



## CHAPTER 4

# The Triumph of Industry

**SS.912.A.3.2** Examine the social, political, and economic causes, course, and consequences of the Second Industrial Revolution that began in the late 19th century.

**SS.912.A.3.3** Compare the First and Second Industrial Revolutions in the United States.

**SS.912.A.3.4** Determine how the development of steel, oil, transportation, communication, and business practices affected the United States economy.

**SS.912.A.3.5** Identify significant inventors of the Industrial Revolution, including African Americans and women.

**SS.912.A.3.13** Examine key events and peoples in Florida history as they relate to United States history.

### Names and Terms You should Know

Market economy	Thomas Edison	Entrepreneur
Capitalism	Wilbur and Orville Wright	Andrew Carnegie
Innovation	Madame C. J. Walker	John D. Rockefeller
Second Industrial Revolution	Elijah McCoy	J. P. Morgan
George Pullman	Sarah Goode	Vertical integration
George Westinghouse	Garrett Morgan	Horizontal integration
Bessemer process	Lewis Howard Latimer	Trusts
Samuel Morse	Jan Ernst Matzeliger	Monopoly
Telegraph	Mail-order house	Sherman Antitrust Act
Alexander Graham Bell	Corporation	Henry Flagler
Transatlantic cable	Stock	

## Florida "Keys" to Learning

1. In the decades following the Civil War, Americans experienced a "Second Industrial Revolution." The first Industrial Revolution, 70 years earlier, had been based on the use of the steam engine and the new factory system. The Second Industrial Revolution witnessed the expansion of the railways, increased production of steel, the introduction of telecommunications and electricity, and the emergence of a truly national market.

2. Many factors prepared the way for America's Second Industrial Revolution. The United States possessed abundant natural resources, including water, timber, coal, iron ore, and oil. A growing population provided labor. The free enterprise system and the American work ethic encouraged individual initiative, entrepreneurship, and economic growth. The government provided a system of laws, established patents and copyrights, regulated the currency, sold public lands, and established tariffs favorable to growth.

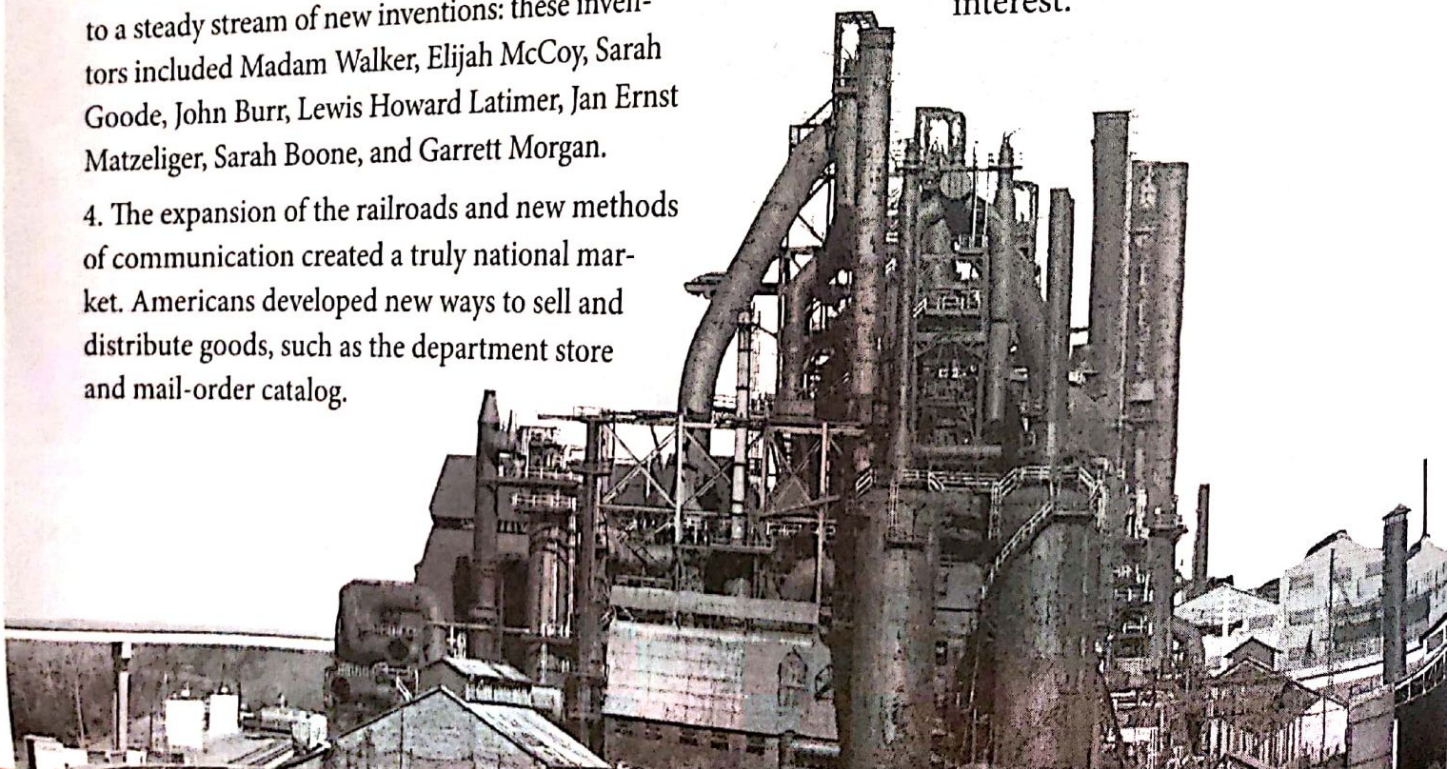
3. New inventions helped to trigger the Second Industrial Revolution. These included the Bessemer process for making steel, the sewing machine, telegraph, telephone, electric light bulb, typewriter, elevator, refrigerated railway car, and cash register. African-American men and women contributed to a steady stream of new inventions: these inventors included Madam Walker, Elijah McCoy, Sarah Goode, John Burr, Lewis Howard Latimer, Jan Ernst Matzeliger, Sarah Boone, and Garrett Morgan.

4. The expansion of the railroads and new methods of communication created a truly national market. Americans developed new ways to sell and distribute goods, such as the department store and mail-order catalog.

5. New forms of doing business, such as the corporation, made it easier to raise the huge sums of money required by heavy industry. Large enterprises enjoyed certain economies of scale. They could purchase large quantities of goods at a discount, or even acquire their own sources of supply. They could design larger production facilities and take full advantage of mechanization and the latest technologies. They could also engage in cutthroat practices against competitors and equally harsh tactics against their own workers.

6. The entrepreneurs who built these enterprises—among them, Andrew Carnegie in steel, John D. Rockefeller in oil, and J. P. Morgan in electricity, banking and steel—amassed immense personal fortunes. Many of the richest gave part of their fortunes away through acts of philanthropy.

7. The federal government attempted to prevent some of the worst abuses of "Big Business" through legislation. The Interstate Commerce Act (1887) prevented unfair practices by railroads. The Sherman Antitrust Act (1890) allowed the government to break up monopolies that engaged in harmful business practices against the public interest.



# America's Second Industrial Revolution



In 1860, most Americans were farmers living in the countryside. They made most things for themselves—from clothes to furniture—and bought only a few small luxuries or scarce items in the local general store or from a traveling peddler. People depended on torches or whale oil lamps once the sun went down. American manufacturing consisted mainly in making textiles and ironwares, and in processing foods. Railroads and canals linked together Northeastern cities but much of the American West was still unsettled. Many Americans had limited contact with the world outside their own community in the course of a lifetime.

By 1920, the United States had changed dramatically. Half of all Americans now lived in cities. Large corporations produced goods for the entire nation. Railroads and telephone lines spanned the country from coast to coast. Americans bought their goods in department stores, chain stores, specialty shops, or from mail-order catalogs. Electric lights illuminated the evening hours, and a large number of factories were driven by electricity. People went to motion picture shows for entertainment. The use of the automobile was spreading. America had become the world's leading industrial power. How did all these great changes come about?



## Background: The Foundations for Economic Growth

Economists generally agree that the foundations for America's spectacular economic growth had already been laid by the end of the Civil War.

### 1. Abundant Natural Resources

The United States was generously endowed with valuable natural resources: fertile soil, swift-flowing streams, vast quantities of timber, and rich deposits of coal, iron ore, oil, phosphates, and copper.

### 2. The "Free Enterprise" System

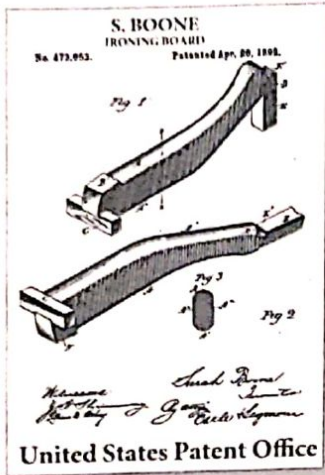
The United States enjoyed the benefits of the "free enterprise," or **capitalist**, system of economic organization. Under this system, tools, factories, and other means of production (including the money needed to buy these things)—known as *capital*—are privately owned. People are free to buy and sell goods and labor on an open market. For this reason, this is also known as a **market economy**. The producers of better and cheaper goods are generally able to compete

more effectively and stay in business. The market acts to eliminate less efficient producers. While each person pursues his own interest, the market guides all individual activity towards the most efficient means of production.

A competitive "work ethic" strengthened belief in the virtues of the free enterprise system. American culture emphasized individualism and material success. American individualism encouraged entrepreneurs, farmers, and laborers to work hard. The nineteenth-century philosophy of **Social Darwinism** likewise stressed the necessity of free competition. Based on the evolutionary theory of biologist Charles Darwin, Social Darwinists believed that the most successful individuals were those endowed with superior talents who had the ability to adapt, survive, and thrive. Wealthy people often viewed poverty as the fault of the poor themselves rather than as the product of circumstances or of injustices in the social system.

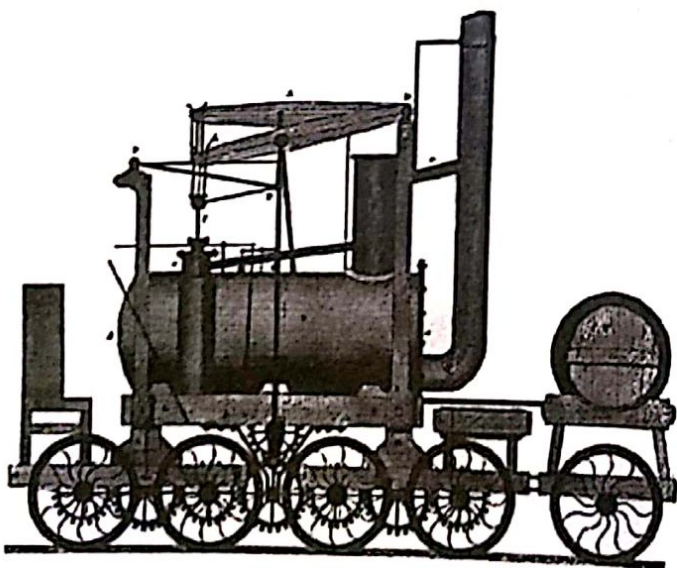
### 3. The Role of Government

Under the theory of “*laissez-faire*” capitalism, the government was supposed to interfere in the free market as little as possible. Although the government officially followed this “hands-off” policy, it actually encouraged industrialization in many ways. The **patent system**, established in the U.S. Constitution, encouraged inventiveness by guaranteeing an inventor exclusive rights to the use of his or her invention



for a limited period, if a *patent* was filed and issued. The aim of this system was to encourage inventors to share their discoveries and innovations with the public, secure in the knowledge that they could reap the benefits of their invention for a reasonable length of time.

**Tariffs** protected American manufacturing from foreign competition by imposing customs duties on foreign-made goods. Other laws protected property and business agreements (*contracts*). Congress had the power to regulate the currency and banks. Finally, federal land policies encouraged westward expansion and development. Grants of franchises to railroad companies over vast tracts of federal land encouraged the construction of railroads.



### 4. The Legacy of the First Industrial Revolution

In the late 18th century, the “Industrial Revolution” in Great Britain introduced the use of steam power and the mass production of goods in factories. The United States became the first nation to follow Britain’s lead. By the 1850s, the use of steam power was firmly established in the United States. Northeastern states became the main centers of American manufacturing. Steamboats and railroads began linking together distant regions of the country. In the South, railroads and steamboats led to an expansion of the “Cotton Belt,” producing raw cotton for export to British factories. The Midwest produced livestock and wheat for both the Northeast and the South.

### 5. The Economic Stimulus Provided by the Civil War

The value of Northern manufacturing doubled in the decade of the Civil War. Wartime needs for uniforms, guns, processed foods, and other goods stimulated production. Huge wartime profits were re-invested in manufacturing. The abolition of slavery at the end of the war united the North and South in a giant free-labor, free-market economy.

Finally, the secession of the South temporarily freed Northern Congressmen to enact federal laws favorable to the growth of Northern industry.

#### Civil War Legislation Encouraging Economic Growth

**Morrill Tariff** (1861) was enacted to protect American manufacturing from European competition.

**National Banking Acts** (1863 and 1864) created a national banking system through nationally chartered banks and a national currency through the regulation of bank notes.

**Homestead Act** (1862) offered free land to settlers occupying farms in the West.

**Morrill Act** (1862) gave land grants to states to support technical and agricultural colleges.

**Pacific Railway Act** (1862) gave federal loans and land grants to railroad companies to complete a transcontinental railroad.

## The Historian's Apprentice

- ▶ Create your own illustrated concept map or web showing those factors that set the stage for America's spectacular economic growth in the late 19th century.
- ▶ Use the Internet or your school library to conduct further research on one of the factors supporting American economic growth. Then write a brief report describing that factor and explaining why it was important.

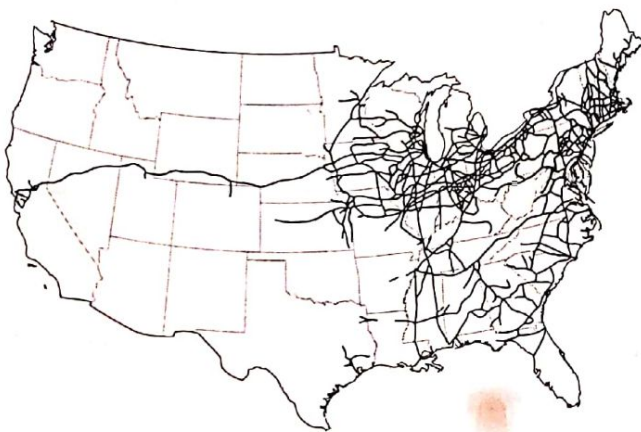
## America's Second Industrial Revolution: Emergence of the Modern Industrial Economy

After the Civil War, America was united by new railroad lines, making possible a truly national market for the first time. Manufacturers were able to produce and sell goods more easily across the entire nation. New forms of business organization enabled producers to raise the vast sums of money needed to cover their larger production and distribution costs. These developments transformed how goods were made and used. Historians generally refer to this new burst of economic growth as America's "**Second Industrial Revolution.**"

### The Spread of the Railways

By the end of the Civil War, the United States had 35,000 miles of railroad track. Only 25 years later, it had more than five times that mileage—in fact, more

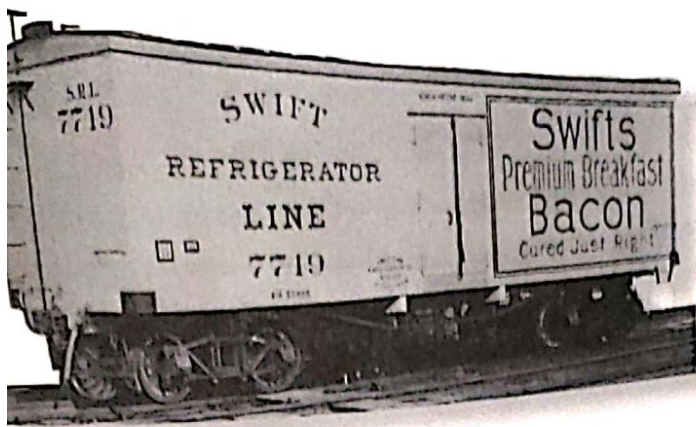
than all of Europe. The greatest growth in this period occurred in the West. The first transcontinental railroad was completed in 1869; four additional transcontinental lines were built by 1893. Soon other lines were extended from these first trunk lines. Federal and state governments encouraged railroad construction by granting franchises over vast tracts of land to railroad companies. Steel rails replaced iron ones. A uniform track width (or "gauge") was adopted, making it possible to travel on the tracks of different railroad companies without disruption. The railroads were made safer and more comfortable by laying double tracks. **George Pullman** invented the sleeping car, and **George Westinghouse** invented the air brake, which stopped all the cars of a train at the same time. Gustavus Swift developed the first



U.S. Railroads in 1865



U.S. Railroads in 1890



refrigerated railroad cars. Meat was stored in the bottom of a heavily insulated railroad car, while chunks of ice were placed at the top.

Railroads affected just about every aspect of American life. Railroad schedules created the need for uniform time zones across the country. The construction of the railroads provided a tremendous stimulus to the steel, iron, and coal industries. The railroads brought settlers to the Great Plains and connected them with urban markets in the Northeast. Railroads encouraged the growth of cities by enabling workers to commute and allowing farmers to ship their crops and livestock over longer distances. It became possible to slaughter cattle, hogs, and sheep in the stockyards of Chicago, and then to pack and ship the cuts of meat to urban markets in the Northeast. Railroads connected raw materials to factories, and factories to consumers across the nation. Railroad hubs like Chicago and Atlanta mushroomed into major urban centers. Railroads transformed America into a nation on the move as never before.

### Technological Innovation

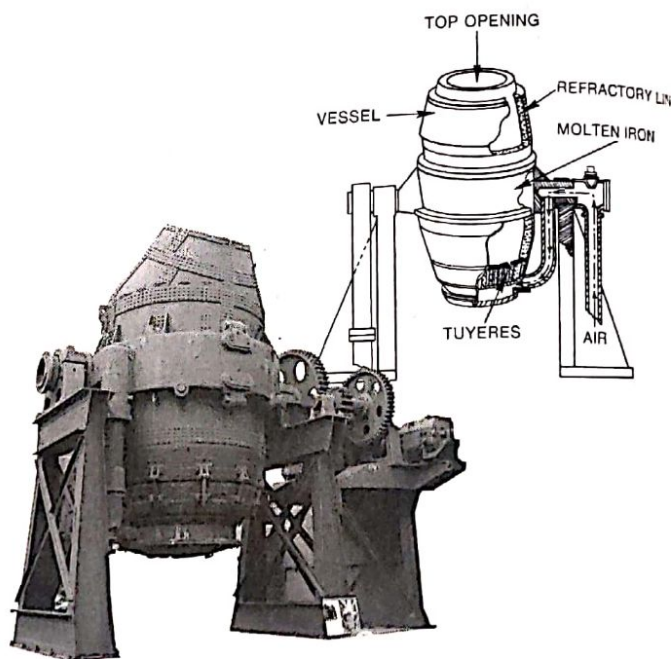
Just as the "First Industrial Revolution" had depended upon new inventions and innovations, such as the invention of the steam engine and its adaptation

for manufacturing in factories, the "Second Industrial Revolution" was also largely based on the twin processes of invention and innovation. The patent system continued to encourage Americans to create inventions and to share those inventions with others. Some of the most striking advances occurred in the fields of steel, communications, electricity, oil and transportation.

### Steel

In Britain, Henry Bessemer invented the "Bessemer process" in 1855, making the production of steel much more economical. Bessemer blew air through molten pig iron (created by heating iron ore with carbon) to remove impurities before it turned into steel.

His new process took place in a lined "Bessemer converter." Hot pig iron was poured into the mouth of the converter and air was blown in through the sides. Impurities burned off the top as gas or dropped to the bottom of the converter as "slag."



### Invention or Innovation?

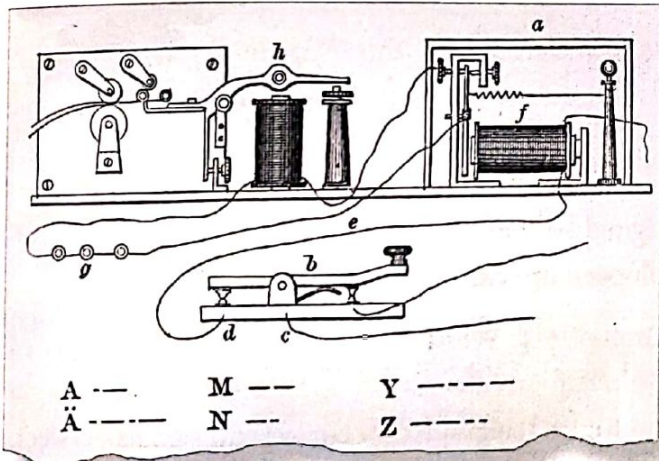
**Invention** is the process of developing something for the first time, especially new machines, methods and products. **Innovation** refers to the process of putting these new ideas and methods into practice. An inventor might design and build the first refrigerator; an innovator is the first to build a factory that manufactures them.

The Bessemer process reduced the cost of making steel by more than 80%. Cheaper steel made it possible for Americans to produce thousands of miles of railroad track and to build giant steamships, towering steel suspension bridges, massive turbines and engines, and skyscrapers made with steel beams.

## Communications

A series of exciting new inventions, most coming from America, completely revolutionized the field of communications.

**Samuel Morse (1791–1872)** Morse's wife suddenly fell ill and died while she and Morse were apart. This heart-stricken painter then began a search for a faster means of long distance communication. Morse developed the **telegraph** using electromagnetism. He also invented a code of long and short spaces capable of transmitting the alphabet. By breaking and closing the circuit, the telegraph operator could move a distant telegraph device on the same circuit. Morse's telegraph made instant communications possible, even over long distances.



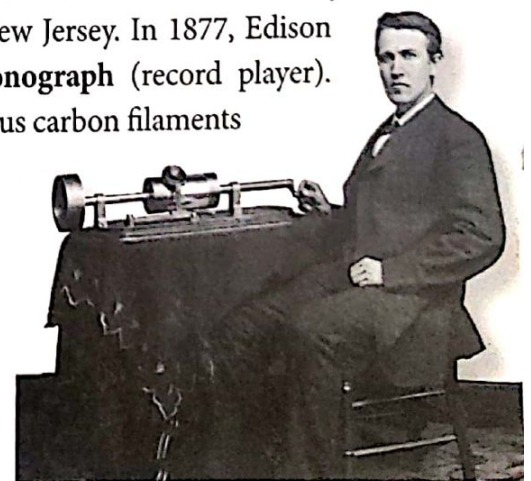
**Cyrus Field (1819–1892)** Field made a fortune in paper manufacturing. He then became interested in laying the first **transatlantic cable** to carry telegraphic messages between America and Europe. Field organized a company that successfully laid the first cable in 1858, but the cable failed after only three weeks. Field organized a new company and laid a heavier and more durable cable seven years later.

**Alexander Graham Bell (1847–1922)** The mother and wife of this Scottish immigrant were both deaf, while his father and grandfather had both been teachers of speech. Bell began investigating how to reproduce the sounds of speech electronically to help the deaf. He patented the **telephone** in 1875, which carries a variable current to a receiver capable of reproducing the human voice. Bell's invention made it possible to communicate over long distances using natural speech instead of Morse code.



## Electricity

Both the telegraph and telephone made use of electrical current. A young telegraph operator, **Thomas Alva Edison**, invented a new "stock-ticker" machine for following the prices of stocks; he also invented an improved telegraph machine. With the money he earned from these first inventions, Edison hired a team of researchers to work in his laboratory in Menlo Park, New Jersey. In 1877, Edison patented the **phonograph** (record player). After testing various carbon filaments (wires) and gases, Thomas Edison invented a practical **electric light bulb** in 1879, which could burn brightly





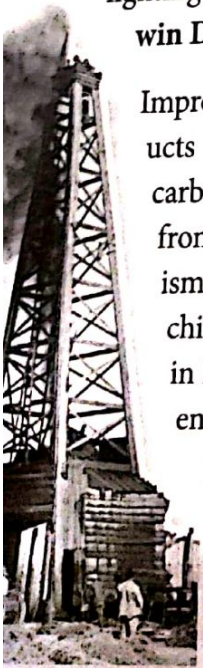
for many hours. Edison and his team of researchers developed a whole series of other inventions, including motion pictures, an improved battery, and the first electric power station. In his lifetime, Edison filed more than a thousand patents.

Electricity was also used to run the new **electric motor**, based on the application of electromagnetism to create motion. Electric motors proved to be more adaptable to different uses than steam engines. By the end of the 19th century, electricity was being used to power factories and to operate electric streetcars and subway trains.

**Nicola Tesla** was a Serbian immigrant who came to the United States in 1884 to work for Edison. Two years later, Tesla started his own company. Tesla challenged Edison's reliance on direct current and developed a motor for producing alternating current ("AC"), which could travel longer distances. George Westinghouse, the inventor of the air brake, became Tesla's financial backer. In 1893, they used their high-voltage alternating current to light up the Chicago World's Fair. Tesla also conducted early experiments with X-rays and radio waves.

## Oil

In the early 19th century, people had used the blubber (or fat) of whales to make oil for lubrication and lighting. The first oil well was drilled by **Edwin Drake** in Pennsylvania in 1859.



Improvements in refining allowed products from **petroleum**—a liquid hydrocarbon formed over millions of years from the decayed remains of sea organisms—to be used for lighting and machine lubrication. Kerosene was used in lamps in millions of homes. By the end of the century, **gasoline**, another petroleum derivative, was being used to run the new internal combustion engine.

## Other Industries

Invented at the end of the 19th century, the **internal combustion engine** used controlled explosions of gasoline to move pistons in a cylinder. It was small yet powerful enough to run automobiles, made by **Henry Ford** and other manufacturers. The internal combustion engine also powered the first airplane, invented by two Ohio bicycle makers, **Wilbur** and **Orville Wright** in 1903.

Other important American inventions in these decades included the typewriter, vacuum cleaner, cash register, fountain pen, linotype (a machine for printing newspapers), and an improved sewing machine.

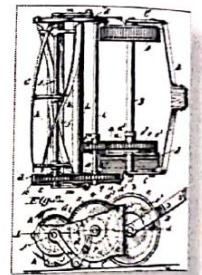
## Women and African-American Inventors

Women had fewer opportunities but could also be inventors. For example, **Josephine Cochran** (1839–1913) was a wealthy woman who invented the first automatic dishwasher.



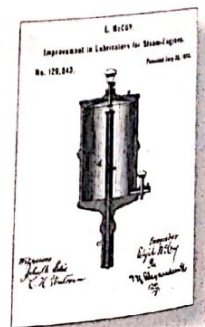
Although often deprived of opportunities for educational and professional advancement, African Americans also made significant contributions to the innovations of this period.

**John Albert Burr** This African-American inventor patented an improved rotary-blade lawnmower in 1899. Its blades were designed so that they would not get plugged up with lawn clippings.



**Granville T. Woods** (1856–1910) patented a series of inventions for trains and streetcars, including a multiplex telegraph that could send signals between stations and moving trains.

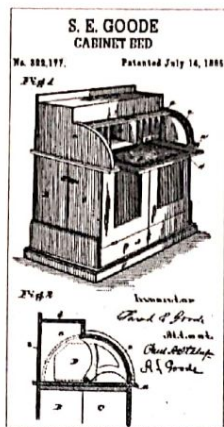
**Elijah McCoy** (1844–1929) Born to fugitive slaves who had fled to Canada, this African-American inventor trained as a mechanical engineer in Scotland before returning to the United States, where he opened up his own machine shop. McCoy obtained several patents for lubricators for steam engines. These lubricators,





or oil-drip cups, automatically added oil to lubricate the engines of railroad locomotives and steamships, enabling them to run better.

**Sarah Goode** (b. 1850) Born into slavery, she became the first African-American woman to receive a U.S. patent. After the Civil War, she moved to Chicago where she opened a furniture store. In 1885, she received a patent for a fold-away bed that could be tucked into a desk. This was especially useful for the millions of Americans living in small apartments.



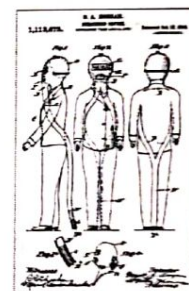
**Madam C. J. Walker** (1867-1919) American cosmetic companies generally ignored the needs of African-American women. Born to former slaves in Louisiana, Madam Walker made a fortune developing and selling hair care and cosmetic products for African-American women. Because of the general lack of indoor plumbing, many people washed their hair infrequently and suffered from scalp diseases. Madam Walker invented new remedial shampoos based on sulfur. She may have been the first African-American millionaire.



**Lewis Howard Latimer** (1848-1928) The son of fugitive slaves, he served in the navy towards the end of the Civil War. Latimer became a patent draftsman and worked for both Alexander Graham Bell and Thomas Edison. In 1881, he patented an improved method for producing the carbon filaments used in the new electric light bulb.

**Jan Ernst Matzeliger** (1852-1889) Born in South America, he moved to the United States at the age of 19 and worked in a shoe factory. In 1883, Matzeliger was awarded a patent for inventing a machine that attached the upper part of a leather shoe to its sole (the bottom of the shoe). By hand, an expert shoemaker could attach no more than 50 soles a day; with the new machine, a worker could attach 150 to 700 soles a day. Matzeliger's invention cut the price of shoes in half.

**Garrett Morgan** (1877-1963) Born in Kentucky to former slaves, he moved to Ohio at the age of 14 in search of work. Morgan began repairing sewing machines and later opened his own shop. He discovered that he had a talent as an inventor. Morgan developed a safety hood and smoke protector for firefighters—a type of gas mask that used a wet sponge as a filter and a long tube that dropped to the ground for the intake of air. He used his safety hood to save workers in an explosion in 1916. Morgan also patented a type of traffic signal for automobiles in 1923.

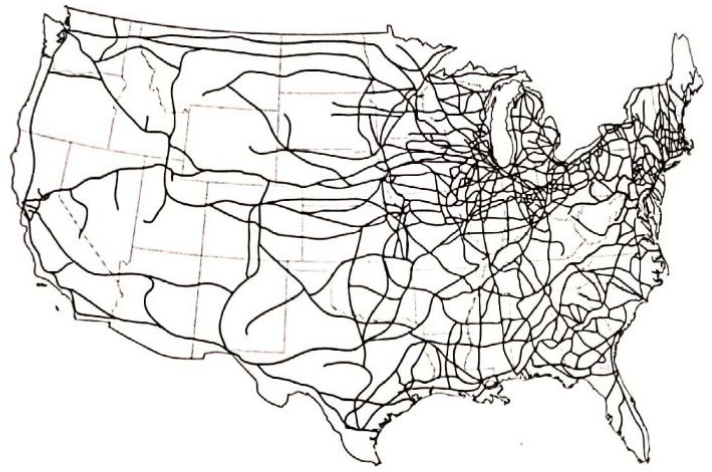


## The Historian's Apprentice

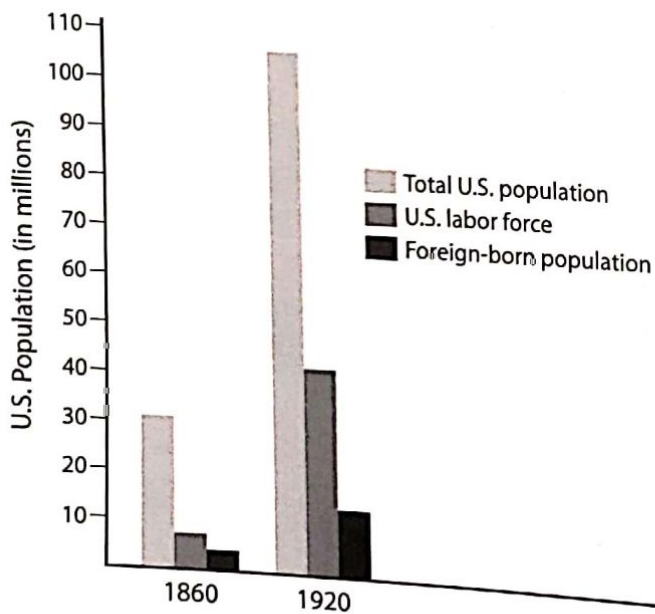
- ▶ Was the "Second Industrial Revolution" of greater importance to Americans than the "First"? Write an essay defending your point of view.
- ▶ Make your own chart or timeline showing the most important inventions of this period with their inventors. Be sure to include an explanation of how each invention changed the ways that people lived.
- ▶ Write an imaginary newspaper headline and article announcing the patenting of a new invention, such as the telephone or electric light bulb.
- ▶ Which invention from this period do you think had the greatest impact on society? Write an essay justifying your selection.
- ▶ How was the U.S. patent system important to the development and sharing of these American inventions? Write a paragraph explaining its role.

## A Growing Population

The use of machinery and the increased acreage under cultivation made it possible for American farmers to feed many more people than ever before. Between 1860 and 1920, the population of the United States more than tripled. This increase was fueled in part by a constant stream of European and Asian immigrants. Population growth created conditions favorable for business growth: there was a steadily rising demand for goods and a ready supply of cheap labor.



	1860	1920
Total U.S. population	31,443,321	106,021,557
U.S. labor force	7,442,705	42,918,000
Foreign-born population	4,138,697	13,920,692



\* Source: U.S. Census; Weiss, *US Labor Force Estimate and Economic Growth*

## The Emergence of a National Market

The spread of railroads and innovations in communications and manufacturing led to the replacement of separate regional markets by a single national market. Railroads made it cheaper to transport goods to other parts of the country, the telegraph

and telephone improved communications, the population itself expanded, and new methods of advertising and selling were developed. More of the population became concentrated in large cities, where goods were easier to sell. Large corporations developed specialized marketing and advertising departments. New types of retailers—department stores, chain stores (Woolworths), mail-order houses (Sears & Roebuck), and specialty shops—bought items in large quantities from producers at a discount, in order to sell to consumers at a profit.



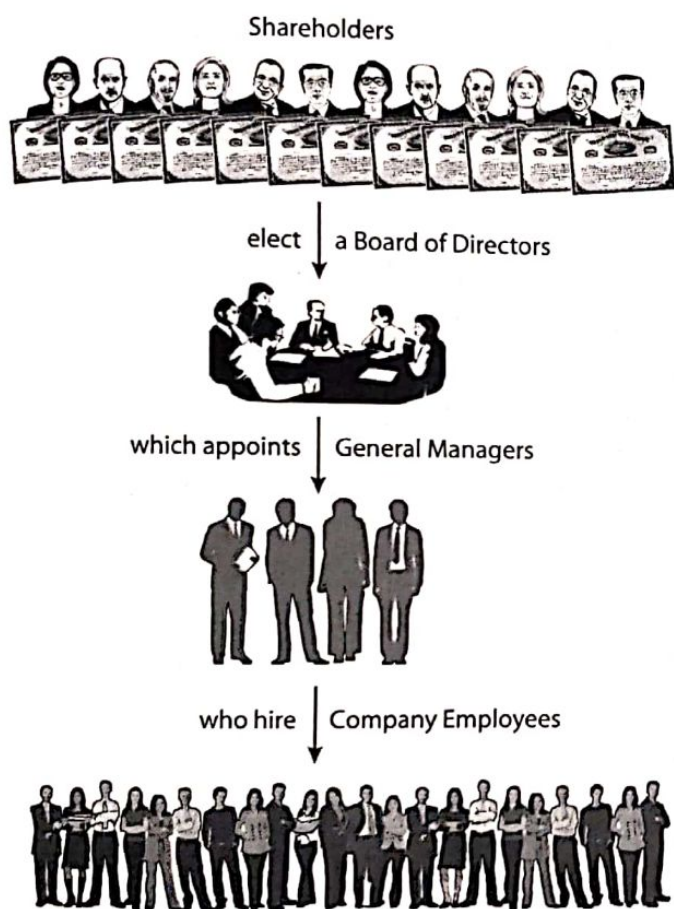
While the growing population needed consumer goods, expanding industries needed steel, coal, oil, and machinery. National producers could make and ship these capital goods more cheaply than local producers. The high investment costs of modern mass production required a large market to remain profitable.

## New Business Practices: The Rise of the Corporation

Before the Civil War, most American businesses had been owned either by an individual or by a group of partners. Owners were personally **liable** (responsible) for the debts of their company. When owners died, their business usually dissolved.

In the years following the Civil War, a new form of enterprise became more common. A **corporation** is a company chartered by a state and recognized in law as a separate "person." The corporation issues **stocks**, or shares of ownership in the corporation, to investors.

Each stockholder is a partial owner of the corporation and receives a share of its profits in the form of dividends. Stockholders elect a board of directors, who in turn appoint a general manager (or "CEO") to run the company.

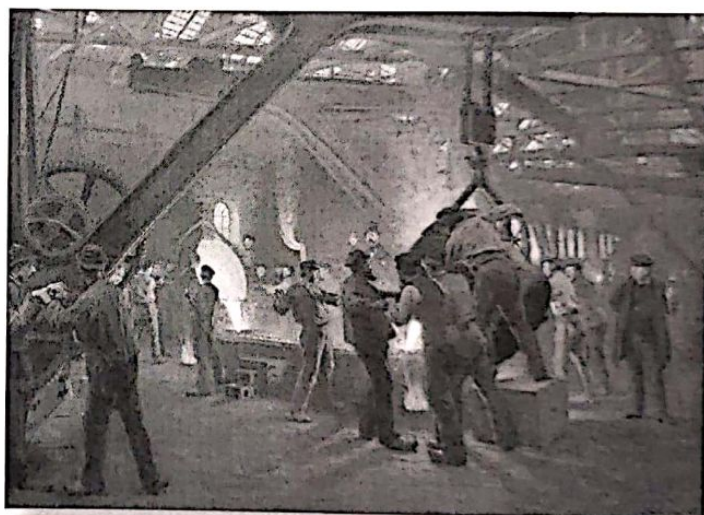


Corporate stocks are transferable and can be inherited or sold. The death of a stockholder does not affect the survival of the corporation, which can continue indefinitely. Nor are individual shareholders personally responsible for the debts of the company, although they do risk losing their investment.

Building railroads, producing steel, refining petroleum, laying telegraph and telephone wires, and building factories required enormous sums of capital investment. By issuing stocks, corporations were



able to raise greater sums of money than ever before. Individuals were able to pool their money together by investing in a corporation. The corporate form of business organization thus allowed the creation of larger businesses. Large-scale enterprises enjoyed many advantages over smaller competitors.



**Economies of Scale in Production** Larger businesses could build larger production facilities and modernize more rapidly. Such facilities were often more efficient because they could introduce a greater division and specialization of labor, more mechanization, and an increased use of water, steam, or electrical power. They could also invest more money in developing a superior factory design, such as the use of assembly lines.

**Cheaper Sources of Supply** Giant corporations could obtain raw materials more cheaply from suppliers because the large size of their bulk

purchases gave them greater bargaining power and the ability to obtain discounts. Eventually some large corporations even acquired their own sources of supply. A few companies took control over all stages of production and distribution, known as **vertical integration**: they owned their own sources of raw materials, their own transportation networks, and their own manufacturing facilities.

**More Efficient Management** The larger size of corporations allowed them to develop better management. Large corporations generally had specialized departments headed by expert managers—accounting, purchasing, processing, marketing, and research and development. They adopted the practice of cost-accounting—determining the exact cost of each step in the production and distribution process—to guide their decisions. They pioneered new methods for marketing their products, such as the use of brand names. Corporations could afford to hire engineers, chemists, and scientists to conduct continuous research to improve their existing products and develop new products.

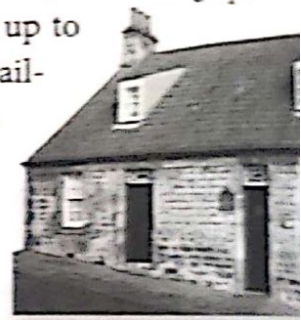
### The Entrepreneurial Spirit

The creation of the modern industrial economy would not have taken place without the guiding hand of the great entrepreneurs. **Entrepreneurs** are those who take risks by engaging in business to make a profit. The leading entrepreneurs of America's "Second Industrial Revolution" considered themselves to be "captains of industry" who adopted new technologies and took advantage of new forms of corporate organization to make cheaper and better products. They had the vision to see the possibilities created by the latest advances in transportation, technology and corporate finance. They also had the drive to sacrifice the interests of others to their own ambitions. Critics called them "Robber Barons" who exploited workers, used dishonest tactics, and exercised their monopoly control over individual industries to overcharge the public. They amassed legendary personal fortunes and frequently turned to **philanthropy** in their old age.

## A Portrait Gallery of the Great Entrepreneurs of the Gilded Age

Because of the displays of great wealth by leading industrialists, often obtained through unethical tactics and covering serious social problems, historians sometimes refer to America's Second Industrial Revolution as the "Gilded Age." A *gilded surface* has a thin layer of gold on top concealing a less expensive metal beneath. The name is taken from the title of a novel by Mark Twain and Charles Dudley Warner, published in 1873, which humorously criticized greed and corruption in American society.

**Andrew Carnegie (1835–1919)** was a penniless immigrant from Scotland as a child. He worked as a factory worker, messenger boy, and telegraph operator. He worked his way up to a managerial position in a railroad company and became friends with the owner, who helped him with his own investments. During the Civil War, Carnegie helped manage Union railroad lines.



Carnegie's birthplace

After the war, Carnegie left the railroad industry to start the Keystone Bridge Company. He hoped to build bridges of iron instead of wood. His company built the first bridge to carry trains across the Mississippi River. To span this distance, he had to build the bridge of steel. Carnegie became one of the first to adopt the Bessemer process for producing steel. He used the corporate form of enterprise to raise additional capital and bought out competing local companies in the 1870s.



He joined with Henry Clay Frick to gain access to Frick's coke operations since coke (*carbon made by heating coal in a furnace without air*) was needed to make pig iron, an essential ingredient for making steel. Carnegie began

Andrew Carnegie in 1878, age 33

producing steel girders for building construction, as well as steel rails for railroad tracks.

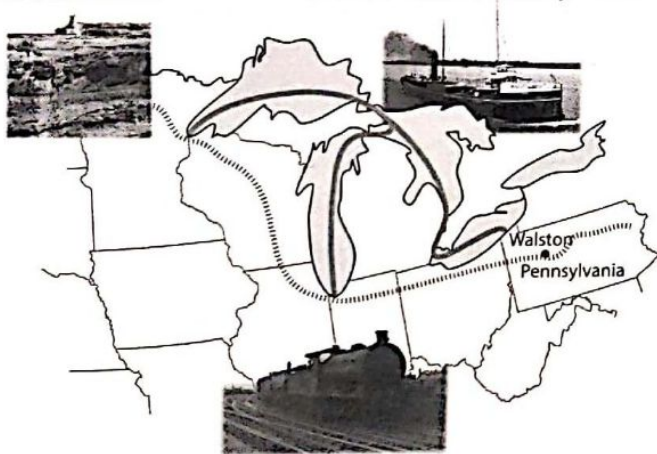
Carnegie hired chemists to improve his production and introduced cost-accounting. He eliminated middlemen and made use of immigrant labor at low wages. Carnegie's workers worked 12-hour shifts, and his mills operated day and night.

Carnegie pretended to be a friend to labor, and so he hid in Scotland while Frick broke the back of the steelworkers' unions during the Homestead Strike (see the next chapter). Carnegie opposed all attempts at worker organization during the 1892 Homestead Strike.

Meanwhile, he bought iron ore mines, a coke works, a limestone company, railroads, and a fleet of ore boats in the Great Lakes. This gave him complete control over all stages of the production and distribution process, known as **vertical integration**.

Iron ore mines in Minnesota

Transport by boat across Great Lakes to steel mills in Pennsylvania



Transport by train to steel mills in Pennsylvania

By the end of the century, Carnegie was producing one-quarter of all the steel made in the United States. He sold his company to J. P. Morgan in 1901 for \$225 million. He spent the rest of his life giving his money away in acts of philanthropy, including millions to establish public libraries and Carnegie Hall in New York City.



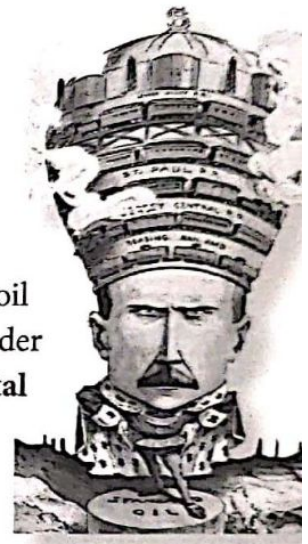
Carnegie, age 78

Carnegie expressed his views on philanthropy in his book *The*

*Gospel of Wealth*. He believed that a rich man should not die with his wealth but should give it away in his lifetime, especially to institutions that promoted self-improvement.

**John D. Rockefeller (1839–1937)** made profits during the Civil War by investing in oil refineries in Ohio. In 1870, he formed the Standard Oil Company, taking advantage of the corporate form of enterprise.

Rockefeller purchased local rivals in the 1870s and expanded to other Northeastern states. He entered into agreements with railroad companies to give him secret rebates for shipping his oil, while they charged higher prices to his competitors. Later, he started building pipelines to transport his oil, bypassing the railroads altogether. In 1882, Rockefeller formed the Standard Oil Trust, the first great industrial trust (see page 73 for an explanation of a trust). It brought 90% of all oil refining in the United States under his control, a form of **horizontal integration** (when one owner controls all companies and facilities at one stage of production of a good or commodity).



"King" Rockefeller

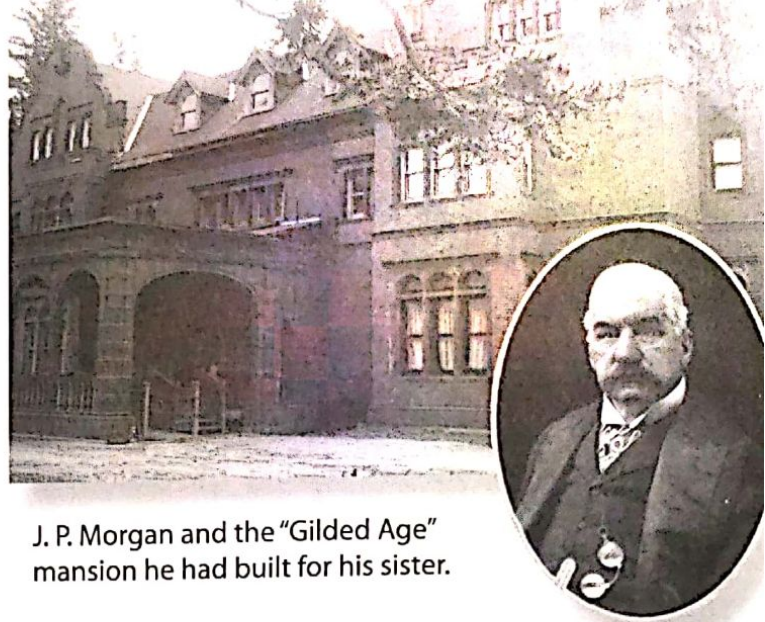
At the same time, Rockefeller lowered the price of kerosene and other oil products by more than 80%. This made it possible for ordinary people to afford to light their homes at night. The demand for kerosene



A Standard Oil Company refinery

soared. Just when the invention of the electric light bulb threatened to make Rockefeller's oil less valuable, the invention of the automobile required gasoline, another product made from oil. Like Carnegie, Rockefeller introduced cost-accounting, hired chemists, eliminated middlemen, used cheap labor, and bought out rivals. Also, like Carnegie, he turned to philanthropy in his old age, giving funds to both education and science.

**John Pierpont ("J. P.") Morgan (1837–1913)** was the son of a banker and gifted financier. Much of his early career was spent reorganizing and consolidating failing railroad companies. But Morgan wanted to start his own industry. In 1892, Morgan helped Thomas Edison to form the Edison Electric Company. Edison opposed the use of alternating current, which he thought was too dangerous. When Edison proved to be wrong, Morgan pushed him out of the company, which he renamed as General Electric, and adopted Tesla's system of alternating current. In



J. P. Morgan and the "Gilded Age" mansion he had built for his sister.

1895, Morgan formed the J. P. Morgan & Company, a commercial and investment banking institution. In 1901, Morgan bought Carnegie's steelworks and joined them with other steel companies to form U.S. Steel, the first billion-dollar company in the United States.

## The Historian's Apprentice

- ▶ Were these leaders of American businesses "Captains of Industry" or "Robber Barons"? Select one of the great entrepreneurs above or others such as Cornelius Vanderbilt, Jay Gould, James Fisk, Andrew Mellon, James Duke, or Henry Flagler. Conduct your own research on the Internet or in your school library. Then present your findings to classmates by pretending to be that entrepreneur. In a short speech to your classmates, justify the actions you took to ensure the success of your business.
- ▶ Choose one of the following industries and write a one-page essay explaining how its development affected the U.S. economy: steel, oil, transportation, or communications.

## The Consolidation of Big Business and the Government Response

The mania for laying new railroad lines led first to speculation and then to financial collapse in 1873. In the **depression** (*a prolonged business downturn with high unemployment*) that followed, successful entrepreneurs like Carnegie and Rockefeller drove many

smaller competitors out of business and bought up their companies or facilities. In other cases, falling prices and "**cutthroat competition**" (*lowering prices temporarily to drive competitors out of business*) led rival companies to join together.

Business consolidations took a variety of forms. **Pooling agreements** were informal agreements to fix prices or divide markets on a regional basis, often used by railroad companies. **Trusts** became popular because various state laws placed restrictions on companies operating in more than one state. To get around these restrictions, stockholders of existing companies gave their stocks over to the board of directors of a “trust” in exchange for “trust certificates,” entitling them to dividends based on the profits of the entire trust. The trustees exercised control over the different companies in the trust and managed them as a single enterprise. By combining all the companies producing a particular product (or stage of production) into a single trust, the trustees could obtain complete control over that commodity. Similar to a trust, a **holding company** was a company that owned a controlling number of shares in other companies.

### The Dangers of Monopoly

The aim of all these forms of business consolidation was to eliminate competition and to establish a **monopoly**—complete control over the production of a good or service. Monopolies had important disadvantages for the general public:

- ▶ Monopolists had less incentive to improve their products since they faced no competition.
- ▶ Monopolists could raise their prices at any time to earn excessive profits. Consumers had no choice but to pay because of the lack of alternative products.

### Early Government Regulation of Business

<i>Munn v. Illinois</i> (1877)	In this case, the U.S. Supreme Court ruled that states could regulate businesses affecting the public “interest,” such as railroads.
<i>Wabash v. Illinois</i> (1886)	Here, the U.S. Supreme Court ruled that states could not regulate railroads running through several states since this was “interstate commerce.” Only Congress could regulate interstate commerce.
<i>Interstate Commerce Act</i> (1887)	In response to <i>Wabash v. Illinois</i> , Congress passed this law against unfair practices by railroads. Railroads were prohibited from pooling agreements or giving rebates. All customers were required to pay the same rates, which were to be “reasonable and just.” Finally, a special regulatory commission was established to enforce the act.
<i>Sherman Antitrust Act</i> (1890)	In this law, Congress forbade all trusts, combinations, and conspiracies that limited or restricted interstate trade. The act simply stated: “Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal.” The language of the act was extremely vague, weakening its effect. In the 1890s, it was even used against labor unions instead of against “Big Business.”
<i>U.S. v. E.C. Knight Company</i> (1895)	In this case, the U.S. Supreme Court ruled that the Sherman Antitrust Act could not be used to break up a monopoly controlling over 90% of all U.S. sugar refining. The Court held that this was a manufacturing monopoly and therefore not within the congressional power to control “interstate trade.” This decision greatly weakened the reach of the Sherman Antitrust Act over “Big Business.”

## The Government Response

During the Gilded Age, the federal government took few steps to curb the power of “Big Business.” In general, government helped business by its absence of regulations or corporate taxes, and its failure to protect either workers or consumers. Under the *laissez faire* ideology of the Gilded Age, government was not supposed to interfere in relations between producers and buyers, or with employers and employees. The operation of the free market was expected to eliminate inefficient businesses, leading to the best and cheapest goods. A series of Supreme Court decisions affirmed that government had no right to interfere in the relationship between employers and their free employees. Meanwhile, business leaders often gave hefty campaign contributions and some even secretly

bribed government officials. They used government support to break up unions and prevent strikes, at the very same time that they argued that government should not interfere in business.

Reformers therefore demanded that the government take measures to regulate “Big Business” and to prevent the formation of monopolies. The abuses of some businesses were so glaring that U.S. lawmakers finally acknowledged that monopolies posed a greater danger to free enterprise than the risks of government interference. The first **anti-trust laws** (*laws against monopolies*) were weakly enforced, but they established the fundamental principle that Congress could regulate business in some circumstances.

## The Historian's Apprentice

- ▶ What is the cartoonist's view of Andrew Carnegie and trusts?
- ▶ Write a newspaper editorial agreeing or disagreeing with the Supreme Court's decision in *U.S. v. E.C. Knight Company*. Be sure to interpret the Sherman Antitrust Act in your editorial.
- ▶ Write an outline for an essay on the causes or the consequences of the Second Industrial Revolution.
- ▶ Write a three-paragraph essay on the rise of corporations and the effects of business consolidation and other business practices on the United States economy during the “Gilded Age.”



“A trustworthy beast”

## Florida in Focus

Any study of Florida in the late nineteenth century would be incomplete without mentioning **Henry Morrison Flagler** (1830–1913). Flagler was a partner of John D. Rockefeller in the creation of Standard Oil Company, which gained monopoly control of all oil refineries in the United States by 1892. Rockefeller gave Flagler full credit for its formation. “I wish I had the brains to think of it,” he said, but “it was Henry M. Flagler.”

From his first visit to Florida in 1876 until his death in 1913, Flagler was fascinated with Florida. He devoted much of his time and money to developing the Sunshine State. In 1887 and 1888, he built the Ponce de Leon Hotel (now Flagler College), a luxury resort in St. Augustine. He later built similar luxury hotels in Palm Beach and Miami, forming the basis for the tourism industry in Florida. Flagler's enterprises also included railroads, real estate, and shipping. Flagler's



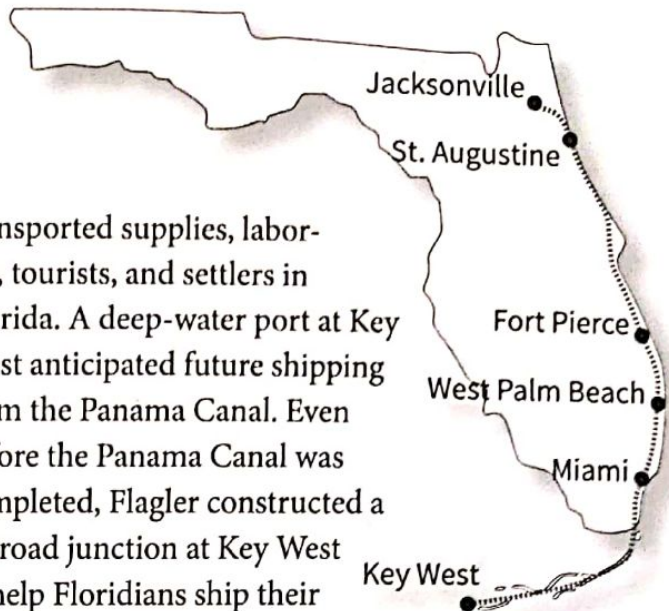


contributions to the growth of Miami were so important that he was given an unofficial title as the “Father of Miami”.

It was in railroad building that Flagler had his greatest impact.

With his vast wealth and grants of land and rights-of-way obtained from both the State of Florida and private landowners, Flagler was able to buy and build railroads connecting the entire length of Florida from Jacksonville to Miami, and eventually all the way south to Key West. Flagler merged several smaller railroads together to form the **Florida East Coast Railroad**. His railroad brought tourists to fill his hotels, but also made it possible for Floridians to export their agricultural products, including citrus fruits, vegetables, tobacco and cigars, cotton, beef, and cattle. The same railroads

transported supplies, laborers, tourists, and settlers in Florida. A deep-water port at Key West anticipated future shipping from the Panama Canal. Even before the Panama Canal was completed, Flagler constructed a railroad junction at Key West to help Floridians ship their exports to the Caribbean and beyond. Flagler hoped his railroads would transport both goods and passengers. His railroad to Key West was destroyed by hurricane in 1935, but provided the foundation for the Overseas Highway that goes to Key West today.



## Chapter Review

### Factors behind American Economic Growth

- ▶ Abundant natural resources
- ▶ Growing population provided labor
- ▶ Free enterprise system—market economy: *laissez faire* capitalism encouraged individual initiative
- ▶ Legacy of First Industrial Revolution: use of new source of power (steam); mass production; factory system
- ▶ Role of government:
  - Patents encouraged new inventions.
  - Tariffs protected American manufactured goods.
  - Laws protected property and contracts.
  - Land grants encouraged railroad construction.
  - Government regulated currency and banks.
- ▶ Stimulus of the Civil War—tariffs, Banking Act, Pacific Railway Act, Homestead Act

### America's Second Industrial Revolution

- ▶ Spread of railways
- ▶ Technological innovation
  - Bessemer Process
  - Telegraph
  - Telephone
  - Transatlantic cable
  - Elevator
  - Sewing machine
  - Electric light bulb
  - Internal combustion engine
- ▶ Emergence of national market
- ▶ Rise of corporations (limited liability; ability to raise more capital)
- ▶ Contributions of entrepreneurs

### Spread of Railways

- ▶ Provided stimulus to iron, coal, and steel industries
- ▶ Provided cheaper transportation costs for carrying raw materials and finished goods
- ▶ Forged a national market
  - Henry Flagler—Florida East Coast Railroad