico, Jan 17, 1917

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



"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."

commercial telegraph

Rothschilds & Napoleonic Wars

Admiral Cochrane

"Napoleon is dead"

Omnium from 26-1/2 to 33

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,



Thomas Cochrane
1775–1860

Stendhal
The Telegraph
Hofl P2P - 37

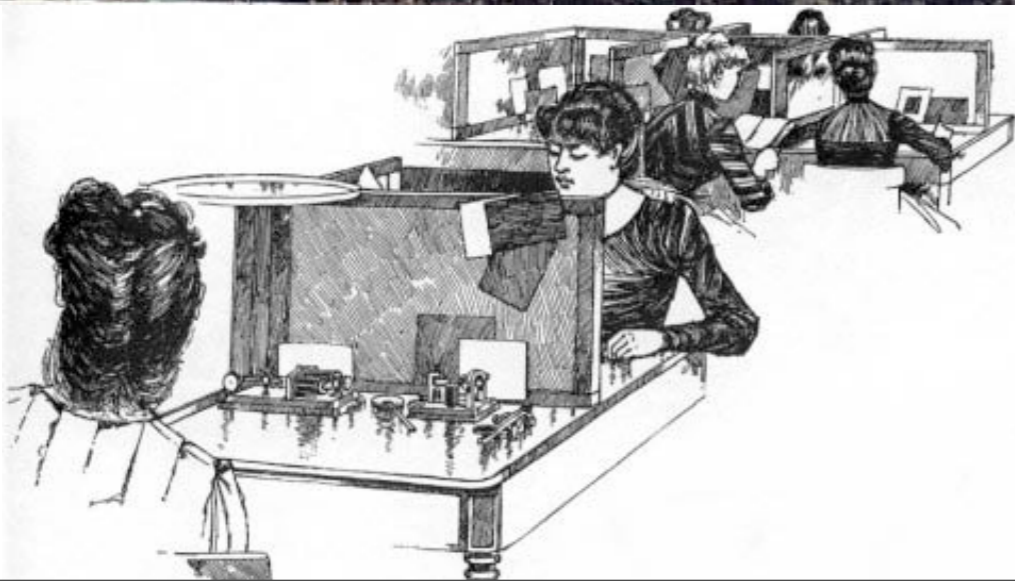


love on the wires



"Fujino-san and his wife met and courted via COARA, and their wedding was one of the early bonding vents of the community"
—Howard Rheingold,
The Virtual Community

marriage over the wires
1848: *Anecdotes of the Telegraph*



prevention & Gretna Green

"what an enemy science is to romance and love"
38



someone on the line



Henry James
1843–1916



Elizabeth Bowen
1889–1973

"as if I had no more feelings than a
letterbox"

—Henry James, "In the Cage," 1898

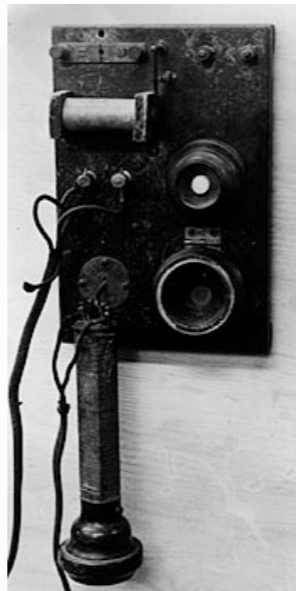
"It's bound to be so unintimate—unless she does not
consider the postmistress, and I do think surely
she ought to because it is our postmistress..."

"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

MUSIC BY TELEGRAPH.

About two months ago Mr. Elisha 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



-graph to -phone

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. Converse at Malden, about six miles distant. Prof. Bell had

New York Times, Feb 3, 1877

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

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. 16.— Upon reading the criticisms
of THE TRIBUNE on the playing of Gray's Tele-
phone at Martine'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
a present development. In fact he is
not trying to develop a musical instrument
at a system of multiple telegraphy based upon the
simultaneous transmission and analysis of musical
notes. 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 circles.
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 soon lit
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.

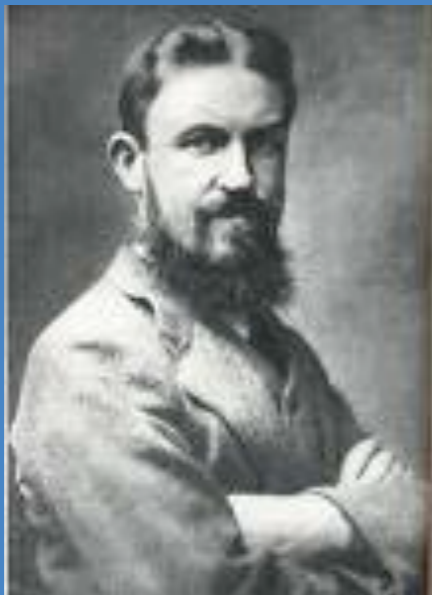
Dr. Gray in an interview yesterday concluded
that perhaps a higher authority than the Pa-
tent-Office, with legal jurisdiction, might yet
change the verdict.

Chicago Trib July 24, 1883

Hofl P2P - 41



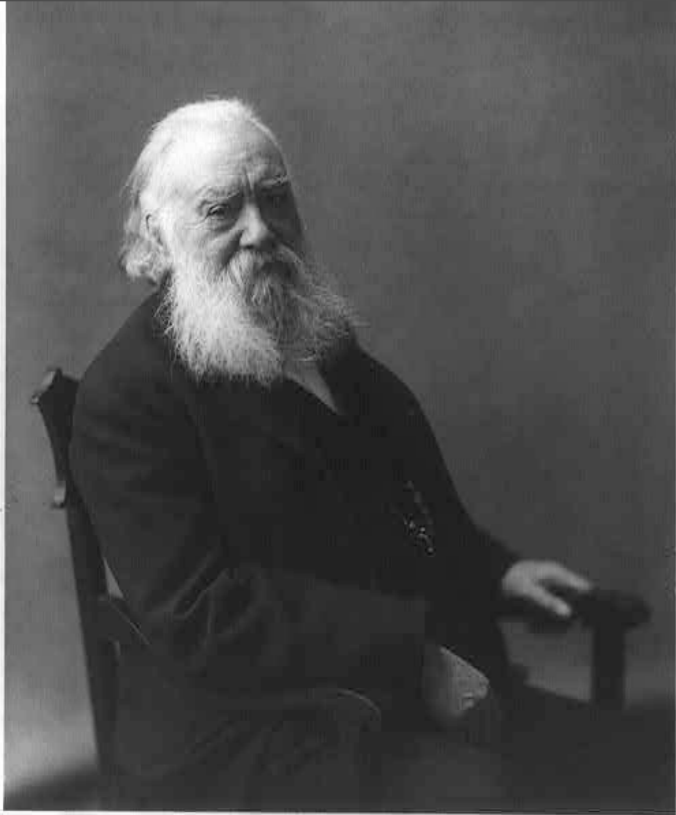
warriors



George Bernard Shaw
1856–1950

They adored Mr. Edison as the greatest man of all time in every possible department of science, art, and philosophy, and execrated Mr. Graham Bell, the inventor of the rival telephone, as his Satanic adversary; but each of them had, or pretended to have) on the brink of completion, an improvement on the telephone, usually a new transmitter. They were free-souled creatures, excellent company: sensitive, cheerful and profane; liars, braggarts, and hustlers; with an air of making slow old England hum which never left them even when, as often happened, they were wrestling with difficulties of their own making, or struggling in no-thoroughfares from which they had to be retrieved like strayed sheep by Englishmen without imagination to go wrong.

—George Bernard Shaw



Alexander Graham Bell
1847–1922



Elisha Gray
1835–1909

harmonic telegraph & disharmony

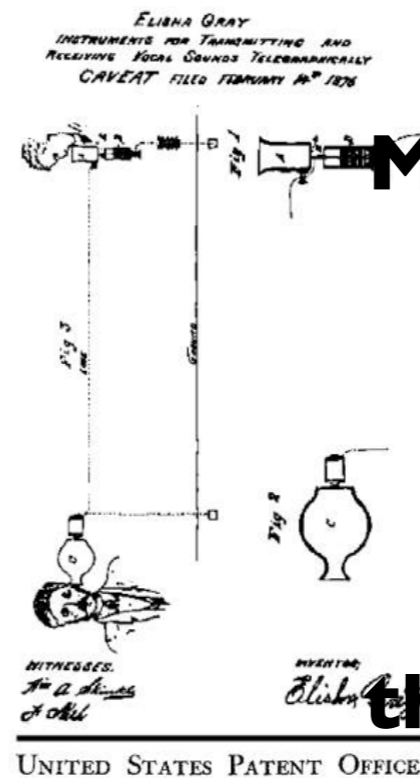
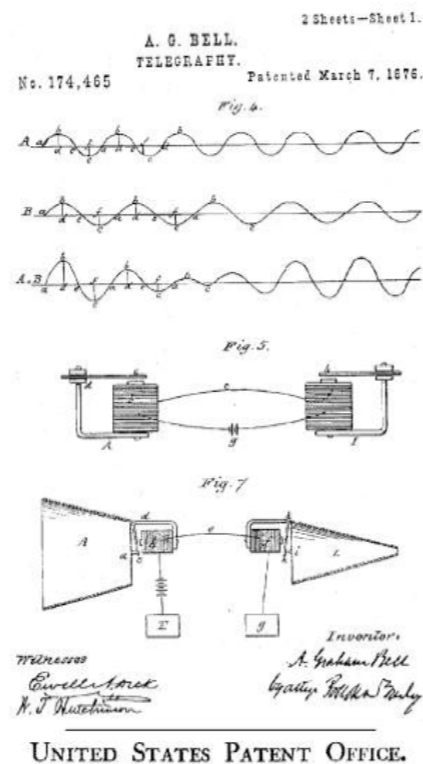
1868: duplex (Joseph Stearns)
quadriplex (Thomas Edison)

1876: Valentine's day filing
two hours difference
decades of litigation

March 10 message

Bell: AT&T
Elisha Gray:
Western Electric

the English patent
for want of a nail



"part of the instrument had been screwed down
for Atlantic crossing..."⁴³



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?

business needs and sociability

"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

communication channels

national interest

private interest

public good

ownership of intellectual property

nationalization (UK telegraph)

public ownership (France, photography)

private monopoly (US, AT&T)

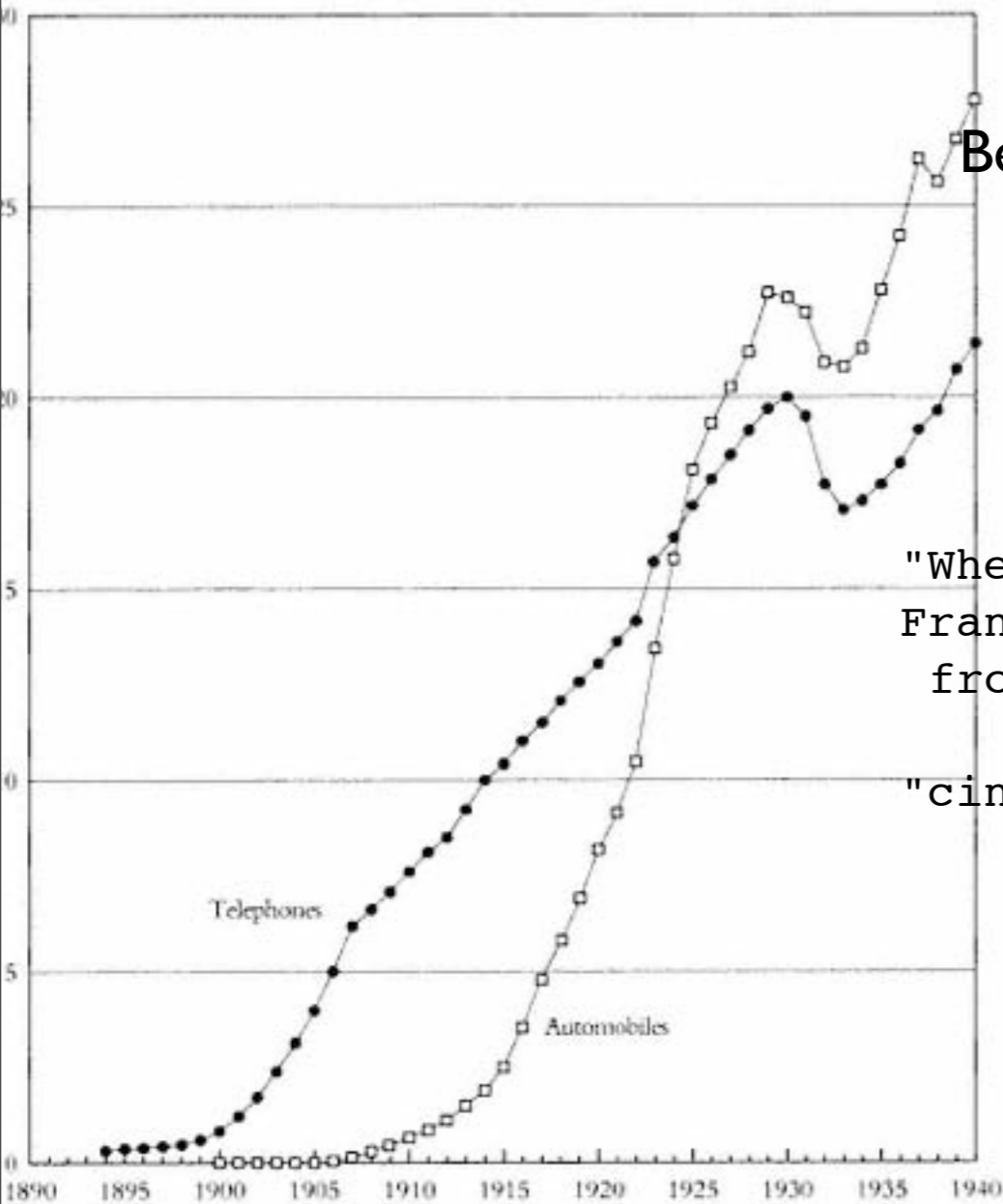
licensing (Xerox, ethernet)

competition



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

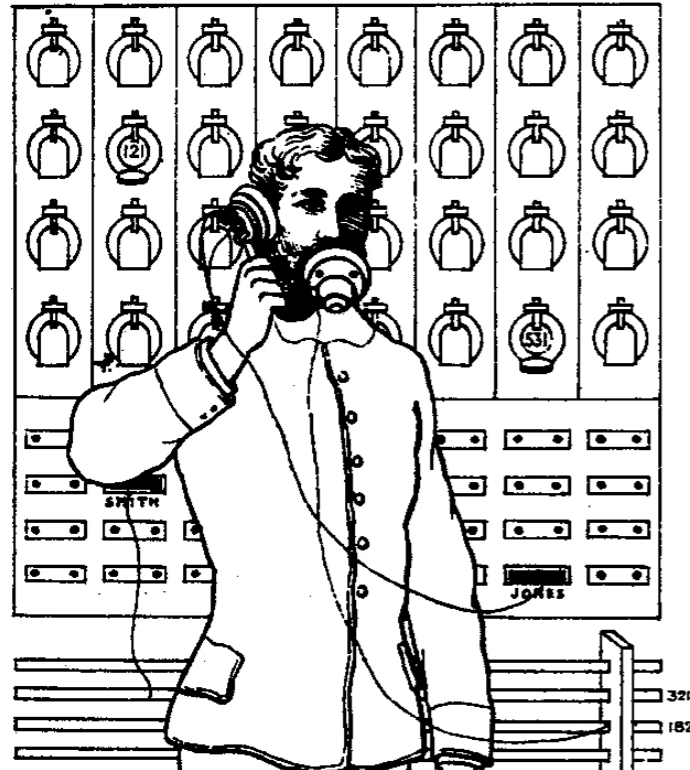
diffusion of telephones and cars.
1894-1940



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



"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 [cp Fischer]
grounds for monopoly?
for international cooperation?

Strowger switch (1888-92)

traffic analyses

1903, Malcolm Rorty, traffic probability



medium and message



Sabin's Express System
San Francisco, 1894

**information infrastructure
from telegraph to telephone**

**expertise and transparency
vs user contribution**

**controlling the network from the
center**

common carriers



in conclusion

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

users

businesses

governments