

Chapter 12, Section 4 – More Technological Advances

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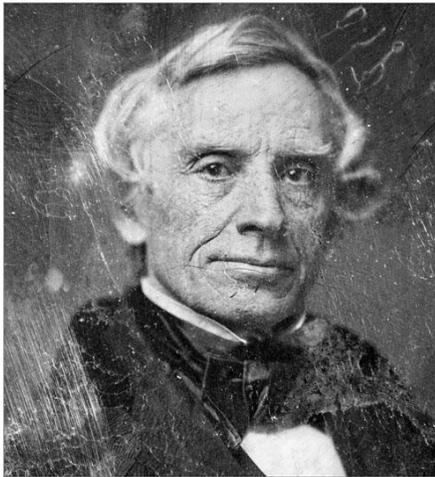
The Industrial and Transportation Revolutions had far-reaching effects on Americans' lives. They led to still more innovations in technology. Some of the new machines and devices speeded up processes for business owners. Others made life easier for people at home.

Telegraph Speeds Communication

In 1832 **Samuel F.B. Morse** perfected the **telegraph** – a device that could send information over wires across great distances.

- To develop the telegraph, Morse studied electricity and magnetism. In time, Morse put the work of other scientists together in a practical machine.
- The telegraph sent pulses, or surges, or electric current through a wire.
- The telegraph operator tapped a bar, called a telegraph key, that controlled the length of each pulse.
- At the other end of the wire, these pulses were changed into clicking sounds. A short click was called a dot. A long click was called a dash.
- Morse's partner, Alfred Lewis Vail, developed a system known as Morse code – different combinations of dots and dashes that represent each letter of the alphabet. For example, *dot dot dot (. . .)*, *dash dash dash (- - -)*, *dot dot dot (. . .)* is the distress signal called SOS.
- Several years passed before Morse was able to connect two locations with telegraph wires. Despite that achievement, people doubted his machine. Some people did not think he was reading messages sent from miles away. They claimed that he was making lucky guesses.
- Morse's break came during the 1844 Democratic National Convention in Baltimore, Maryland. A telegraph wired news of the presidential candidates nomination to politicians in Washington. The waiting politicians responded, "Three cheers for the telegraph!"
- Telegraphs were soon sending and receiving information for businesses, the government, newspapers, and private citizens.

- The telegraph grew with the railroad. Telegraph companies strung their wires on pole along railroads across the country.
 - They established telegraph offices in many train stations.
 - Thousands of miles of telegraph line were added every year in the 1850s.
 - The first transcontinental line was finished in 1861.
- By the time he died in 1872, Morse was famous across the United States.



Steam Power and New Factories

At the start of the Industrial Revolution, most factories ran on waterpower. In time, however, factory owners began using steam power. This shift brought major changes to the nation's industries.

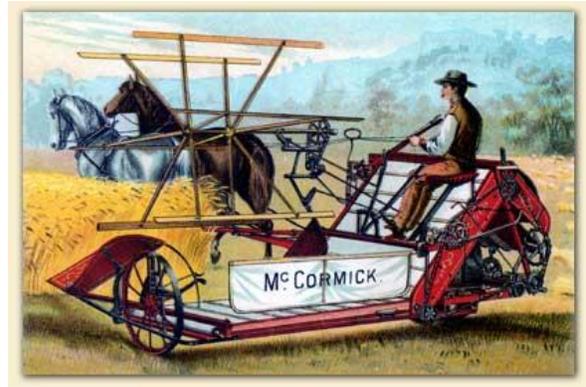
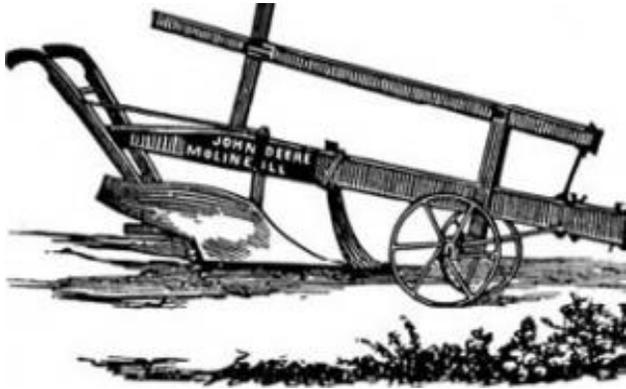
- Water-powered factories had to be built near streams or waterfalls. In contrast, steam power allowed business owners to build factories almost anywhere.
- Most of the nation's industries were still in the Northwest. By 1860 New England alone had as many factories as the entire South did.
- Some companies decided to build their factories closer to cities and transportation centers. This provided easier access to workers, allowing businesses to lower wages.

- Being closer to cities had other incentives, such as reduced shipping costs.
- Cities soon became the center of industrial growth. People from rural areas as well as foreign countries flocked to the cities for factory jobs.
- Factory workers improved the designs of many kinds of machines.
 - Mechanics invented tools that could cut and shape metal, stone, and wood with great precision.
 - By 1840s this new machinery was able to produce interchangeable parts.
 - Within a short period of time, the growing machine-tool industry was even making customized equipment.

Improved Farm Equipment

During the 1830s, technology began transforming the farm as well as the factory.

- In 1837 blacksmith **John Deere** saw that friends in Illinois had difficulty plowing thick soil with iron plows. He thought a **steel blade plow** might work better. His design for a steel plow was a success. By 1846 Deere was selling 1,000 plows per year.
- In 1832 **Cyrus McCormick** developed a new harvesting machine, the **mechanical reaper**, which quickly and efficiently cut down wheat.
 - He began mass producing his reapers in a Chicago factory. McCormick used new methods to encourage sales.
 - His company advertised, gave demonstrations, and provided a repair and spare parts department.
 - He also let customers buy on credit.
- The combination of Deere's plow and McCormick's reaper allowed Midwestern farmers to plant and harvest huge crop fields.
- By 1860, U.S. farmers were producing more than 170 million bushels of wheat and more than 800 million bushels of corn per year.



Changing Life at Home

Many inventions of the Industrial Revolution simply made life easier.

- The **sewing machine**, first invented by **Elias Howe**, a factory apprentice in Lowell, Massachusetts, was one of these conveniences.
- **Isaac Singer** then made improvements to Howe's design.
- Like McCormick, Singer allowed customers to buy his machines on credit and provided service.
- By 1860 Singer's company was the world's largest maker of sewing machines
- Other advances improved on everyday items.
 - In the 1830s, iceboxes cooled by large blocks of ice became available. Iceboxes stored fresh food safely for longer periods.
 - Iron cookstoves began replacing cooking fires and stone hearths.