

THE INDUSTRIAL REVOLUTION IN BRITAIN AND AMERICA TO 1900

THE INDUSTRIAL REVOLUTION IN AMERICA – THE ROBBER BARONS
AND INDUSTRIAL EXPANSION (1850 TO 1900) (MARCH 13)

1. INTRODUCTION; THE LATE MIDDLE AGES; VENICE
(JANUARY 23)

2. AN EMPIRE OF MARKETS (JANUARY 30)

3. WHY BRITAIN? (FEBRUARY 6)

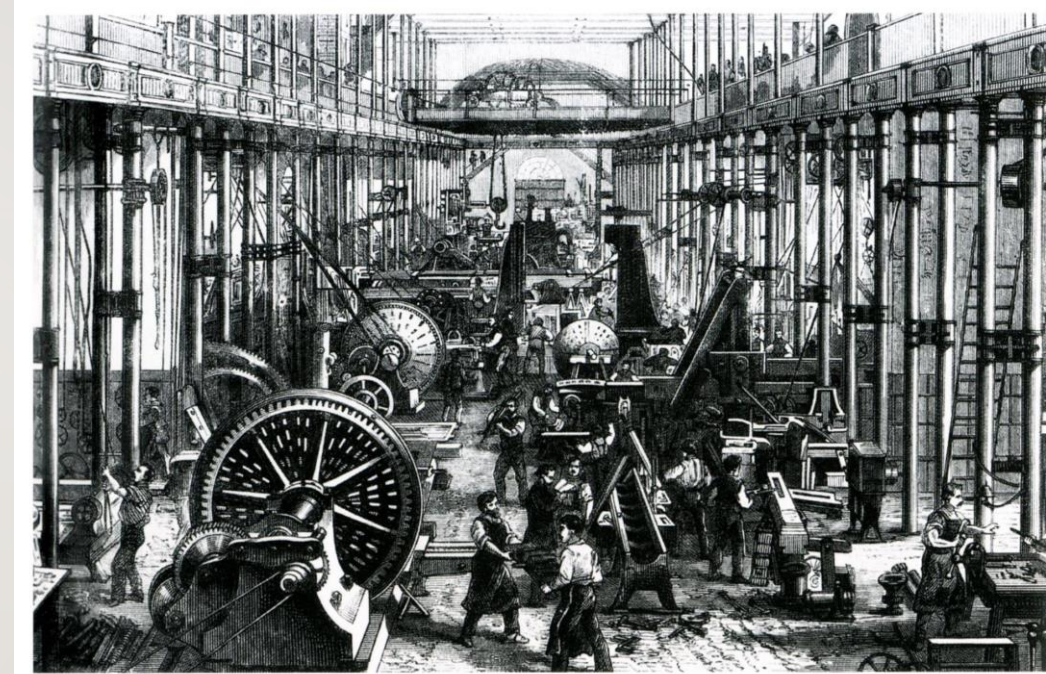
4. CITIES, TEXTILES AND METALS (FEBRUARY 13)

5. COAL AND STEAM (FEBRUARY 20)

6. THE BRITISH CONSUMER REVOLUTION; ADAM
SMITH (FEBRUARY 27)

7. THE INDUSTRIAL REVOLUTION IN AMERICA – THE
TYRANNY OF DISTANCE (1700 TO 1850) (MARCH 6)

8. **THE INDUSTRIAL REVOLUTION IN AMERICA – THE
ROBBER BARONS AND INDUSTRIAL EXPANSION (1850
TO 1900) (MARCH 13)**



Between 1850 and 1900:

1. Power driven machinery replaced human and animal muscle as the primary source of energy for doing all kinds of work.
2. Technological innovations infiltrated every area, business and economic activity, greatly increased productivity and expanded range of goods.
3. Production increased the scale and efficiency by moving from scattered homes and shops to factories or other centrally located facilities.
4. A transportation revolution (trains, roads, ships) sped up regular flow of goods and people.



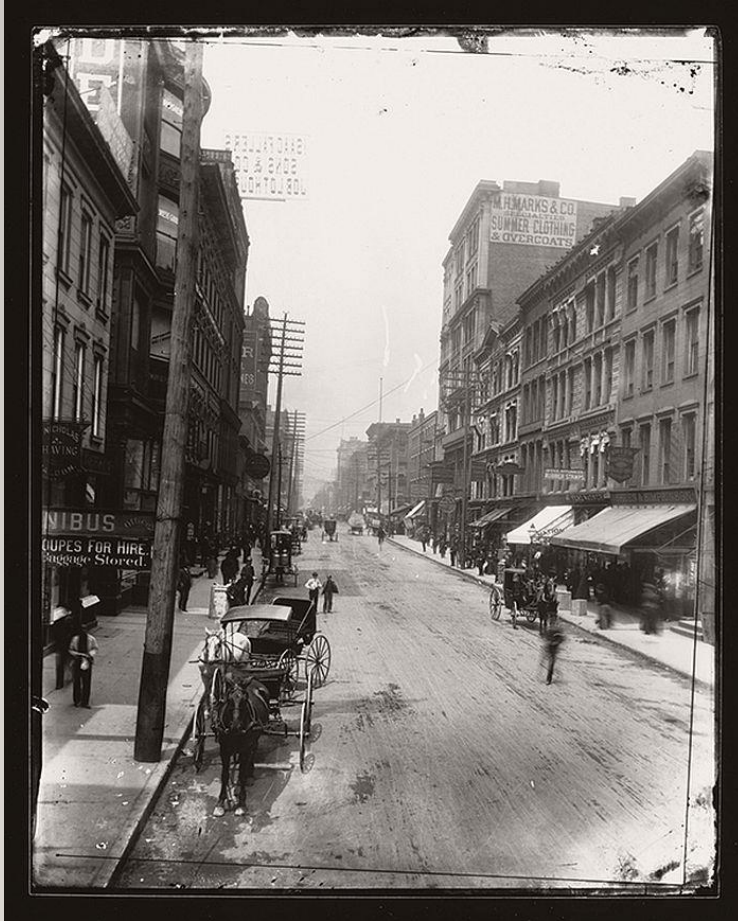
5. A communications revolution regularized and speeded up the flow of information, enabling firms to do business across the nation while maintaining a centrally located headquarters.

6. A full-blown market economy emerged and extended its reach beyond the local level to regional and national levels.

7. An organizational revolution restructuring American businesses enabling unprecedented size and scale of operation.

8. Population increased at unprecedented rates.





9. The number of cities and towns increase sharply as did the proportion of Americans living in them, providing condensed markets.

10. Public education grew as states had more tax revenue to provide education for the needs of a growing technological work place.

11. America was exporting manufactures and commodities in ever increasing amounts.

GROWTH OF MAJOR U.S. CITIES, 1860–1900

City	1860	1880	1900
New York City	1,174,800	1,912,000	3,437,000
Philadelphia	565,500	847,000	1,294,000
Boston	177,800	363,000	561,000
Baltimore	212,400	332,000	509,000
Cincinnati	161,000	255,000	326,000
St. Louis	160,800	350,000	575,000
Chicago	109,300	503,000	1,698,000

Economic growth

Measured in 2023 dollars, American gross national product averaged \$230 billion a year during the 1870s.

- ❖ Reached \$530 billion in 1890, \$770 billion in 1900, and \$1.26 trillion in 1914.
- ❖ Per capita income increase from \$531 in the 1870s to \$1256 in 1914.
- ❖ By 1899, the US population increased by 250% from 1850.
- ❖ The number of business concerns went from 427,018 in 1870 to nearly 1.2 million in 1900.
- ❖ During these years, America was rocked by depressions in the 1870s and in the 1890s. These continued for two to three years at a time, increasing unemployment sometimes to over 15%.

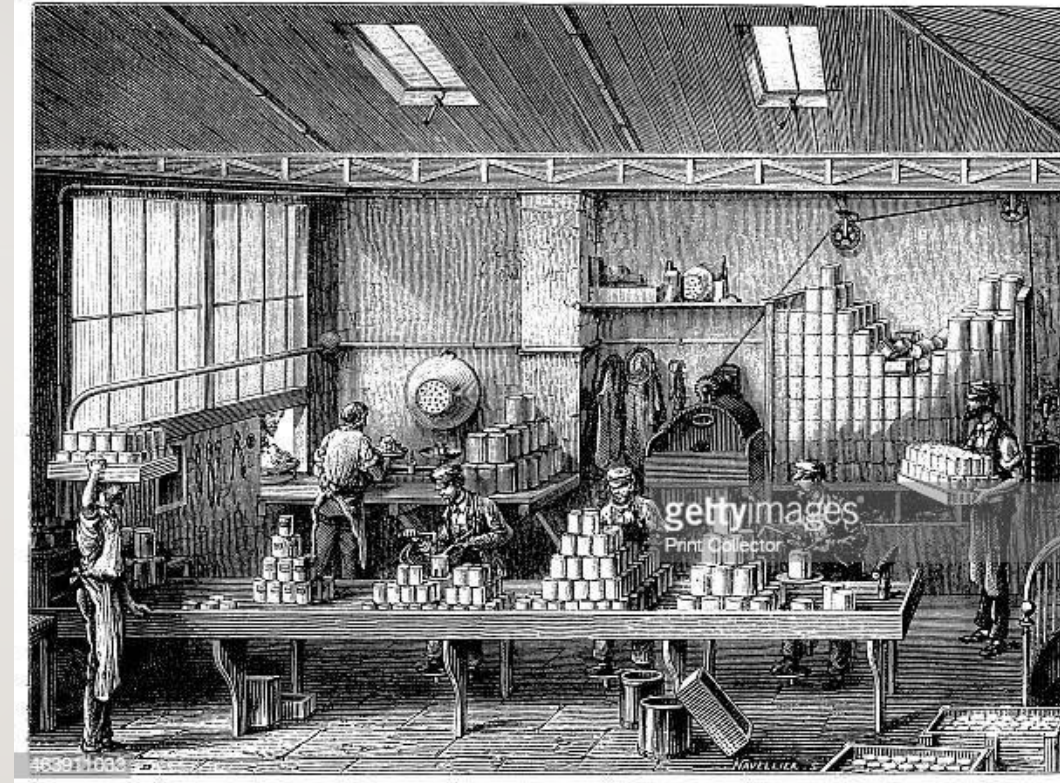


Changes Everywhere

- Cheap gas lighting became a staple of city life and the use of gas extended to heating and cooking.
- Gas lit homes transformed everyday life and changed how people viewed time itself.
- New machines transformed woodworking and metal working and produced whole new generation of machines.
- Spinning and weaving in home cottages or small establishments gave way to giant factories where a handful employees could attend to multiple machines manufacturing thousands of yards of textiles every day.
- Shoes and boots now often made by new machines, boosting production and lowering prices.



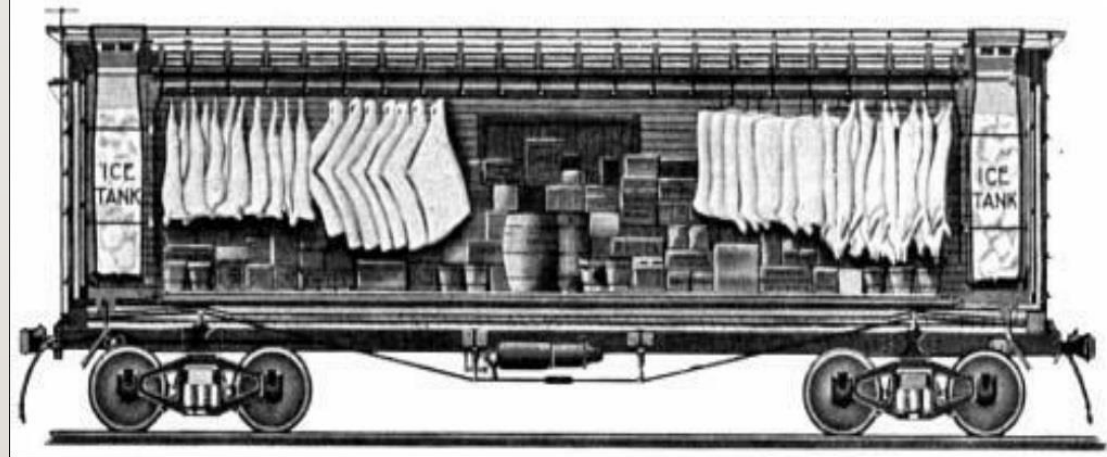
- Power machinery made affordable carpets, furniture, and other home fixtures.
- Expanding machine producing food industry provided ready-made home products like bread and cheese.
- Borden, H.J. Heinz, Campbell Soup, and Libby adopted continuous process canning techniques to turn out products.
- - The first automatic line canning factory opened in 1883 producing 3000 cans an hour.
- Indoor plumbing sanitized to dispose of waste and made bathing and household chores like cleaning much easier.
- Improved sewer systems reduced disease and made cities more livable, and hence more attractive to immigrants from Europe and from American farms.



➤ In the late 1870s refrigerated rail cars which utilized ice and heavy insulation enabled Gustavus Swift and Philip Armour to ship meat across the nation in competition with local butchers.

- ❑ Refrigeration technology spurred the rise of giant firms and meatpacking, fruits and vegetables.
- ❑ Creative marketing convinced East Coast consumers the acceptability of purchasing cattle meat raised in Kansas and slaughtered in far off Chicago and trained to Philadelphia, etc.

Swift's Refrigerated Rail Car



The Robber Barons

20th century economist Joseph Schumpeter described the entrepreneur as the person who breaks up the old and creates the new.

Key concept was innovation. Entrepreneur might introduce:

- a new type or quality of goods,
- a new method of production,
- open a new market,
- acquire a new source of raw materials, or partially finished, manufactured products, or
- impose some new form of organization on an industry.

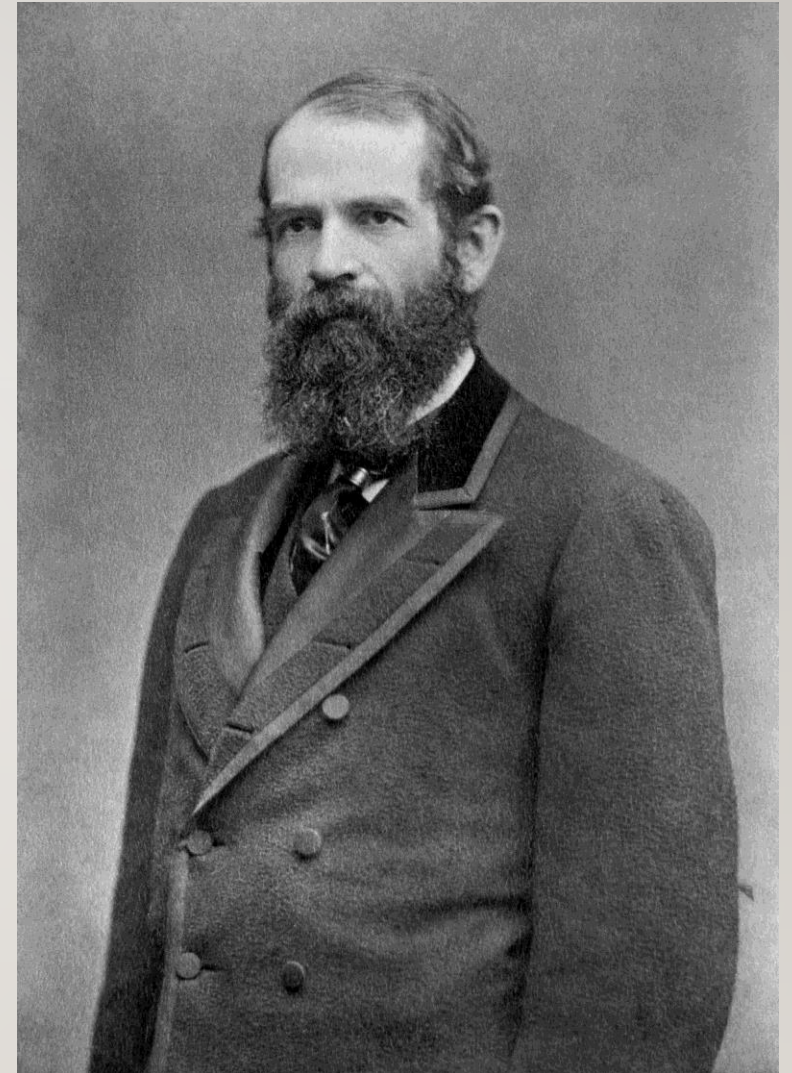


NYC mansion of Jay Gould

Transportation: Jay Gould (1836-1892)

John D. Rockefeller called Gould the greatest businessman in America.

- ❑ Early career sold US bonds during Civil War (public financing experience). A visionary risk taker who could convince others through persuasion or coercion.
- ❑ During 1870s and 1880s compelled mergers of other regional railroads to create several nationwide rail lines.
 - Ex.: acquired a controlling interest in the Erie Railroad, a small New York regional rail road, and compelled two of the strongest railroads, the Pennsylvania and Vanderbilt owned New York Central to expand westward to Chicago to meet Gould threat of westward expansion.
 - Later gained control of floundering Union Pacific and expanded into a dominant transcontinental railroad.



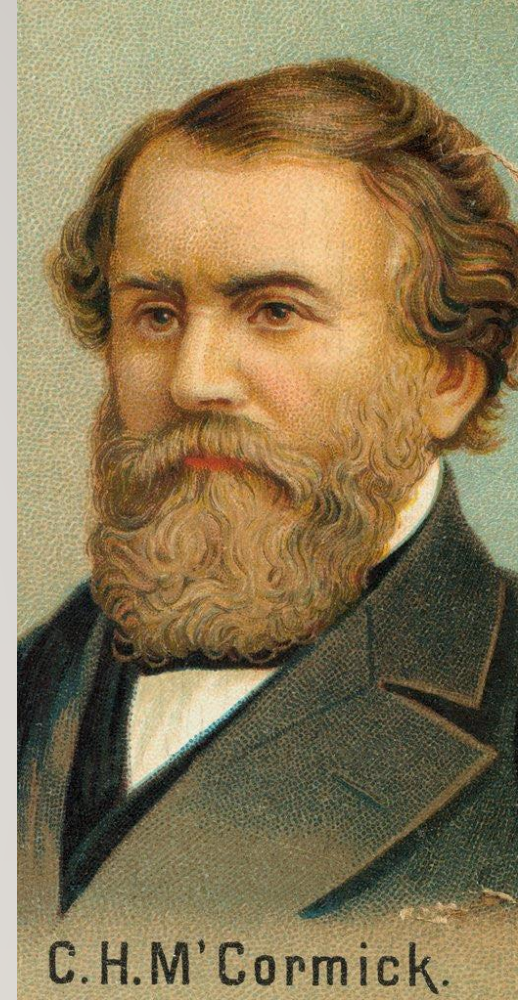
- ❑ Sold his interest in the Union Pacific and bought control of the Missouri Pacific, a small road between St. Louis and Kansas City and built into a powerful 7000 mile system.
- ❑ Gould's aggressive expansion policies forced every major rail system to rethink its strategy and policies.
- ❑ At same time, Gould created telegraph companies, and sold them to the industry giant Western Union, and then he acquired Western Union.
- ❑ Under Gould's control, Western Union more than doubled, its miles of wire.



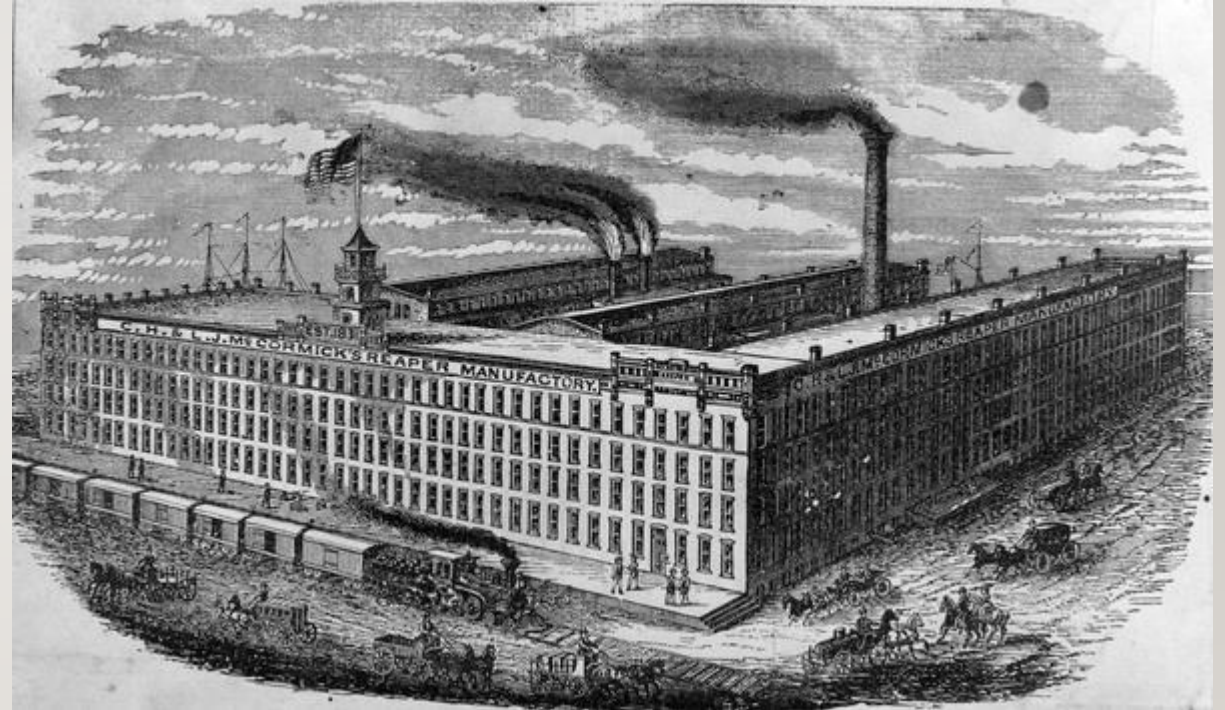
Western Union Building, NYC

Farming and Manufacturing: Cyrus McCormick

- ❑ Intercontinental railroad of 1869 coordinated with 1862 Homestead Act where any citizen could claim 160 acres a public domain land for a \$10 fee.
 - ❑ Opened up more farmland and gave rise to demand for more productive farming techniques.
 - ❑ Cyrus McCormick's first reaper produced in 1831 and cleared 10 acres a day with help of eight men and a horse or two at a cost of about one dollar per acre.
 - ❑ By hand, took five men, and 10 helpers to harvest the same 10 acres with cost running about 2 to 3 dollars per acre.

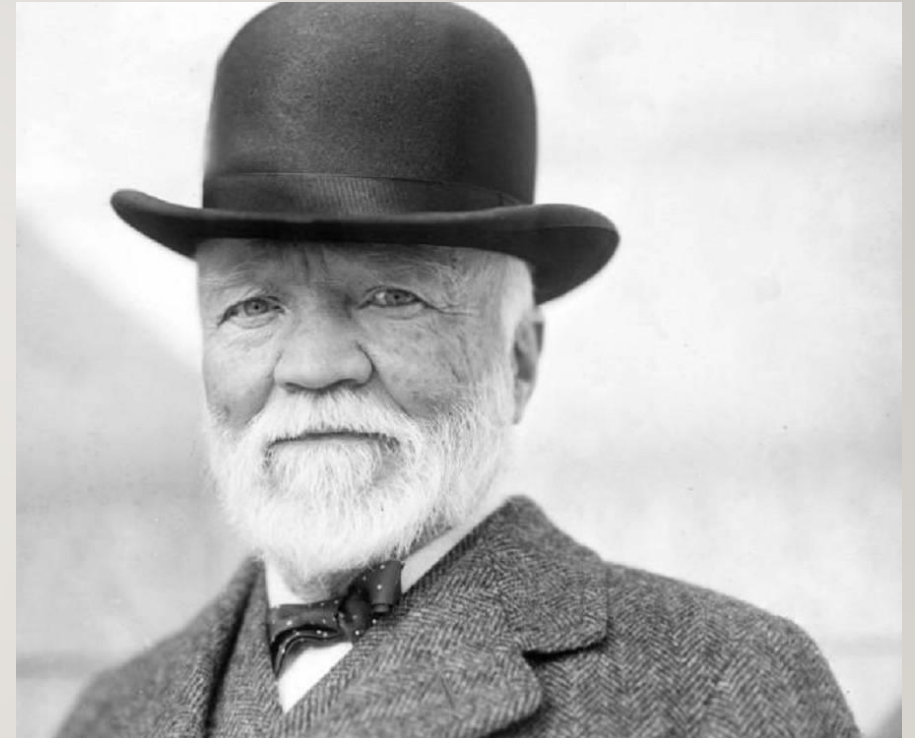


- ❑ McCormick pioneered constant and lavish advertising; provided a fixed price, a written guarantee, and a solid service organization.
 - ❑ His representatives would sell machines, educate farmers on their operation, and be readily available to repair a machine in the field on break down.
- ❑ Offered payment terms understanding farmer cashflow.
- ❑ During the depression years of 1872 to 1875, McCormick doubled his sales
- ❑ By 1878 he sold more than 18,000 machines/year and earned a \$600,000 net profit.

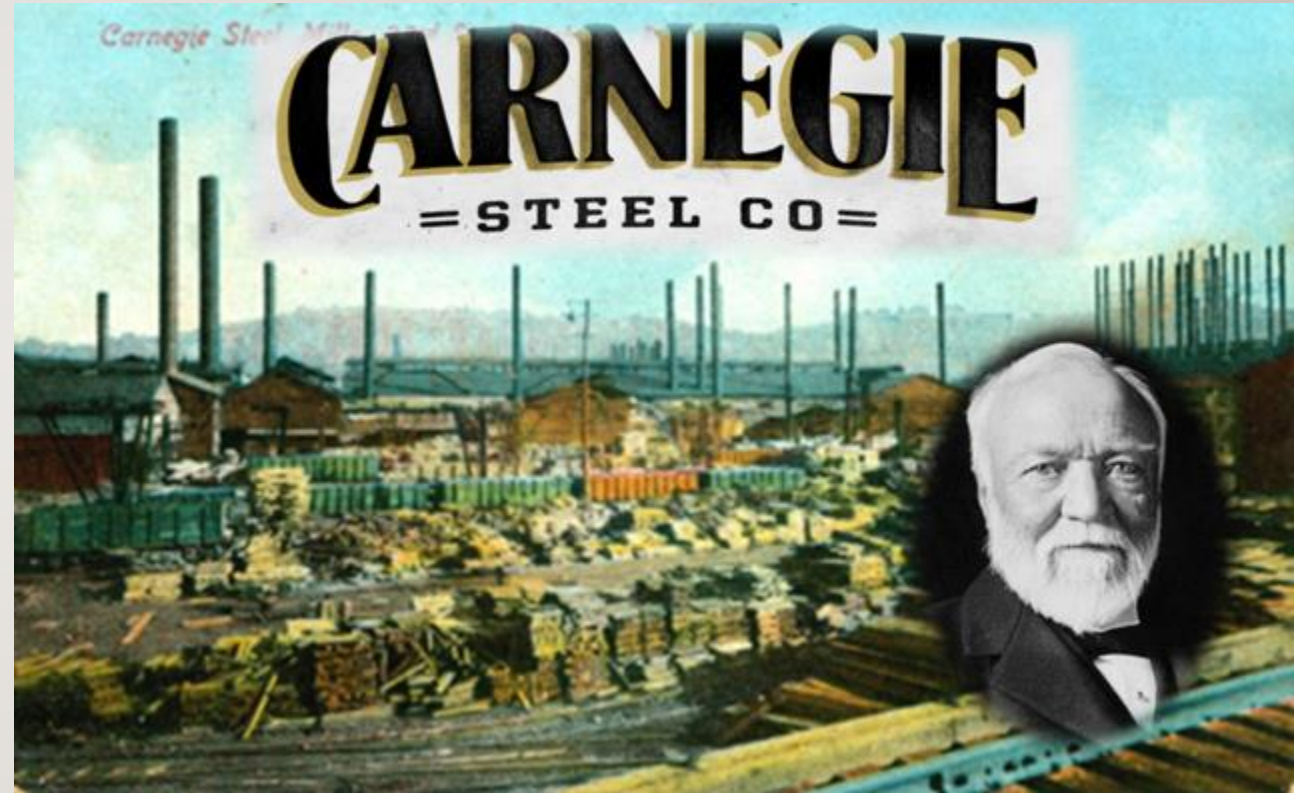


Andrew Carnegie –Steel Industrialist

- Born in Scotland, and emigrated at age 12 to Pittsburgh in 1848.
- In 1853, when Carnegie was around 18 years old, Thomas A. Scott of the Pennsylvania Railroad Company employed him as a secretary/telegraph operator at a salary of \$4.00 per week (\$130 by 2022 inflation).
- By age 24, Carnegie officially became superintendent of the PA RR Western Division.
- Railroads were the first big businesses in America, and the Pennsylvania RR one of the largest.
 - Carnegie learned much about management and cost control during these years.



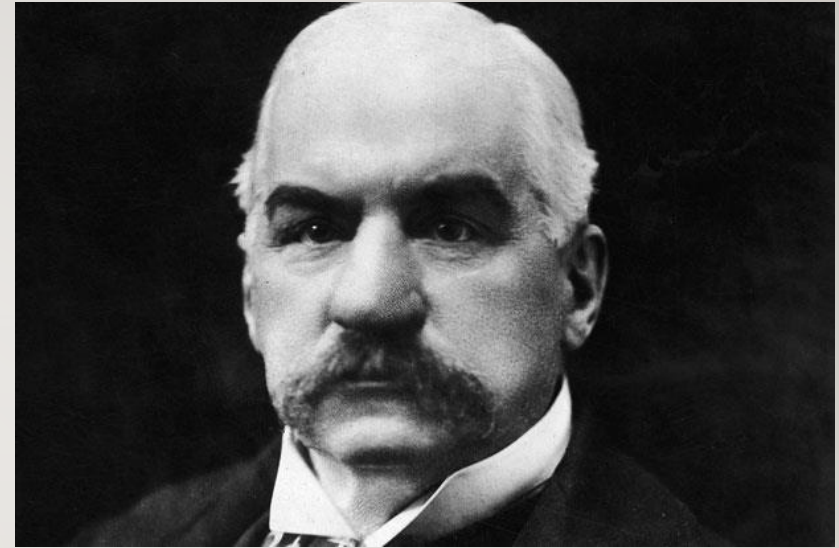
- After leaving Scott, Carnegie worked with others in establishing a steel rolling mill, and steel production and control of industry became the source of his fortune.
- Carnegie's two great innovations were adopting and adapting the Bessemer process, which allowed the high carbon content of pig iron to be burnt away in a controlled and rapid way during steel production and vertical integration through purchases of his suppliers of raw materials.
- By 1889, the U.S. output of steel exceeded that of the UK, and Carnegie owned a large part of it.



Carnegie Operations

Name	Location	Rail Service	Type of Facility
<u>Carnegie Carrie Furnaces</u>	Rankin	Union RR	Steel Mill - 5 Blast furnace stacks
Clark works	Pittsburgh	Allegheny Valley	Hoops, bands, light rails
Donora works	Donora	Pgh, Virginia & Charleston	Steel Mill - 2 Blast furnace stacks
Duquesne works	Cochran	Union RR	Steel Mill - 4 Blast furnace stacks
Edgar Thomson works	Bessemer	Union RR	Steel Mill - 11 Blast furnace stacks
Homestead works	Munhall	Union RR	Steel Mill
Howard axle works	Howard	Union RR	Forge
<u>Isabella furnaces</u>	Etna	West Penn	Steel Mill - 3 Blast furnace stacks
Lower Union Mills	Pittsburgh	Allegheny Valley	Iron Mill
<u>Lucy furnaces</u>	Pittsburgh	Allegheny Valley	Steel Mill - 2 Blast furnace stacks
Monessen works	Monessen	Pittsburgh and Lake Erie	Rolling Mill and Steel works
McCutcheon works	Allegheny	Pittsburgh and Western	Hoops, bands, light rails
Painter works	South Side	Pittsburgh and Lake Erie	Processing
Upper Union mills	Pittsburgh	Allegheny Valley	Iron Mill
Galvanizing plant	South Side	Pittsburgh and Lake Erie	Processing

- Carnegie's success was also due to his attention to reducing costs and his convenient relationship with the railroad industries, which not only relied on steel for track and bridges, but were also making money from steel transport.
- At age 65, Carnegie sold Pittsburgh's Carnegie Steel Company to J. P. Morgan in 1901 for \$303,450,000 (equal to \$9.8 billion today); it formed the basis of the U.S. Steel Corporation.



The Management Revolution

- Beginning with railroads, large multi-unit, multi-location enterprises were replacing “compressed” enterprises
 - Before the multi-unit business enterprise, a single organization would engage in several businesses.
 - E.g., a merchant trader may own ships to ship goods to his city, insure the ship with other merchants, sell the goods in his retail shops or transport the goods to other coastal cities or inland towns, all with his small group of employees.



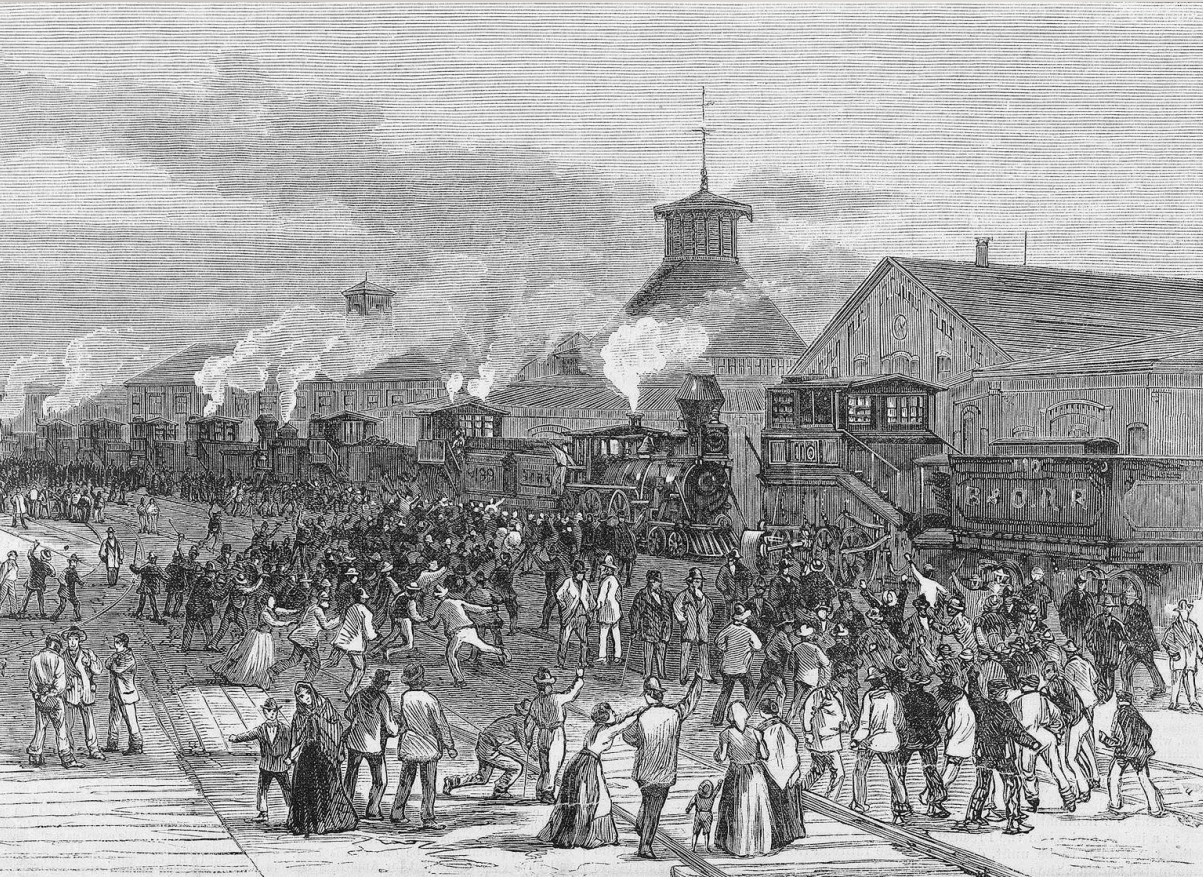
American Labor

Intense industrialization, and new management techniques assembled a labor force that sometimes became disenchanted with the pay, working conditions, and stress of industrial and city life.

Strikes as semi ultimate response to labor conditions including pay

In many of the strikes, state and federal government was for management, and would use emergency powers to assemble state, militiamen or federal military against workers.





Great Railroad Strike of 1877

- Part of fallout from a business recession that began in 1873.
- Organized in Martinsburg, West Virginia where workers had suffered two successive pay cuts, brought mid-east coast trains to a standstill. W Va.
- Governor sent in state militia, but its members sympathized with the strikers and refused to harm them.
- Sympathetic violent outbreaks occurred in Pittsburgh, Baltimore, Philadelphia and St. Louis.
 - Worse fighting and destruction occurred in Pittsburgh.
 - Pa. state militia shot more than 20 strikers in Pittsburgh.
 - Most strikers not unionized, and were ultimately forced back to work.
 - Strike created legacy of mistrust and resentment between labor and management.

Haymarket Square riot of 1886

- McCormick harvesting machine company workers went on strike.
 - Held large rally in Chicago's Haymarket Square; made peaceful speeches but someone threw a bomb killing seven policeman and four bystanders.
 - Eight participants rounded up and put on trial, convicted, and seven sentenced to death.
 - Four executed the next year and a fifth committed suicide this cell.

Pullman Car strike of 1894

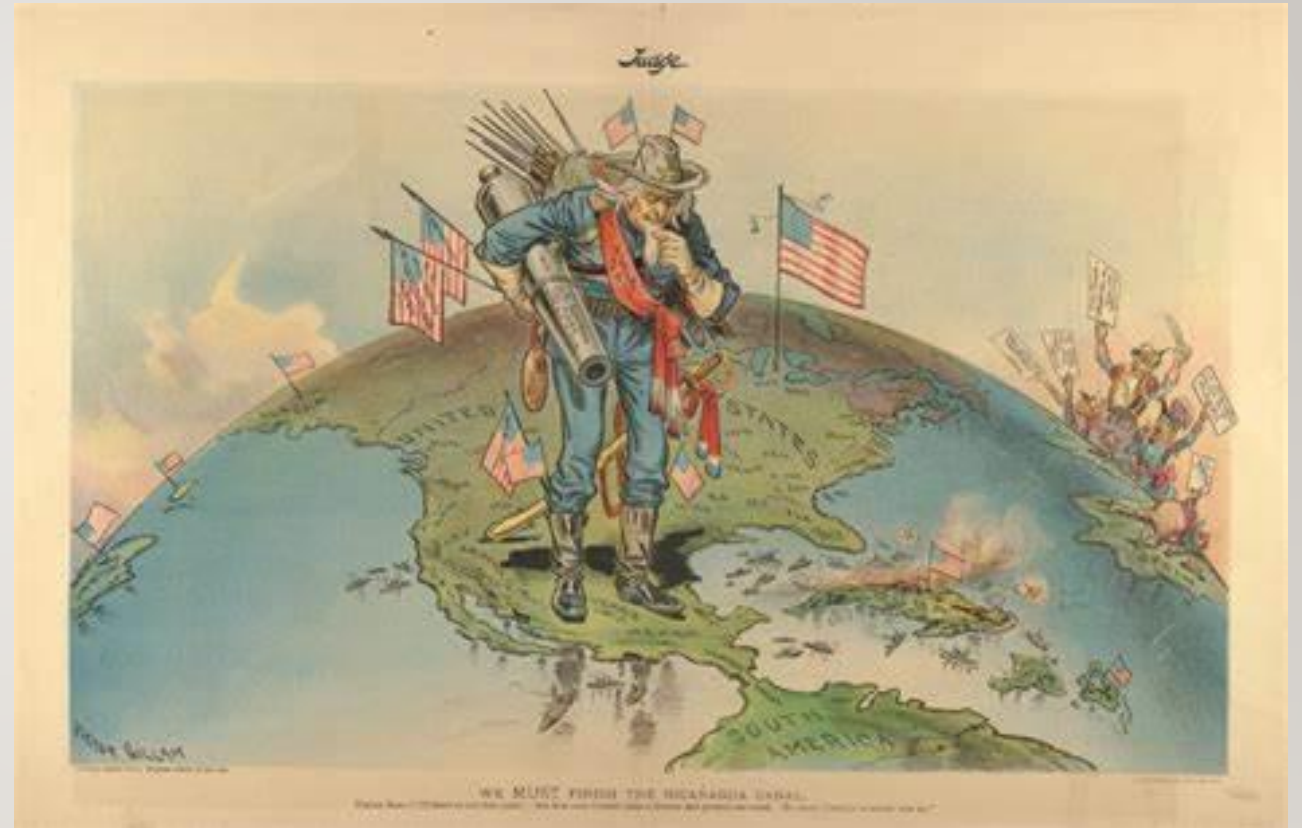
- Strike occurred fromnst pay cuts during economic recession
- Many employees lived in company houses whose rent was not cut when wages were cut.
- American railway union, tried to persuade rail workers nationwide to boycott trains.



America in 1900

United States an industrial powerhouse by 1900.

- Steel production would soon eclipse that of Great Britain and Germany combined
- World watched this restless nation for what it would do next.
- US would struggle on the world stage, not understanding the extent of its power or responsibility as the Industrial Revolution reached other power houses like Germany, Japan, France and Russia.
- Result in great wars of the early 19th century occurring with great devastation in the 20th Century.





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