A dense network of colorful wires and cables, symbolizing communication and connectivity.

“Every phase of the mental activity of the country is more or less represented in this great system. The fluctuations in the markets; the price of stocks; bargains offered and bargains closed; sermons, lectures and political speeches; fires, sickness and death; weather reports; the congratulations of friends – every thing has its turn in passing the wires.”

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—*Harpers New Monthly Magazine*,
1873

History of Networking

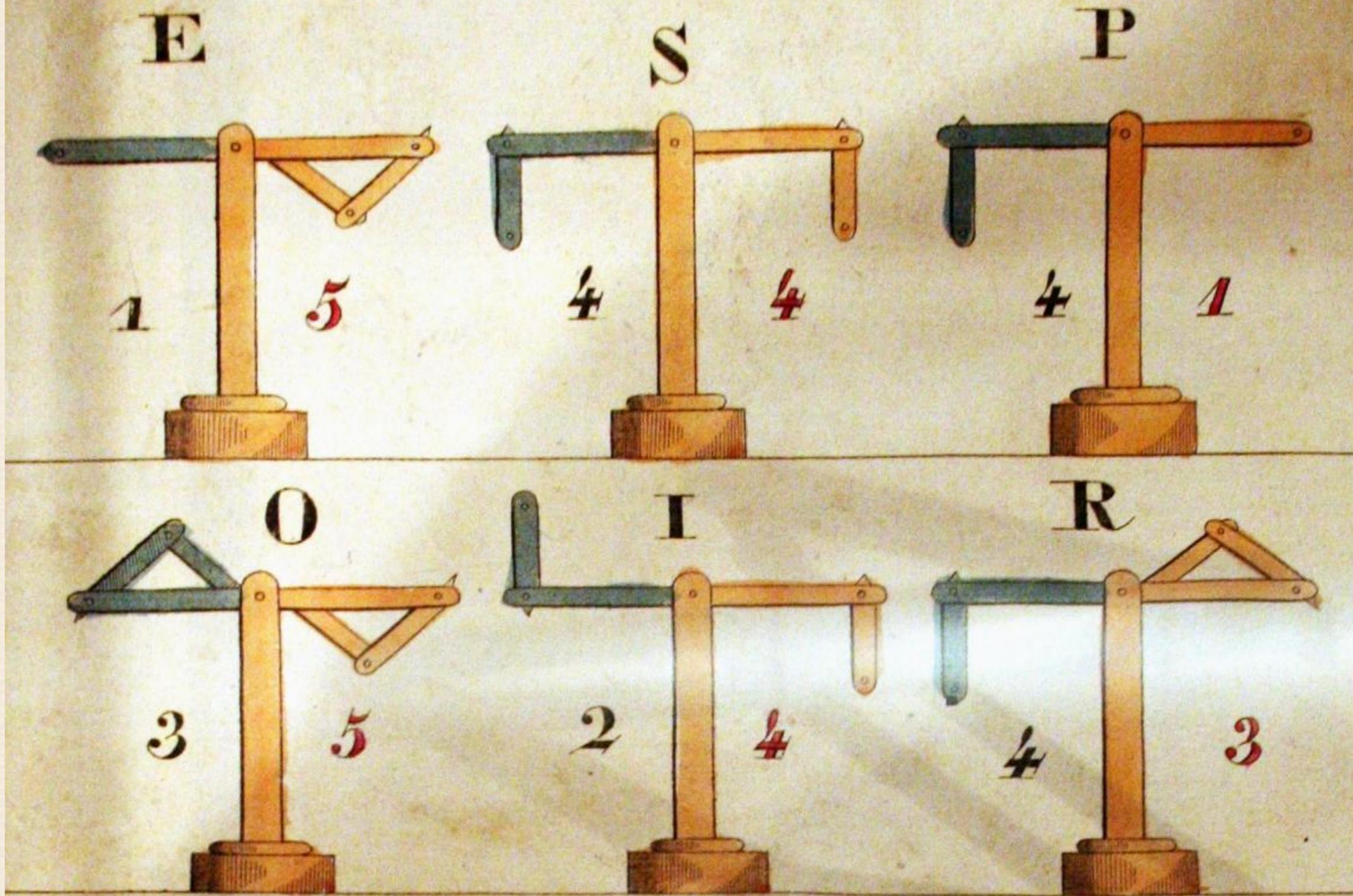


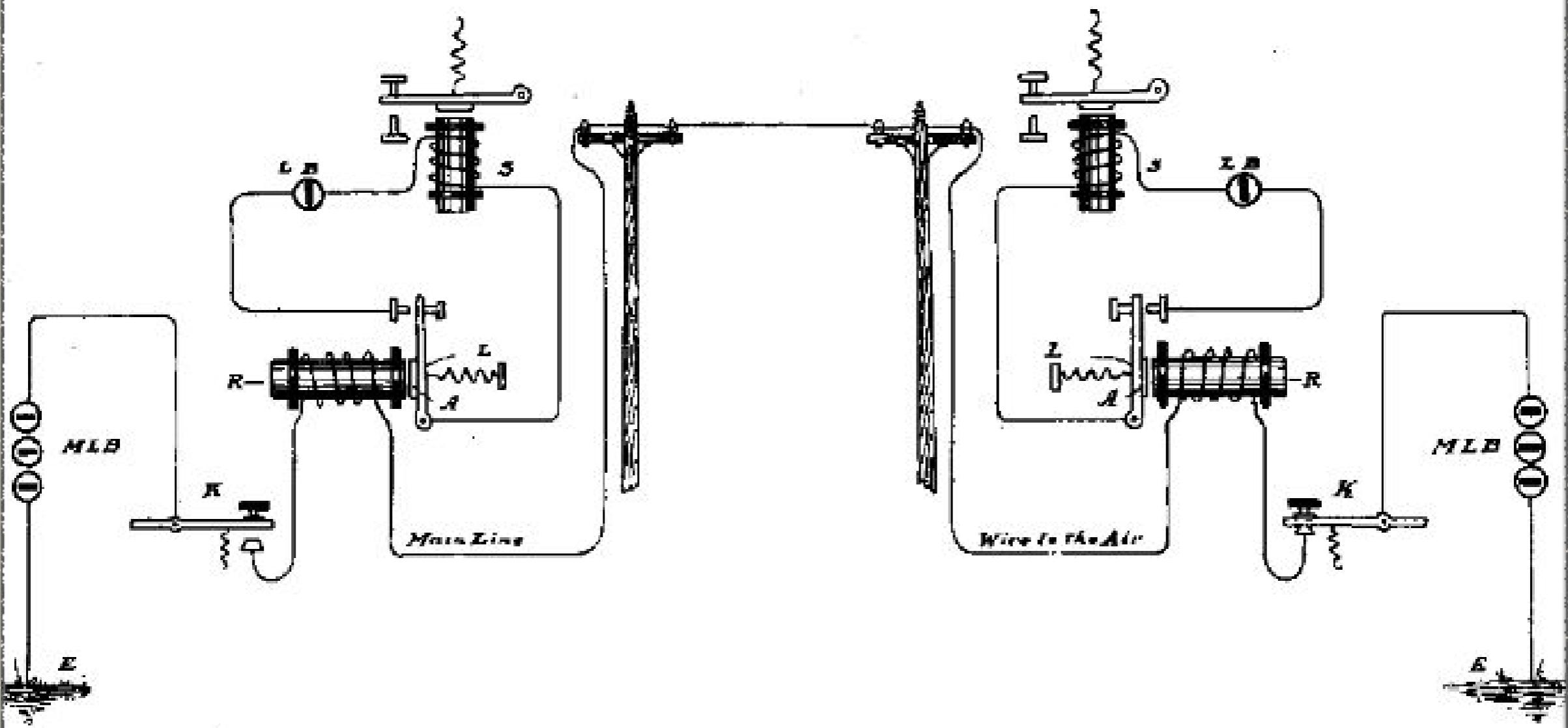
The Victorian Internet



The Gallery of the Louvre (Samuel Morse, 1831)







The Main Line Circuit.



“The dot is an unfortunate appellation for this sign, because it conveys the idea of a point, or to speak electrically, a current of infinitely short duration. Electro-magnets, however, require time in magnetization. Currents involve time in transmitting signals [and] must be of sensible duration. The dot, therefore, involves time, but this time is variable, according to circumstances. The length of the dot should increase with the length of the circuit. In long submarine lines the dot has to be made longer than the dash itself on short open air lines.”

—*Modern Practice of the Electric Telegraph*, Frank L. Pope, 1881

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

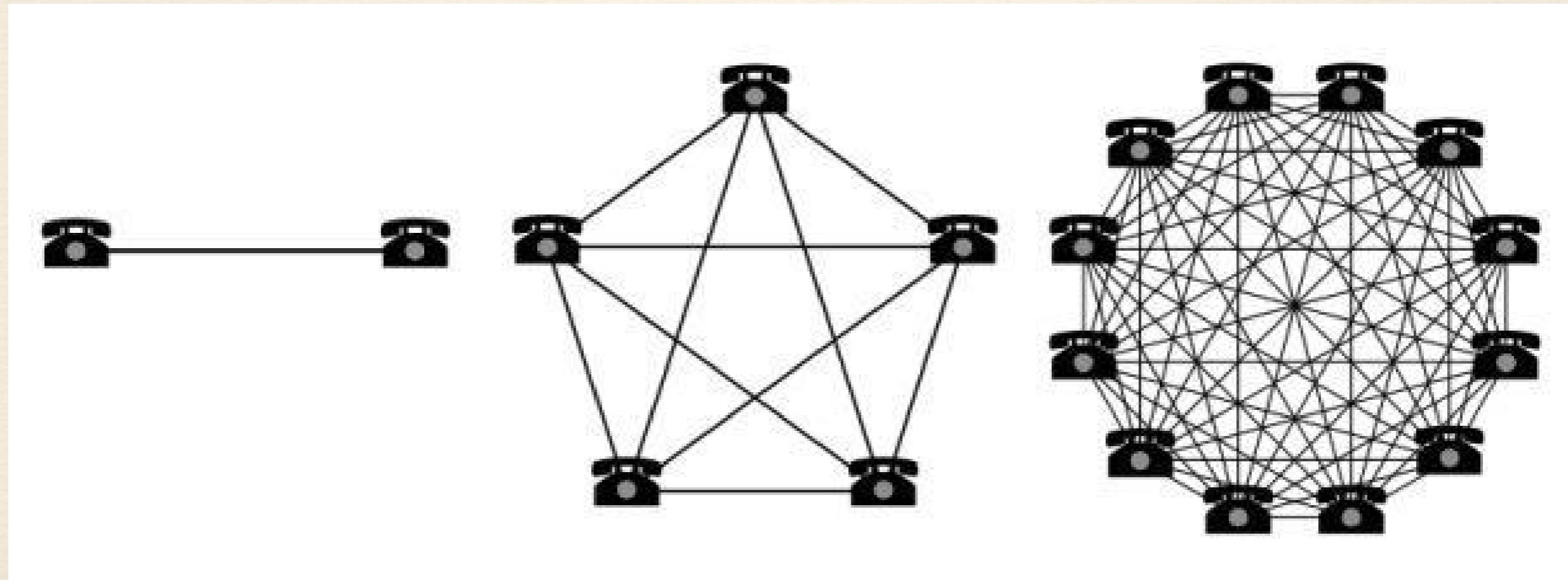
A • —
B — • • •
C — • — — •
D — • •
E •
F • • — — •
G — — — •
H • • • •
I • •
J • — — — —
K — • —
L • — • •
M — —
N — •
O — — —
P • — — — •
Q — — — • —
R • — — •
S • • •
T —

U • • — —
V • • • — —
W • — — —
X — — • • —
Y — — • — —
Z — — — • •

1 • — — — —
2 • • — — —
3 • • • — —
4 • • • • —
5 • • • • •
6 — • • • •
7 — — • • •
8 — — — • •
9 — — — — •
0 — — — — —

“The value of a network is proportional to the square of the number of connected users of the system.”

—Robert Metcalfe, circa 1980

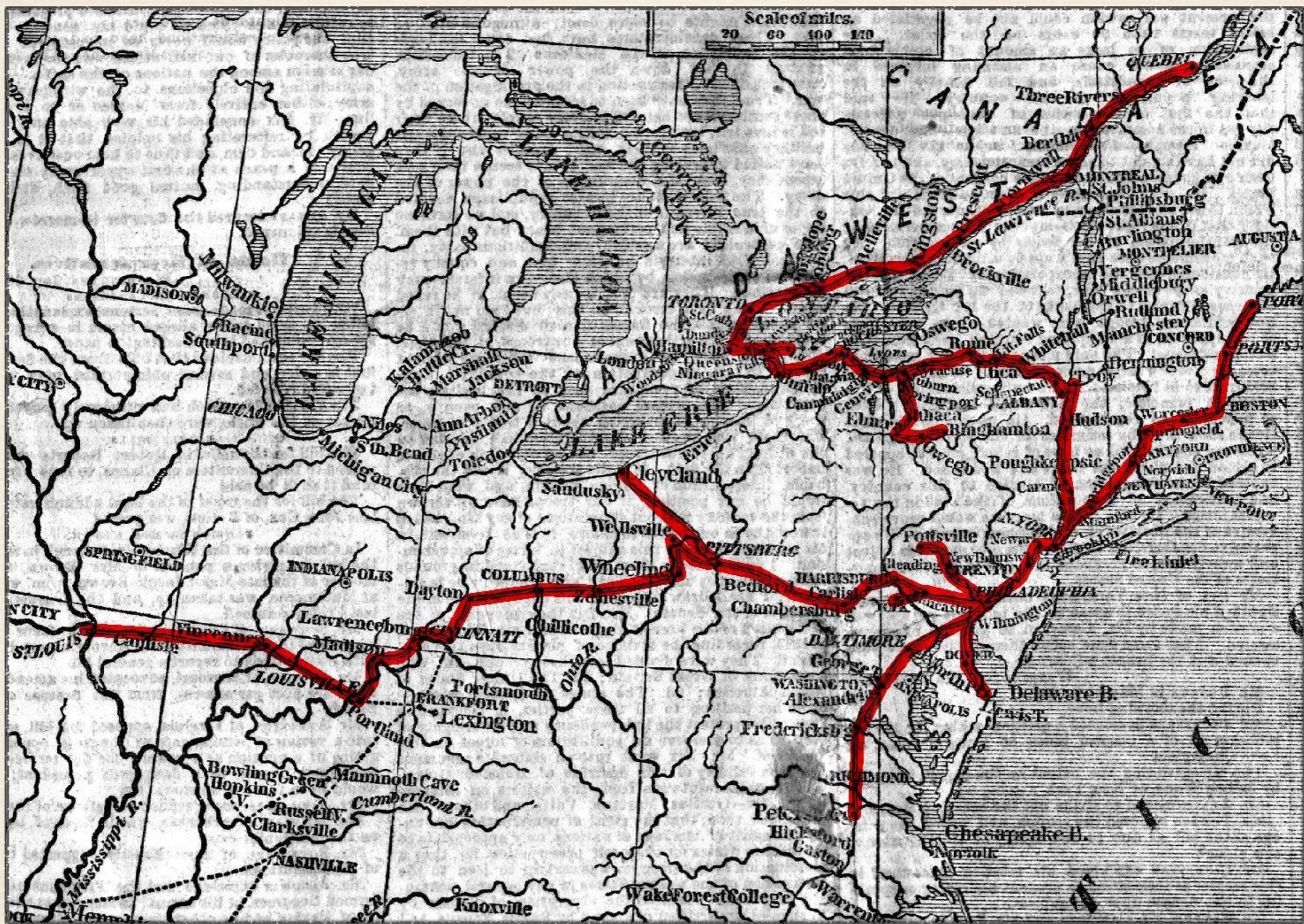


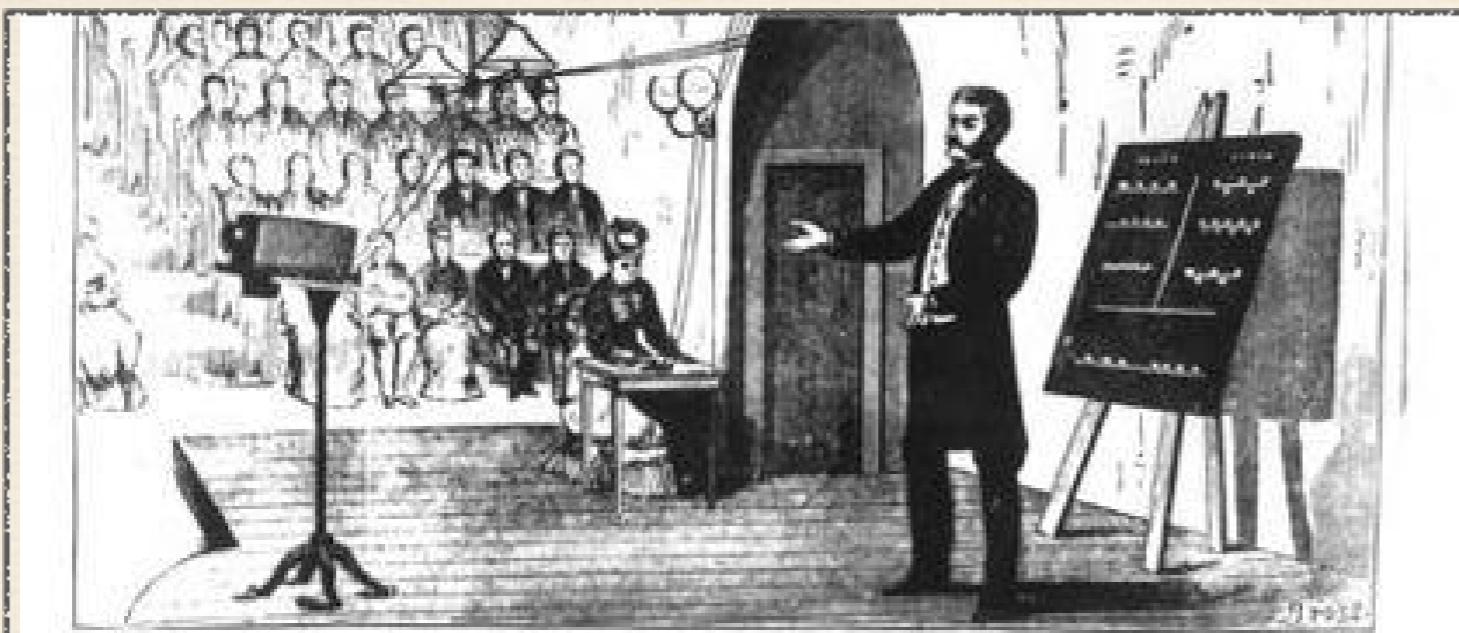
184
6

1848

1850

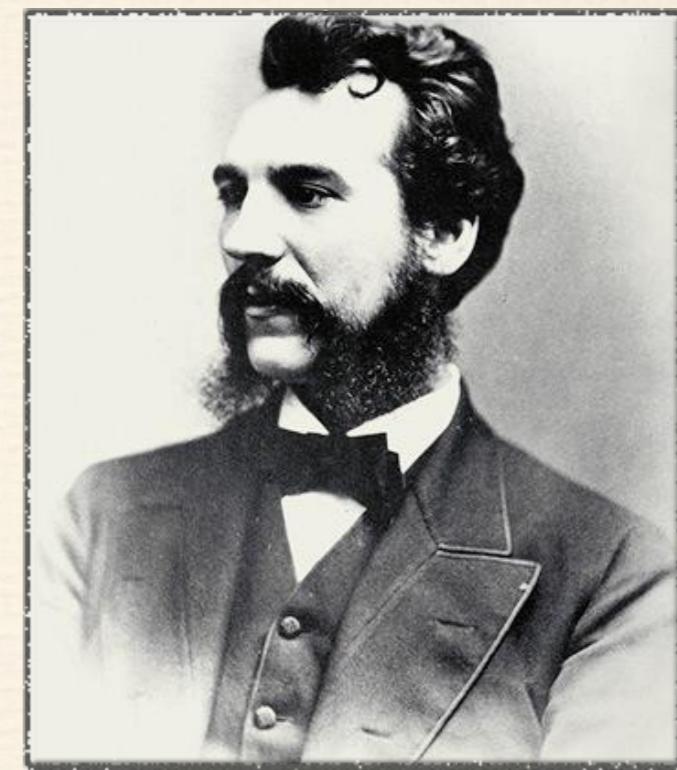
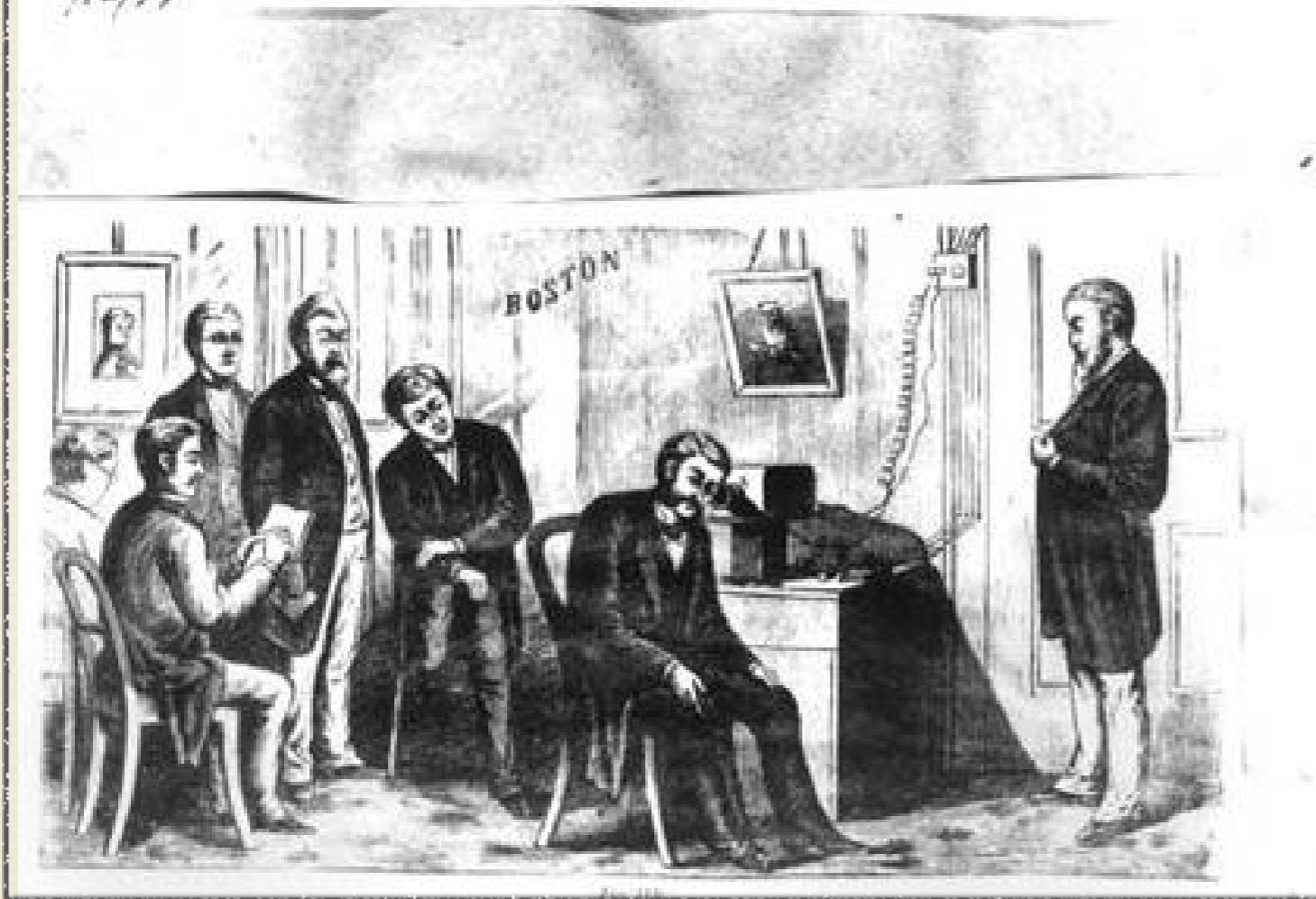
185
2





4/12/77

Fig. 214.
Sabin





The Victorian Internet

- . Exponential growth driven by Metcalfe's Law

- . Physical constraints are invisible to the operator but manifest in other ways:
 - . Message buffering and lag
 - . Message routing
- . Packet switching is the basis of all modern networks
- . Just-for-fun reading: *The Victorian Internet* by Tom Standage (ISBN 0802716040)

+▼

 $y=x(x-1)$  $y=n(\log(n))$

3

