

A Technological Revolution

Chapter 4 – Section 1



Daily Life Before 1860's

- No indoor electric lighting (candles, oil lamps, or go to bed after dark)
- No refrigeration (blocks of ice packed in sawdust for those who could afford)
- Long distance communication *very* slow (3 weeks mail across country and could take months for news from relatives in Europe)



Dramatic change

- By 1900's life changed dramatically for Americans
- Tremendous growth in new ideas and inventions
- Financial investment in these new ideas by European & American business leaders



Increase in Patents

- A license to make, sell, or use an invention
- Things like typewriters, sewing machines, and phonographs
- (Only 36,000 given out between 1790-1860, but 500,000 between 1860-1890)



RR's pre-Civil War



- Short lines connecting neighboring cities (most in the East)
- No standard track width (had to reload)
- Dangerous (no standard signals, unreliable brakes)

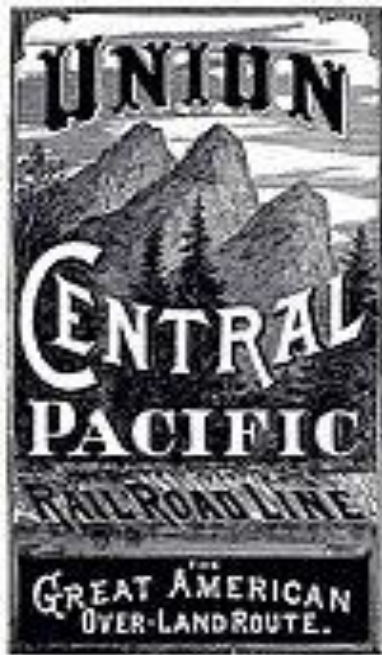
Transcontinental Railroad

- A big deal because it connected coast to coast



Union Pacific & Central Pacific

- 2 private companies that built it with grants from Federal Govt. (too big to be privately funded)



How it was Built

- Mostly immigrant workers
- Irish immigrants (Union Pacific) out of East
- Chinese (Central Pacific) out of West
- Grueling labor – up to 6 miles/day through mountains (chiseling, plowing and dynamiting)



3 Improvements

- Trains were noisy, dirty, and uncomfortable for travelers, but improvements were made to train travel
- Steel rails (instead of iron)
- More effective air brakes
- Telegraph system for moving trains (less collisions)



Time Zones

- Each town set clock according to solar time
- Created chaos for schedules because trains had to be “on time”
- 1883 adopted National System of time zones to have consistency



RRs help Business

- 190,000 miles of rails linked businesses and customers
- Shipping costs reduced dramatically
- (for example, in 1865 a barrel of flour shipped from Chicago to NY cost \$3.45 – only 68 cents in 1895)



The Telegraph

- A system of sending messages over wires
- First message sent in 1844
- Important b/c this was the start of a communications revolution (the internet of it's time)



Morse Code

- Allowed people to transmit messages using short and long electrical impulses

International Morse Code

1. A dash is equal to three dots.
2. The space between parts of the same letter is equal to one dot.
3. The space between two letters is equal to three dots.
4. The space between two words is equal to seven dots.

A	• —	U	• • —
B	— • • •	V	• • • —
C	— • — •	W	• — —
D	— • •	X	— • • —
E	•	Y	— • — —
F	• • — •	Z	— — • •
G	— — •		
H	• • • •		
I	• •		
J	• — — —		
K	— • —		
L	• • • •		
M	— —		
N	— •		
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P	• — — •		
Q	— — • —		
R	• — •		
S	• • •		
T	—		
		1	• — — — —
		2	• • — — —
		3	• • • — —
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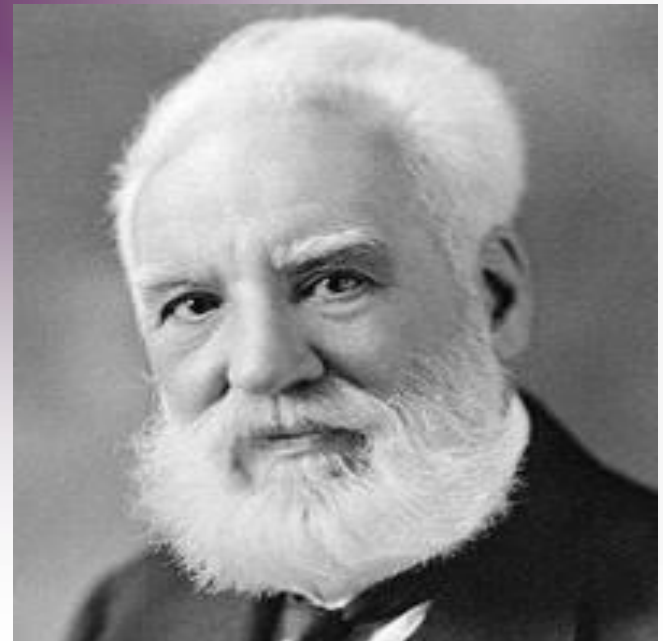
Western Union Telegraph Company

- A merger of several telegraph companies that owned 900,000 miles of wire
- (by 1900 sending 63 million messages/yr.)



Telephone

- Alexander Graham Bell invented in 1876
- Originally only connected two places
- Soon central switchboards linked entire cities (by 1900 1.5 million telephones in use)
- In 1885 set up American Telephone and Telegraph Company (sound familiar?)



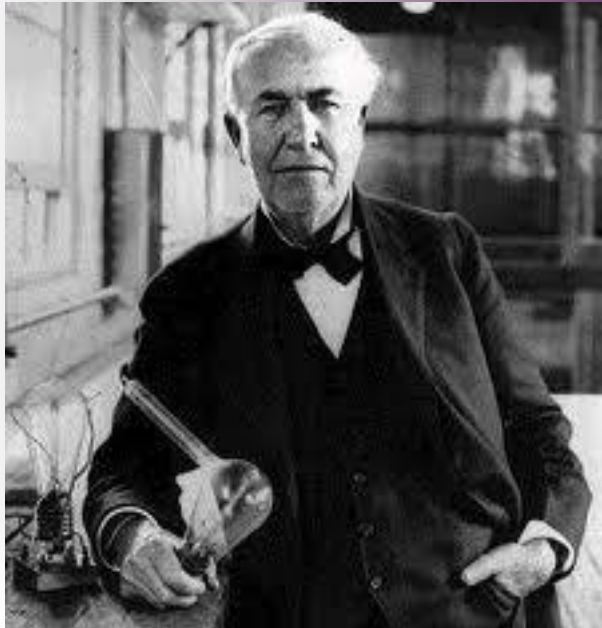
Science

- Created fuels like gasoline
- Electricity changed everything about people's lives – eating, working, even sleeping habits



The “Wizard of Menlo Park”

- Thomas Edison – great inventor
- Electric lighting
- Power stations (provide power to dozens of homes)
- Phonograph (first song – Mary had a Little Lamb)
- Many more inventions



George Westinghouse

- Improved Edison's ideas and made the use of electricity available in all homes
- Used an *alternating current* to transmit electricity more cheaply & efficiently
- Used a device called a *transformer* to send electricity over long distances



2 Important Inventions

- The refrigerator – reduced food spoilage
- Electric sewing machine – led to ready-made clothing industry (foot pedal was much slower & time consuming)



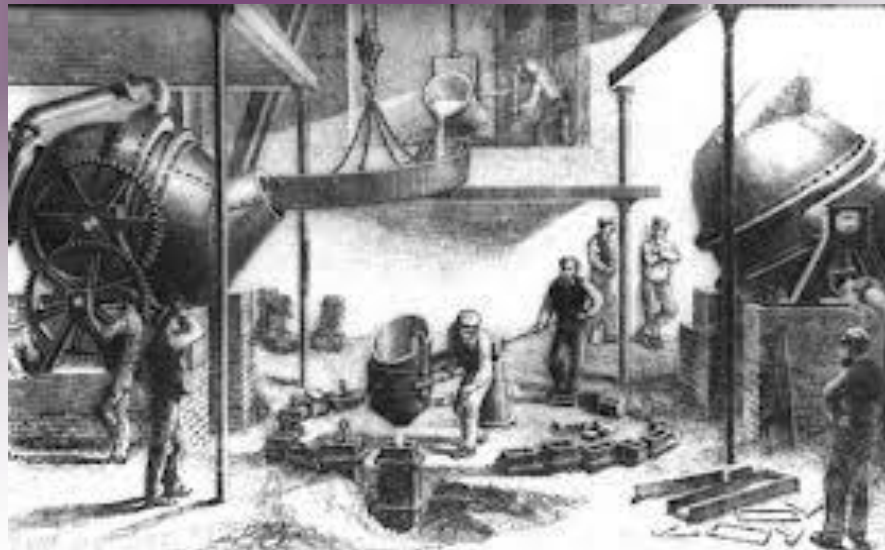
Did Everyone Benefit?

- Rural areas went without electricity for many decades and some couldn't afford the home appliances that ran on it



Bessemer Process

- Process of making steel easier and cheaper
- Allowed for the mass production of steel and a new age of building to begin (used to use iron which was heavier, weaker, and less flexible)
- (named after Henry Bessemer in England who came up with it)



Brooklyn Bridge

- A big deal b/c it symbolized what the inventive genius and hard work of Americans could produce
- (used steel cables – 1,595 foot span across East River in NYC was longest in world)



Activity

- With a partner, come up *with an invention that will improve daily life for Americans*. Explain how and why it would improve daily life and how you would get funding for your invention.



Homework Essay

- Imagine that you are a 55 year-old living in the year 1900. Describe the improvements you have witnessed in your life since you were a teenager in the 1850's. Be sure to discuss specific ideas from the section (200-250 words)