Chapter 22 – Life in the Industrial Age. (1800-1914).

(1) The Industrial Revolution Spreads.
(2) The World of Cities.
(3) Changing Attitudes and Values.
(4) A New Culture.

**First Belgium.**
- Factories.
- Daguerre Perfects. Photography.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tr>
<td>1807</td>
<td>Belgium becomes first European nation outside Britain to industrialize.</td>
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**(1) The Industrial Revolution Spreads.**

**Setting the Scene.**
The second Industrial Revolution is marked by the spread of industry, the development of new technologies, and the rise of big business. By 1880s, steel replaces steam as symbol.

**New Industrial Powers.**
In first Industrial Revolution Britain stands alone as world industrial giant. Britain tries to protect its lead through laws against export of inventions (or inventors). By mid-1880s, others challenge Britain dominance. In Europe. Elsewhere. 1807. Belgium becomes first European nation outside Britain to industrialize. British mechanic (William Cockerill) opens factories to make spinning, weaving machines. 1871. Germany unifies into powerful nation. Becomes Europe’s leading industrial power. 1900. USA emerges as world’s leading industrial power. Some nations in southern and eastern Europe (sans resources) are slower to industrialize. Japan industrializes rapidly after 1868 to become leading industrial power in Asia.

**Technology and Industry.**

In first Industrial Revolution inventions (like steam engine) are work of gifted tinkerers. In second Industrial Revolution professional chemists and engineers create new products.

Early inventors try to repair tools or improve existing machinery. Later inventors (after 1850) try to discover new products to manufacture.

The marriage of science, technology, and industry spurs economic growth.

**Steel.**

**Chemicals.**
- 1866. Alfred Nobel, Swedish chemist, invents dynamite (for safe construction use).
Electricity.
   First simple electric motor. First dynamo, machine that creates electricity.
   (Note: A ‘farad’ is a unit of capacitance in electrical calculations.)
   Most prolific inventor the world has ever seen
   Invents Stock Exchange ticker in 1871.
   Invents phonograph in 1877.
   Invents incandescent bulb in 1879.
1890. Cables carry electrical power from dynamos to factories.

New Methods of Production.
Basic factory system in 1800s: Large number of workers use machines to mass-produce.
To improve efficiency manufacturers design products with interchangeable parts.
By early 1900s manufacturers introduce the assembly line to work stations for product.
Each worker has only one task. More products are made more quickly and cheaper.

Technology Speeds Transportation and Communication.
In second Industrial Revolution transportation and communication are transformed.
Steamships replace sailing ships.
And railroad building takes off.
   USA. Transcontinental between Atlantic to Pacific.
   Russia. Trans-Siberian between Moscow and European Russia and Pacific.

The Automobile Age Begins.
1887. Daimler introduces first four-wheel car.
The French nose out the Germans as early carmakers. Then come the Americans.
   Ford starts to use the assembly line to mass produce cars. USA becomes leader.

Conquest of the Air.
1903. Wright Brothers, American bicycle makers, fly Kitty Hawk a few seconds.
1920s, Commercial passenger travel begins.

Rapid Communication.

New Directions for Business.
A corporation is a business owned by many shareholders with limited liability.
A monopoly is total control of a market for one product. Like Krupp, Rockefeller.
A cartel is an association to fix prices, set production quotas. Like OPEC.
Rise of ‘Big Business’ and creation of great wealth leads to move toward regulation.

Looking Ahead.
By late 1800s European and American companies set up facilities around world.
(2) The World of Cities.

**Setting the Scene.**
The population of cities grew as people move to urban centers for jobs.

**Medicine and Population.**
Between 1800 and 1900 the population of Europe doubles.
Not due to large families. Families in fact have fewer children.
Population rises because the death rate falls.
People ate better due to improved:
- Methods of farming.
- Food Storage.
- Distribution.

**The Fight Against Disease.**
Scientists know about microscopic organisms, or microbes, since 1600s but do not use knowledge to tie microbes into infectious diseases. Doctors scoff at germ theory.

Then comes Louis Pasteur in 1870 who clearly shows link between microbes and disease.

**Louis Pasteur.** (1822-1895). French chemist.
- Father of modern bacteriology.
- Professor of Chemistry at Sorbonne.
- Findings: Microbes (bacteria) make milk and beer go sour.
- Pasteurization: Kills bacteria in milk by heating it.
- Makes memorable experiment of vaccination with sheep and cows.

**Robert Koch.** (1843-1910). German physician.
- Discovers in 1882 that bacteria causes tuberculosis.
- Nobel prize for medicine in 1905.

**Joseph Lister.** (1827-1912). English surgeon.
- Father of antiseptic surgery.
- 1867. Insists surgeons wash hands and sterilize their instruments.

**Florence Nightingale.** (1820-1910). English nurse and hospital reformer.

**Life of the Cities.**
Despite drawbacks (e.g., slums) cities attract millions looking for a job.

**Working-Class Struggles.**
1869. Germany legalizes labor unions.
- Britain, Austria, France follow.

The standard of living measures the quality and availability of necessities in a society.
(3) Changing Attitudes and Values.

Setting the Scene.
The Industrial Revolution changes the social order in the western world, and new ideas challenge long-held traditions. The middle-class increasingly comes to dominate society.

A New Social Order.
The old social order in western world slowly changes in the Industrial Revolution. Two main classes: Nobles and Peasants. Roles determined by relationship to land. Old Order: Landowner aristocracy. Middle class. Skilled workers. Small farmers. New Order: Landowners v. wealthy Middle class (factory owners, doctors, lawyers), new social class (factory workers) without political or economic power.

Middle-Class Values.
The nuclear family lives in a large house. Parent supervision. Code of etiquette. Young people start to have more say in whom they will marry ("falling in love"). Successful husband is one who earns enough income so wife stays at home.

Rights for Women.
Early pioneers for women’s rights: Olympe de Gouges. Mary Wollstonecraft. Mary Wollstonecraft. (1759-1797). Writes “Vindication of Rights of Women.” Elizabeth Cady Stanton and Susan B, Anthony organize women in USA. 1848. Seneca Falls Convention of 1848 demands women’s suffrage. Women’s suffrage (right to vote) only arrives in USA after WWI.

Growth of Public Education.
Reformers persuade government that good education makes good citizens. Industrialized societies see the need for a literate work force.

New Directions in Science.

The Darwin Challenge.
Darwin adopts Malthusian idea that all plants and animals produce more offspring than food. Living things with some advantage are “selected” to survive to reproduce. Spenser coins expression “survival of the fittest” which is often assumed to be Darwin’s. Religious backlash. Criticism: Evolution was anti-Bible (‘God created world in six days’). Ignores human soul. Fails to explain human supremacy. Denies God’s role in creation.

Social Darwinism.
Darwin never promoted any social ideas. But some use his theories to support own beliefs. Industrial tycoons, argue social Darwinists, are more “fit” than those put out of business. Social Darwinism is associated with racism belief that one race is superior to another.

Religion in an Urban Age.
1878. William and Catherine Booth start Salvation Army in London.
A New Culture.

Setting the Scene.
New artistic styles emerge as a reaction to the Industrial Revolution. In 1800s, some writers (Romantics) turn away from harsh realities of industrial life while others (Realists) make the new industrialized, urban society the subject of their work.

The Romantic Revolt Against Reason.
Romanticism is a cultural movement between 1750 and 1850. Romantic writers rebel against the Enlightenment emphasis on reason and progress. Romantic writers glorify nature and seek to excite strong emotions in their audiences.

The Romantic Hero.
Romantic writers create a new kind of hero – a mysterious, melancholy figure who feels he is out of step with society. This hero often hides a guilty secret and faces a grim destiny. Lord Byron (1788-1824) is a writer who fits description of hero. Hero is thus ‘Byronic’.

Romance of the Past.
Some Romantic writers combined history, legend, and folklore.
Examples: Sir Walter Scott on Scottish clans. Alexandre Dumas in “Three Musketeers.”

Music.

Art.

Call to Realism.
Realism is the new artistic movement in mid-1800s that wants to convey world as it is.

The Novel.

The Play.

Art.

New Direction in Visual Arts.
Louis Daguerre. (1789-1851). Perfects process in 1839 that yields first photographic image. Photography poses a problem for painters. Why try for realism when a camera can do it?

Impressionists.
All new artists us brush strokes of color side by side without any blending.

Postimpressionists.