The previous chapter describes the dramatic political changes that followed the American and French Revolutions. Equally profound were the social and economic changes that accompanied what has sometimes been called the Industrial Revolution. Beginning in Great Britain about 1750, the processes of manufacturing were transformed. Britain held the lead in industrialization, but eventually the following changes reached western Europe, the United States, Russia, and Japan.

- **New sources of energy.** The coal-fired steam engine replaced traditional sources of power such as wood, wind, & water. Nations with abundant coal—Britain, Germany, and the U.S.—could benefit from the new technology. Railroad and steamships, fired by the steam engine, created important links between raw materials, industry, and market.

- **New labor-saving technologies.** Phases in textile production once done by hand, such as spinning and weaving, were mechanized. Factories replaced cottage industry and became more efficient through the use of interchangeable parts and the assembly line.

- **Increased standard of living.** The factory system was tremendously productive. Efficiencies of scale and improved transportation links meant cheaper consumer goods for everyone. The accumulation of great wealth provided the capital for further industrialization.

- **New patterns of work.** The factory system transformed rural laborers into industrial workers w/ rigid timetables & strict discipline. Workers faced long hours of tedious & often dangerous work.

- **New social patterns.** Industrialization separated work from home life and created separate spheres for men & women. Women, especially middle-class women, were expected to take care of home and children. Men were expected to work and provide for the family.

- **Urbanization.** Industrial centers grew rapidly through 19th C. Large cities struggled to provide such services as water delivery, sewage disposal, police and fire protection, public education.

### 1. Patterns of Industrialization

**A. Foundations of Industrialization**

1) Coal critical to the early industrialization of Britain in 18th century
   a. Shift from wood to coal, deforestation caused wood shortages
   b. Abundant, accessible coal reserves in Britain

2) Overseas colonies provided raw materials
   a. Plantations in the Americas provided sugar & cotton
   b. Colonies also became markets for British manufactured goods
   c. Grain, timber, & beef shipped from U.S. to Britain after 1830

3) Demand for cheap cotton spurred mechanization of cotton industry
   a. John Kay invented the flying shuttle, 1733
   b. Samuel Crompton invented the spinning “mule,” 1779
   c. Edmund Cartwright invented a water-driven power loom, 1785

4) **James Watt’s steam engine, 1765**
   a. Burned coal, which drove a piston, which turned a wheel
   b. Widespread use by 1800 → productivity, cheaper prices

5) Iron and steel also important industries, w/ continual refinement
   a. Coke (purified coal) replaced charcoal as principal fuel
   b. **Bessemer converter (1856)** made cheaper, stronger steel

**What combination of factors were necessary to begin the Industrial Revolution?**

**What “new” markets did industrialized states look/create for their exports?**
6) Transportation improved with steam engines and improved steel
   a. George Stephenson invented 1st steam-powered locomotive, 1815
   b. Steamships began to replace sailing ships in mid-19th C.
   c. Railroads & steamships lowered transportation costs, created dense transportation networks

B. The Factory System
   1) The factory gradually replaced the putting-out system
      a. Factory system required division of labor; each worker performed a single task
      b. Required high degree of coordination, work discipline, close supervision
   2) Working conditions often harsh
      a. Workers lost status; no longer “skilled craftsmen,” just wage earners
      b. Harsh work discipline, fast pace of work, frequent accidents
   3) Industrial protest
      a. Luddites struck against mills, destroyed machines, 1810s
      b. 14 Luddites hung in 1813, movement died

C. The Early Spread of Industrialization
   1) Industrialization in western Europe
      a. British industrial monopoly, 1750-1800, forbade immigration of skilled workers
      b. Napoleon dismantled guilds, abolished internal trade barriers within W Europe
      c. Belgium & France moved toward industrialization by mid-19th C
      d. Bismarck sponsored heavy industry, arms, shipping
   2) Industrialization in North America
      a. Slow to start (b/c few workers, little capital)
      b. Brit. craftsmen started cotton textile industry in New Eng. 1820s
      c. Heavy iron & steel industries in 1870s
      d. Rail networks developed in 1860s; integrated U.S. regions

D. Industrial Capitalism
   1) Mass production provided cheaper goods
      a. Eli Whitney promoted mass production of interchangeable parts
      b. Henry Ford introduced assembly line to automobile production
   2) Industrialization expensive; required large capital investment
      a. Encouraged large-scale corporations w/ 100s, 1,000s of investors
      b. New laws protected investors from liability
   3) Monopolies, trusts, & cartels: competitive associations
      a. Vertical organization: Rockefeller’s Standard Oil Co. (now BP)
      b. Horizontal organization (or cartel): IG Farben, world’s largest chemical company

What were the important developments in transportation during the Industrial Revolution?
How did factories change the nature of labor itself?
Where did factories start, and where/how did the factory system spread?
How did the Industrial Revolution affect the scale of businesses and overall economic activity?
What financial institutions facilitated industrial production?
2. Industrial Society

A. The Fruits of Industry
   1) Population growth
      a. Industrialization raised material standards of living (eventually)
      b. Populations of Europe & America rose sharply 1700-1900
      c. Better diets & improved sanitation ▶ death rate of adults & children
   2) Demographic transition: population change typical of industrialized countries
      a. Pattern of declining birthrate in response to declining mortality
      b. Voluntary birth control through contraception

B. Urbanization and Migration
   1) Industrialization drew migrants from countryside to urban centers
      a. By 1900, 50% of pop. of industrialized countries lived in towns
      b. By 1900, >150 cities w/ > 100,000 in Europe & N America
      c. Urban problems: shoddy houses, fouled air, inadequate water supply
      d. By late 19th C, gov’ts passed building codes, built sewer systems
   2) Transcontinental migration: workers sought opportunities abroad
      a. 1800-1920, 50 million Europeans migrated to N & S America
      b. Fled: famine in Ireland, anti-Semitism in Russia, et al

C. Industry and Society
   1) New social classes created by industrialization
      a. A new aristocracy of wealth: “Captains of Industry” or “Robber Barons”?
      b. Middle class: managers, accountants, other professionals
      c. Working class: unskilled, poorly paid, vulnerable
   2) Dramatic changes to the industrial family
      a. Sharp distinction btwn work & family life, worked long hours outside home
      b. Family members led increasingly separate lives
   3) Men gained increased stature & responsibility in industrial age
      a. Middle- and upper-class men were sole providers
      b. Valued self-improvement, discipline, & work ethic
      c. Imposed these values on working-class men
         (1) Workers often resisted work discipline
         (2) Working-class culture: bars, sports, gambling, outlets away from work

How did industrialists legitimize the economic changes of the Industrial Rev?

How did the Industrial Revolution affect social & demographic characteristics?
4) Opportunities for women narrowed by industrialization
   a. Working women could not bring children to work in mines or factories
   b. Middle-class women expected to care for home & children
   c. Increased opportunities for women to work in domestic service
5) Many children forced to work in industry to contribute to family support
   a. 1840s, British Parliament began to regulate child labor
   b. 1881, primary education became mandatory in England

D. The Socialist Challenge
1) Utopian socialists: Charles Fourier, Robert Owen, & their followers
   a. Established model communities based on principle of equality
   b. Stressed cooperative control of industry, education for all children
2) Karl Marx (1818-1883) and Friedrich Engels (1820-1895), leading 19th-century socialists
   a. Scorned the utopian socialists as unrealistic, unproductive
   b. Critique of industrial capitalism
3) Unrestrained competition ➔ ruthless exploitation of working class
4) State, courts, police: all tools of the capitalist ruling class
5) The Communist Manifesto, 1848
   a. Claimed excesses of capitalism would ➔ communist revolution
   b. “Dictatorship of the proletariat” would destroy capitalism
   c. Socialism would follow; a fair, just, & egalitarian society
   d. Ideas dominated European & intern’l socialism through 19th C
6) Social reform came gradually, through legislative measures
   a. Regulated hours & restricted work for women & children
   b. Bismarck’s Germany provided medical insurance & social security, not from any moral sense of humanitarianism, but as a manipulative/cynical method of calming the working class
7) Trade unions formed to represent interests of industrial workers
   a. Faced stiff opposition from employers & gov’ts
   b. Forced employers to be more responsive to workers’ needs; averted violence
   c. No successful strikes until after 1900

How did workers respond to the Industrial Revolution, and how did their vision of society compare to industrialists’?

How did governments respond to the tremendous economic changes of the Industrial Revolution?
3. Global Effects of Industrialization

A. The Continuing Spread of Industrialization Beyond Europe & N Am.
   1) Industrialization in Russia promoted by tsarist gov’t (“top-down”)
      a. Built 35,000 miles of RR 1860-1900
      b. Finance minister, Sergei Witte, promoted industry
         (1) Oversaw the construction of the trans-Siberian RR
         (2) Reformed commercial law to protect industries & steamship co’s
         (3) Promoted nautical & engineering schools
         (4) Encouraged foreign investors
      c. By 1900 Russia produced 50% of world’s oil, also significant iron & armaments
      d. Even by early 1900s, Russia still lagged far behind W Eur in nearly every measurable category
   2) Industrialization in Japan also promoted by gov’t
      a. Background: Tokugawa Shogunate had outlawed foreign contact until 1853. Policy reversed 1868
      b. Hired 1,000s of foreign experts to establish modern industries in 1870s
      c. Created new industries; opened technical institutes & univ’s
      d. Gov’t-owned businesses then sold to private entrepreneurs, who developed huge industrial empires (zaibatsu) ≈ trusts/cartels.
      e. Japan was the most industrialized land in Asia by 1900
         (1) reflected in imperialistic actions toward Taiwan, (1894) China’s Boxer Rebellion, (1899) and Korea (1910)

B. The International Division of Labor
   1) Industrialization increased demand for raw materials
      a. Non-industrialized societies became suppliers of raw materials
      b. Cotton from India, Egypt; rubber from Brazil, Malaya, & Congo River basin
   2) Economic development better in lands colonized by Europe
      a. High wages encouraged labor-saving technologies
      b. Canada, Argentina, S Africa, Australia, New Zealand: later industrialized
   3) Economic dependency more common in other countries
      a. Latin America, sub-Saharan Africa, S Asia, & SE Asia
      b. Foreign investors owned & controlled plantations & production (“Banana Republics”)
      c. Free-trade policy favored foreign products over domestic
      d. World divided into producers & consumers

What raw materials were commonly exported to industrialized areas?
As industrial production rose, what type(s) of production declined?