AP US History

Chapter 17 - Industrial Supremacy

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Key Concepts

What are this chapter's key concepts?

- **6.1.I.B** - Businesses utilized technology, resources, financial systems, marketing, and labor to produce more goods
- **6.1.I.D** - Business magnates sought to raise profits by combining corporations into larger trusts/holding companies → wealth further concentrated
- **6.1.II.A** - Several supported laissez-faire economic policies for long-term economic growth, opposing govt. intervention even during crises
- **6.1.II.B** - The industrial workforce expanded and diversified due to migration, but child labor also increased
- **6.1.II.C** - Labor forces fought w/ managers over wages, conditions → formations of local/national unions to rise against business leaders
- **6.3.I.A** - Social Darwinism further used to justify inevitability of success of certain
- **6.3.I.B** - Some business leaders used Gospel of Wealth argument to push wealthy to assist poor through philanthropy

Sources of Industrial Growth

What spurred long-term industrial development in the U.S.?

Industrial development was spurred greatly by the rapidly growing steel industry, which was tightly connected to the trailblazing railroad industry; the creation of the automobile and aeroplane revolutionized transportation. Corporations began to jump on the technology boom, funding research in labs and universities; several turned to scientifically optimizing the manufacturing process for efficiency. The stock-based corporation developed in the 1840s, with corporations growing rapidly through horizontal and vertical integration, most notably seen in Rockefeller's Standard Oil; trusts and mergers allowed companies to come together. Though several criticized the dominance which these companies began to hold over American society, they inevitably stimulated economic growth.

How did technology encourage long-term industrial growth?

- Iron/steel production most important w/ rapid growth post-Civil War
  - Henry Bessemer (GB) and William Kelly (US) simultaneously found how to convert iron → steel, known as Bessemer process, complimented by Mushet's idea of adding to melted iron
  - 1868: Hewitt (US) introduced open-hearth process, soon replacing Bessemer process
  - Steel dev. allowed rapid production of large pieces for rail cars, rails, girders for buildings
  - Emerged in W. PA and E. OH due to natural iron ore, demand for anthracite fuel (common in PA) → Pittsburgh early center
  - Rapid growth of industry → new sources found in MI, MN, AL w/ Cleveland, Chicago, Detroit, Birmingham growing
  - Stone furnaces for steel production replaced w/ brick in 1870s → far larger amounts could be produced at once
- Transportation emerged to cater to steel industry
  - Freighters to Great Lakes allowed growth of industry there
  - Steam engines unloaded ore far more rapidly than humans
  - Railroads closely connected to steel industry w/ steel used for rails/cars and rail companies providing instant market
- Lubrication in steel production → oil grew in relevance (not as fuel until much later) w/ petroleum reserves in PA producing large amts.

The production of steel from iron was arguably the most important technological advancement spurring industrial growth; starting in Pennsylvania and Ohio but rapidly expanding outward, it was critical for the construction of railroads and also relied on railroads to reach new markets. Additionally, the need for lubrication led to the growth of the petroleum industry.

What characterized the development of the airplane and automobile industries?

- Automobile made possible by process of separating petrol from crude oil, German development of gas-powered engine (not initially portable)
  - Charles/Frank Duryea built first gasoline-driven vehicle in 1893
  - Henry Ford built vehicle in 1896
  - Industry grew extremely rapidly
- Potential for flight became viable only in late 19th c. w/ experiments using balloons, kites, gliders
  - Wilbur/Orville Wright began to work on glider powered by combustion engine; first test flight in 1903 at Kitty Hawk; could travel 23 miles by 1905
  - Most substantial airplane design in France due to govt. funding; U.S. created National Advisory Committee on Aeronautics in 1915, but commercial flight saw hope only after Lindbergh's first intercontinental flight

The automobile industry was spurred by the process of retrieving usable fuel from crude oil as well as the development of the gas-powered engine; Henry Ford built his first vehicle in 1896. The flight industry first saw potential after by the Wright brothers had their first successful flight, but most early development came from France.

How did research and development spur industrial growth?

- Businesses began to sponsor research to face competition
  - GE made corporate laboratory in 1900; several other large companies had followed by 1913
  - $\uparrow$ corporate interest $\Leftrightarrow \downarrow$ govt. interest $\rightarrow$ skilled scientists moved from govt. to corporations, research far more free-moving and decentralized
- Scientists/engineers became increasingly divided as engineers worked at forefront of tech. for corps. while many scientists insisted on studying less directly practical subjects (though far fewer than in Europe)
- U.S. universities funded by corps $\rightarrow$ developed research institutes for industrial economy (not the case in Europe)

Several large U.S. corporations sponsored research both at laboratories and universities to cater to a rapidly changing market. The increased corporatization of science created a significant rift between knowledge-driven scientists and market-driven engineers.

How did several great thinkers turn to optimizing manufacturing?

- Led by Frederick Winslow Taylor, "Taylorists" stressed subdivision of tasks to limit dependence on single employee, reduce required training to optimize efficiency through "scientific management"
- Henry Ford introduced mass production through moving assembly line in automobile factories to rapidly cut production times

The Taylorists stressed the concept of "scientific management", subdividing tasks to optimize overall efficiency. Henry Ford similarly revolutionized mass production with the moving assembly line to cut production times.

How did the railroad remain the primary agent of industry?

- Railroads blazed way for new development, spurring commercial activity anywhere they expanded
  - Passing thru. forests → lumberers; West → buffalo hunters to kill buffalo, bring cattle
  - As railroad hub, Chicago became slaughterhouse of nation w/ most cattle going there
- Pre-1880s, time determined by sun position → even neighbouring towns had diff. times → railroad companies agreed in 1883 on four time zones each an hour apart for scheduling
- Railroads expanded rapidly due to fed./state/local subsidies, investors from abroad, railroad combinations → power restricted to hands of few
  - Tycoons like Cornelius Vanderbilt, James J. Hill, Collis P. Huntingon represented nation w/ power in hands of few
  - Led to creation of modern corporation

Commercial activity continued to follow railroads wherever they emerged, throughout the nation. Railroads also led to the creation of four standard time zones and were spurred by government subsidies, foreign investors, and railroad combinations.

What was the structure of the U.S. corporation?

- Post-Civil War, railroad leaders/industrialists realized that no single person could dominate economy
- Incorporation laws of 1830s/1840s allowed businesses to earn money by selling stock to public with "limited liability" (investors could only lose amount invested, not having to cover company's debt)
  - Wealth from stocks $\rightarrow$ corporations could take on large projects
- First corporations were railroads, but quickly expanded outward
  - Modest immigrant Andrew Carnegie dominated steel industry, buying out competitors, negotiating railroad deals, buying/leasing coal mines w/ associate Henry Clay Frick
    - Financed projects w/ wealth from sale of stock
    - Sold to banker J. Pierpont Morgan in 1901 for $450m, who created U.S. Steel Corporation, near-monopolizing enterprise
  - Gustavus Swift turned Chicago meatpacking company into national corporation by selling to mil. in Civil War
  - Isaac Singer patended sewing machine in 1851, creating manufacturing corporation
- Corporations began to formally approach management w/ systematic techniques creating hierarchy of control, concept of "middle manager" between owners and workers

Incorporation laws in the 1830s allowed businesses to safely sell stock to the public, creating the modern corporation. Although corporations began with railroads, they soon expanded outward, with Andrew Carnegie dominating the steel industry. As corporations expanded, new managerial techniques emerged, most notably a formal hierarchy of control with "middle managers" between owners and workers.

How did businesses consolidate power in corporate America?

- Businesses consolidated power through **horizontal integration** (merging similar firms in same enterprise) and **vertical integration** (taking over businesses on which the corporation relied)
- Rockefeller's Standard Oil, created in Cleveland post-Civil War, initially expanded horizontally w/ rapid purchase of competitors; soon expanded vertically w/ purchase of factory, freight cars, warehouses, pipelines to prevent reliance on other companies
- Consolidation accepted as method of preventing social instability from too much competition
- Railroads made pool arrangements betw. companies to stabilize rates, divide markets (known as cartels), but rarely viable due to requirement for cooperation from all companies

Rockefeller's Standard Oil company is the greatest example of an expanding company, initially absorbing competitors in the same market (horizontal integration), and later taking over operations on which it depended (vertical integration). Consolidation was so popular because it was seen as a solution to the inevitable instability of an overcompetitive market.

How did the ideas of the trust and the holding company emerge?

- Failure of pools $\rightarrow$ new consolidation methods relying on central control
- "Trust" began w/ Standard Oil, perfected by J.P. Morgan; allowed stockholders to form trust agreements, transferring stocks to small grp. of trustees in exchange for shares in trust
  - Owners relied on trustees to bring in profits
  - Several trustees exercised great power over major corporations
- 1889: NJ allowed companies to buy other ones $\rightarrow$ corporate mergers possible
  - Standard Oil relocated to NJ, created "holding company" to buy stock from trustees
- By turn of century, 1% of corporations controlled more than 33% of manufacturing, in hands of large bankers and industrial magnates; methods frequently criticized but indubitably spurred growth

The "trust" allowed investors to transfer their stocks to trustees in exchange for shares in a trust, giving a small group of trustees great power. Corporate mergers were first made possible in New Jersey and overshadowe the trust, instead creating "holding companies" which controlled several others.