Chapter 30

The Making of Industrial Society
Overview: The Industrial Revolution

- **Energy:** coal and steam replace wind, water, human and animal labor
- **Organization:** factories over cottage industries
- **Rural agriculture declines, urban manufacturing increases**
- **Transportation:** trains, automobiles replace animals, watercraft
Overview: Creation of New Classes

- The Industrial Middle Class
- Urban Proletariat
- Shift in political power
- Inspiration for new political systems, esp. Marxism
Overview: Unexpected Costs of the Industrial Revolution

- **Genesis of an environmental catastrophe**
  - Intellectual origins of human domination over natural resources
  - Unforeseen toxins, occupational hazards

- **Social ills**
  - Landless proletariat
  - Migrating work forces
Genesis of the Industrial Revolution

- Great Britain, 1780s
- Followed agricultural revolution
  - Food surplus
  - Disposable income
  - Population increase
    - Market
    - Labor supply
British Advantages

- Strong banking tradition
- Natural resources
  - Coal, iron ore
- Ease of transportation
  - Size of country
  - River and canal system
- Exports to imperial colonies
  - Esp. machine textiles
Cotton-producing Technology

- Flying shuttle doubled weaving output
  - without doubling supply of yarn
- Spinning jenny (1768)
  - Increased supply of yarn, faster than flying shuttle could process
- Power loom (1787) met supply of yarn
The Growth of Factories

- Massive machinery
- Supply of labor
- Transport of raw materials, finished product to markets
- Concentration in newly built factory towns on rivers
New Sources of Power

- Steam Engine
  - James Watt (1736-1819)
  - Coal fired
  - Applied to rotary engine, multiple applications
- 1760: 2.5 million pounds of raw cotton imported
- 1787: 22 million
- 1840: 360 million

Cotton Imports to UK

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- 1787: 22 million
- 1840: 360 million
Implications: Slave Labor

- Cheap cotton from American south
- Benefit of transatlantic slave trade
- Irony: early British abolitionism, yet profit motive retained
Iron Industry

• Henry Cort devises method of refining iron ore (1780s)
  - First major advance since middle ages
• 1852 produces more high-quality iron than rest of world combined
• Synergy with increasing technological development
Rail Transport

- 1804 first steam-powered locomotive
- Capacity: Ten tons + 70 passengers @ 5 mph
- The *Rocket* from Liverpool to Manchester (1830), 16 mph
- Ripple effect on industrialization
- Engineering and architecture
The Factory System

- Early modern Europe adopts “putting-out” system
- Individuals work at home, employers avoid wage restrictions of medieval guilds
- Rising prices cause factories to replace both guilds and putting-out system
  - Machines too large, expensive for home use
  - Large buildings could house specialized laborers
  - Urbanization guarantees supply of cheap unskilled labor
Poor working conditions

- Dramatic shift from rural work rhythms
- Six days a week, fourteen hours a day
- Immediate supervision, punishments
- “Luddite” Protest against machines 1811-1816
  - Name from legend about boy named Ludlam who broke a knitting frame
  - Leader called “King Lud”
- Masked Luddites destroy machinery, enjoyed popular support
- 14 Luddites hung in 1813, movement dies out
Spread of Industrialization

- Development of technical schools for engineers, architects, etc.
- Government support for large public works projects (canals, rail system)
- Spreads throughout Germany under Bismarck
Industrial Europe ca. 1850
Mass Production

- Eli Whitney (U.S., 1765-1825) invents cotton gin (1793), also technique of using machine tools to make interchangeable parts for firearms
  - “the American system”
- Applied to wide variety of machines
- Henry Ford, 1913, develops assembly line approach
  - Complete automobile chassis every 93 minutes
  - Previously: 728 minutes
Industrialization in the United States

- 1800 US agrarian
  - Population 5 million
  - No city larger than 100,000
  - 6/7 Americans farmers

- 1860 US industrializing
  - Population 30 million
  - Nine cities 100K +
  - ½ Americans farmers
Factory Discipline (Berlin, 1844)

- Workday: 6 am to 7 pm
  - 2 hours total for meals
- Lateness: 2 minutes fined ½ hour pay, more than 2 minutes partial shift
- Conversation prohibited
- Use of toilets mandatory
The Proletariat

- Lack of clear distinction from cottage industry
- Ecologically disastrous conditions
- Coal mines
  - Cave-ins
  - Explosions
  - Pollutants
Distribution of Wealth in the U.S.

- **Percentage of Total US Wealth**
  - 1800:
    - Richest 10: 50%
    - Other 90: 50%
  - 1860:
    - Richest 10: 80%
    - Other 90: 20%
The Industrial Middle Class

- New class, evolved from guild merchants in cities
- “bourgeoisie”
- Capitalists
- Begin to eclipse power and status of agrarian landed classes
Big Business

- Large factories require start-up capital
- Corporations formed to share risk, maximize profits
- Britain and France lay foundations for modern corporation, 1850-1860s
  - Private business owned by hundreds, thousands or even millions of stockholders
  - Investors get dividends if profitable, lose only investments in case of bankruptcy
Monopolies, Trusts, and Cartels

- Large corporations form blocs to drive out competition, keep prices high
  - John D. Rockefeller controls almost all oil drilling, processing, refining, marketing in U.S.
  - German IG Farben controls 90% of chemical production
- Governments often slow to control monopolies
The Fruits of Industrialization

- Technological innovation
  - Improved agricultural tools
- Cheap manufactured goods
  - Especially textiles
- Travel and transportation
Population Growth (millions)
The Demographic Transition

- Industrialization results in marked decline of both fertility and mortality
- Costs of living increase in industrial societies
- Urbanization proceeds dramatically
  - 1800: only 20% of Britons live in towns with population over 10,000
  - 1900: 75% of Britons live in urban environments
Contraception

- **Ancient and medieval methods:**
  - Egypt: crocodile dung depository
  - Asia: oral contraceptives (mercury, arsenic)
  - Elsewhere: beeswax, oil paper diaphragms

- **Thomas Malthus (1766-1834) predicts overpopulation crisis, advocates “moral restraint”**

- **Condoms invented in England**
  - Made from animal intestines in 17th century, latex in 19th century
Development of Slums

- London: 1 million in 1800, 2.4 million in 1850
- Wealthy classes move out to suburbs
- Industrial slum areas develop in city centers
- Open gutters as sewage systems
  - Danger of Cholera
- First sewage systems, piped water only in 1848
Transcontinental Migrations

- 19th-early 20th centuries, rapid population growth drives Europeans to Americas
  - 50 million cross Atlantic
  - Britons to avoid urban slums, Irish to avoid potato famines of 1840s, Jews to abandon Tsarist persecution
  - United States favored destination
New Social Classes

- Economic factors result in decline of slavery
- Capitalist wealth brings new status to non-aristocratic families
- New urban classes of professionals
- Blue-collar factory workers
- Urban environment also creates new types of diversions
  - Sporting events
Women in the Workforce

- Agricultural, cottage industry work involved women: natural transition
- But development of men as prime breadwinners, women in private sphere, working cheap labor
- Double burden: women expected to maintain home as well as work in industry
- Related to child labor: lack of day care facilities
Child Labor

- Easily exploited
  - Low wages: 1/6 to 1/3 of adult male wages
  - High discipline
- Advantages of size
  - Coal tunnels
  - Gathering loose cotton under machinery
- Cotton industry, 1838: children 29% of workforce
- Factory Act of 1833: 9 years minimum working age
The Socialist Challenge

- Socialism first used in context of *Utopian Socialists* Charles Fourier (1772-1837) and Robert Owen (1771-1858)
- Opposed competition of market system
- Attempted to create small model communities
- Inspirational for larger social units
Karl Marx (1818-1883) and Friedrich Engels (1820-1895)

- Two major classes:
  - Capitalists, who control means of production
  - Proletariat, wageworkers who sell labor
- Exploitative nature of capitalist system
- Religion: “opiate of the masses”
- Argued for an overthrow of capitalists in favor of a “dictatorship of the proletariat”
Social Reform and Trade Unions

- Socialism had major impact on 19th century reformers
  - Reduced property requirements for male suffrage
  - Addressed issues of medical insurance, unemployment compensation, retirement benefits
- Trade unions form for collective bargaining
  - Strikes to address workers’ concerns
Industrialization in Russia and Japan

- Slower starts on industrial process
- Russia constructs huge railway network across Siberia under finance minister Count Sergei Witte
- Japanese government takes initiative by hiring thousands of foreign experts
  - Reforms iron industry
  - Opens universities, specializing in science and technology
Global ramifications

- Global division of labor
  - Rural societies that produce raw materials
  - Urban societies that produce manufactured goods

- Uneven economic development

- Developing export dependencies of Latin America, sub-Saharan Africa, south and south-east Asia
  - Low wages, small domestic markets