

Chapter 5 Notes: The Industrial Age

Section 1: Railroads Lead the Way

Railroad Expansion

The railroad system expanded rapidly in the late 1800s, building large fortunes for some wealthy businesspeople.

- Those who **labored**, or worked, to build the nearly 200,000 miles of railroad track often worked for large railroad companies.
- **Consolidation** of the smaller companies brought efficiency and uniformity to the railroad industry.
- A few powerful **individuals** known as **railroad barons** controlled the nation's rail traffic.

Railroads Stimulate the Economy

Railroads brought major changes to American industry and American life in general.

- Railroads stimulated the American steel, lumber, and coal industries and provided thousands of jobs.
- A **standard gauge** of width for the railroad track was adopted, allowing for faster shipment of goods and reduced prices.
- New technology also improved railway transportation.
 - Air brakes, invented by **George Westinghouse**
 - Janney car couplers, invented by **Eli H. Janney**
 - Refrigerated cars, developed by **Gustavus Swift**
 - Pullman sleeping car & dining car, developed by **George M. Pullman**
- **Rebates**, offered by large railroads to their biggest customers, caused increased freight rates for farmers and smaller customers.
- **Pools**, or secret agreements among railroad barons, also resulted in higher rates.

Section 2: Inventions

Communications

New inventions revolutionized communications, making faraway places seem closer.

- Improvements in communication helped unify the country and promoted economic growth.
- Telegraphs **transmitted** messages in Morse code. **Cyrus Field** laid a telegraph cable across the Atlantic Ocean in 1866.
- Telephones transmitted speech. **Alexander Graham Bell** formed the Bell Telephone Company in 1877.

The Genius of Invention

Revolutionary new inventions changed business and everyday life in the 1800s.

- Inventions between 1860 and 1890 were designed to help businesses and everyday life. These included:
 - Typewriters and adding machines
 - **George Eastman's** small box camera
 - **John Thurman's** vacuum cleaner
 - Thomas Edison's phonograph, motion picture projector, storage battery, and electric light bulb
 - George Westinghouse's electric transformers
- A number of African American inventors also contributed to the era of invention, including:
 - **Lewis Howard Latimer's** improved wire for the light bulb
 - **Granville Woods's** electromagnetic brake and automatic circuit breaker
 - **Elijah McCoy's mechanism** for oiling machinery
 - **Jan E. Matzeliger's** shoe-making machine

A Changing Society

Henry Ford's automobile and assembly line changed industry and society forever.

- **Henry Ford** introduced the **Model T**—an affordable automobile—to the public in 1908.
- The **assembly line**, pioneered by Ford, was used to manufacture the cars.
- The assembly line revolutionized other industries by enabling manufacturers to produce large quantities of goods more quickly and more cheaply through **mass production**.
- Merchants looked for new ways, such as mail order and chain stores, to sell their goods.

Section 3: An Age of Big Business

Foundations for Growth

New technology and abundant natural resources led to economic growth.

- When researchers found they could burn petroleum to produce heat and smoke-free light, oil suddenly became valuable.
- The United States had all the resources needed for a growing economy. These factors of production included:
 - Land and natural resources
 - Labor, or workers needed to turn raw materials into goods
 - Capital, or money and manufactured items like machines or tools used to produce other goods and services
- Businesses became **corporations** that sold shares of **stock** to raise capital.
- Investors who purchase shares of stock in a corporation are **shareholders**.
- Shareholders earn **dividends** from the corporation's profits on the stock they own.

The Oil Business

John D. Rockefeller's Standard Oil Company controlled the booming oil industry.

- **John D. Rockefeller** and his **partners** made great fortunes dominating the oil industry.
- Rockefeller formed a **trust**, the Standard Oil Trust, by acquiring stock in many different oil companies.
- By becoming part owner in these other companies, Rockefeller maintained total control of an industry, creating a **monopoly**.

The Steel Business

New processes for making steel created an important industry.

- Steel, a strong and long-lasting form of iron treated with carbon, was ideal for manufacturing railroad tracks, bridges, and other products.
- The Carnegie Steel Company, founded by **Andrew Carnegie**, dominated the steel industry by acquiring companies that provided the equipment and services needed for production and distribution.
- Industrial millionaires like Andrew Carnegie and John D. Rockefeller used some of their money to build libraries and found schools, universities, and other civic institutions.
- The **trend** or general movement toward business monopolies was encouraged by some states. Laws were passed making corporate **mergers**, the combining of companies, easier.
- In 1890 Congress passed the **Sherman Antitrust Act**, which prohibited trusts and monopolies.

Section 4: Industrial Workers

Working Conditions

Factory workers toiled under terrible conditions.

- Industrial growth created many new jobs; however, working conditions deteriorated.
- Problems included long hours, low pay, and unsafe conditions in factories, mines, and **sweatshops**.
- Women and children worked in factories, where their wages were half of what a man might receive.

Growth of Labor Unions

Workers organized unions in order to acquire better wages, benefits, and working conditions.

- Dissatisfied workers organized into labor unions, demanding better pay and working conditions.
- **Trade unions** represented only one trade and were too small to be effective.
- Led by **Terence V. Powderly**, the **Knights of Labor** met secretly and had special ways to **identify** one another.
- The **American Federation of Labor**—led by **Samuel Gompers**—represented skilled workers in various crafts and pressed for better wages, working conditions, and **collective bargaining**.

- A fire at the Triangle Shirtwaist Company led the International Ladies' Garment Workers Union to push for a safer working **environment**.
- Companies hired **strikebreakers** to replace striking union workers.
- **Injunctions**, or court orders, were used to stop unions from striking. **Eugene V. Debs** was sent to jail after the Pullman Strike obstructed the rails and mail.

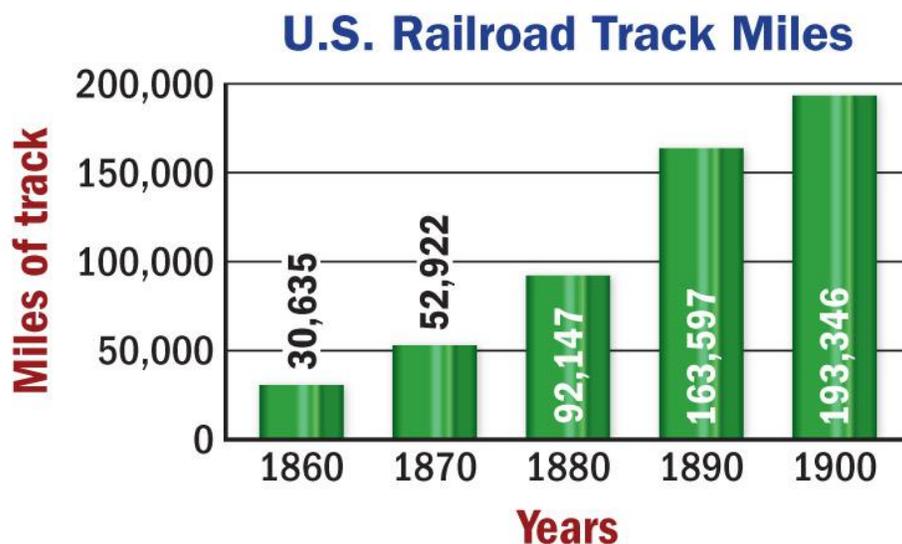
Main Idea	Supporting Details
Expansion of Railroads	<ul style="list-style-type: none"> • From 1860 to 1900, more than 163,000 miles (262,323 km) of new railroad track is laid in the United States. • The width of railroad track becomes standard, simplifying transport by train. • Improvements are introduced such as air brakes, linking systems, refrigerated cars, and sleeping cars.
New Inventions	<ul style="list-style-type: none"> • Transatlantic telegraph • Telephone • Camera • Vacuum cleaner • Electric lightbulb • Model-T car



Main Idea	Supporting Details
Growth of Big Business	<ul style="list-style-type: none"> • U.S. has plentiful resources, including those making up the factors of production—land, labor, and capital. • A few giant corporations, especially in oil and steel, hold substantial economic power. • Trusts and monopolies make corporations efficient but create less competition, hurting consumers.
Philanthropy	<ul style="list-style-type: none"> • Carnegie builds Carnegie Hall, one of the world's most famous music halls, and more than 2,000 libraries nationwide. • Rockefeller establishes the University of Chicago and New York's Rockefeller Institute for Medical Research.
Workers' Rights	<ul style="list-style-type: none"> • Factory workers, miners, and other laborers work long hours, often under dangerous conditions. • Trade unions, such as the AFL, expand in order to represent more workers. • Workers strike in several industries, sometimes sparking violence.

By the Numbers Railroad Tracks

Connecting the Country Railroads expanded rapidly in the years following the Civil War. By the late 1800s, all major U.S. cities from the West Coast to the East Coast were connected by rail.

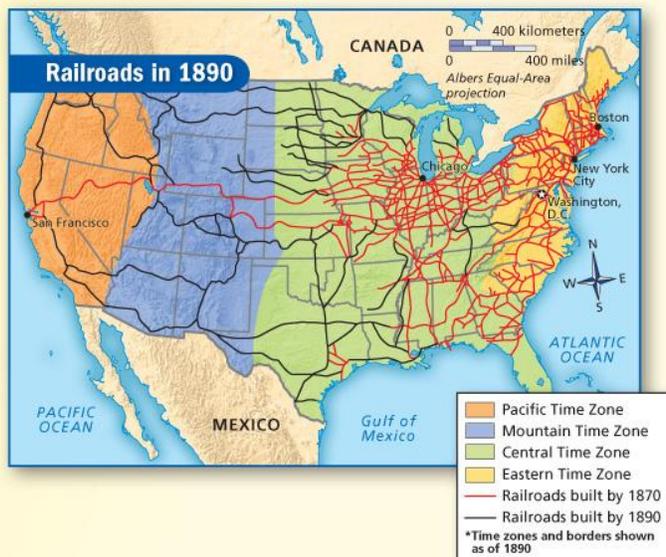


Source: Association of American Railroads;
Historical Statistics of the United States: Colonial Times to 1970

The Growth of Railroads



Time Zones Before railroads, each community established its own time. In order to create sensible schedules, the railroad companies divided the country into four time zones. Each zone was one hour apart from the zone on either side of it.



This advertisement shows the "Hotel" car introduced by George Pullman in 1867. It had both sleeping and dining facilities and greatly improved the experience of rail travel.

Primary Source An Age of Invention

Lightbulbs and Vacuum Cleaners The late 1800s could be called the age of invention. The inventions helped change the everyday lives of Americans.

▼ Alexander Graham Bell's first phone



In 1888 George Eastman marketed the Kodak camera. After taking 100 pictures, a user could send it back to the company. The developed photos and a reloaded camera



were returned to the customer by mail. ▲



▼ Alexander Graham Bell patented the telephone in 1876. There were two million in use by 1900.



◀ Thomas Edison's invention of the phonograph in 1877 attracted worldwide attention.



Primary Source Factors of Production

"I am a woman who came from the cotton fields of the South. I was promoted from there to the wash-tub. Then I was promoted to the cook kitchen, and from there I promoted myself into the business of manufacturing hair goods and preparations. . . . I have built my own factory on my own ground."

—Madam C. J. Walker, quoted in *On Her Own Ground*



▲ Madam C. J. Walker, American entrepreneur

Land
Natural resources



Labor
Human skills and effort



Capital
Buildings, tools, equipment



Entrepreneurs People bring together the factors of production to create products and services. They accept the risk of running a business to earn a profit.

Products and Services



Economics & History

During the late 1800s, vertical and horizontal integration helped businesses grow into monopolies.

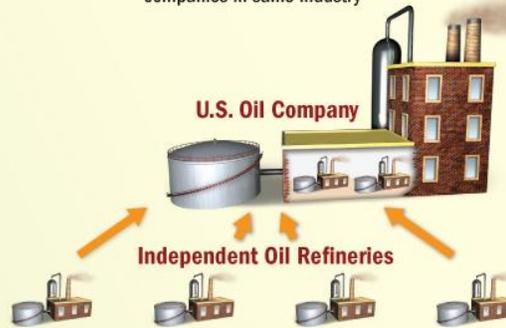
Vertical Integration

Purchase of companies at all levels of production



Horizontal Integration

Purchase of competing companies in same industry



By the Numbers Cost of Living

Working for a Living For industrial workers in the early 1900s, life was difficult. Most family members, including children, worked for long hours and low pay. Employers often hired and paid on a weekly or daily basis. A worker did not get paid if he or she was unable to work because of illness or if an employer closed the factory because business was slow.

Average Hourly Wages*	Average Expenses*
Bricklayers: 50¢	Rent: \$4-10 per month
Plasterers: 50¢	Butter: 22¢ per pound
Newspaper compositors: 36¢	Milk: 6¢ per quart
Machine woodworkers: 25¢	Bread: 5¢ per loaf
Construction workers: 17¢	Rib roast: 13¢ per pound
Metalworkers: 16¢	Postage: 2¢ per ounce

(*in Chicago, 1903)

(*in Chicago, 1903)

The Labor Movement, 1877–1914

NATIONAL GEOGRAPHIC



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| <ul style="list-style-type: none"> 1 1877 Great Railway Strike
Workers protest pay cuts 2 1886 Haymarket Affair
Labor rally ends in violence 3 1892 New Orleans
Workers from 42 unions demand shorter hours and better pay 4 1892 Homestead Strike
Steelworkers protest wage cut | <ul style="list-style-type: none"> 5 1892 Silver Mine Unrest
State jails hundreds of striking workers 6 1894 Pullman Strike
Federal troops end riots 7 1902 Anthracite Coal Strike
Miners strike to win union recognition 8 1914 Ludlow Massacre
State militia burns striking miners' tent colony |
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Unions Struggle After the Civil War, labor leaders sought to organize large national unions. In the late 1800s, however, government opposition, internal divisions, and public disapproval limited the movement's progress.

◀ Unions gained strength in the late 1800s and worked more actively for workers' rights.

▼ Labor unrest during the Pullman Strike, 1894

