

VI. The Industrial Revolution

A. Definition

1. A “revolution” is a period in history where an important change occurs quickly.
2. The American Revolution is a good example. It involves an important change to the American government that occurred between the years 1763-1789. In the span of merely 26 years, a completely new form of government was established that overturned nearly 5000 years of recorded precedent.
3. The “Industrial Revolution” is a rapid change in human “industry”--the work that people do in order to live on earth, of equal consequence to the economic aspect of human life as the American Revolution is to politics.
4. This revolution has many components. It involves changes in the ways that people make the cardinal values of food, water, clothing, shelter, and medicine, but also in the way they make other things – such as means of transportation and communication – that help people obtain the cardinal values.

B. The Process of Making Clothing

1. For thousands of years of recorded history, clothing was made the same way.
 - a) Raw material, such as wool and cotton, was farmed.
 - b) This material was cleaned, combed, and wrapped around a staff in a clump.
 - c) This staff would be spun, and a thin thread of material would be teased from the clump.
 - d) After “spinning” came weaving, where threads were intertwined with each other on a loom.
 - e) From there cloth was cut and sewn into clothing.
2. Spinning was an extremely tedious task, and a woman could only spin one thread at a time.
3. People's ability to collect enough raw material and to weave threads was also very limited, so they were able to make very little clothing.

C. The Textile Revolution: Spinning, Weaving, and Ginning

1. The first revolution in cloth-making came in the area of spinning, when a man named James Hargreaves invented a machine called the “Spinning Jenny” in 1764. Using this machine a woman could spin eight or even sixteen threads at once.
2. Another inventor, Samuel Crompton, improved on this design by creating the “Spinning Mule,” which could allow a single person to spin 200 threads at once.
3. When these inventions were placed in organized factories with powerful engines driving the spinning machines, a single person could spin 4000 threads at once!
4. The new challenge was to be able to weave all this thread.
5. Edmund Cartwright, another inventor, created the “Power Loom,” which could weave cloth 200 times faster than a person.
6. Finally, Eli Whitney, an American inventor invent the “Cotton Gin,” which allowed a worker to clean 5000 times more cotton than before, thus providing more raw material for spinning and weaving.
7. Thanks to these inventors, modern people have a virtually unlimited supply of clothing.

D. The Importance of Transportation

1. One needs means of transportation in life as much as one needs food, water, clothing, shelter and medicine because one needs transportation in order to reach these things, or to have these things brought from where they are made to where one lives.
2. To reach a hospital, one takes a car, or – in an emergency – an ambulance. Trucks bring food to supermarkets. Water is transported to our homes in pipelines and pipes. The materials to construct our homes are brought to the site in trains and trucks. Clothing (now mostly made in China and Taiwan) is brought to America in boats.

E. Basic Forms of Transportation

1. Before the Industrial Revolution, humans could transport materials on their own backs, or by using domesticated animals such as horses.
2. Some people in early prehistoric civilizations had learned to use the wheel, and constructed carts to carry larger loads.
3. Travel over the oceans was limited to sail ships using wind power. To travel down a river one could use the current (although not going upstream!).
4. Over long distances human beings might be able to move, at best around 8 mi/hr. Over water, speeds were much the same. (Columbus's sailing ships are said to have an average speed of only 4 “knots,” i.e. just a little over 4 miles/hr.)

F. The Transportation Revolutions

1. In 1764, Samuel Watt, a Scottish inventor, created a steam engine that could be attached to ships or carts and used as a motor.
2. Steamships were built which used the same kind of engine, and could thus travel against the wind and upstream.
3. The first train that used such an engine to transport people from Liverpool to London in England was able to make the journey in 10 hours, where previously it took 60 hours by carriage. (Already, this early advanced meant a six times average speed increase!)
4. In 1869, the first transcontinental railroad was created across the United States.
5. After trains, came automobiles. The first motorcar was created by Karl Benz, a German inventor, in 1885.
6. Then, in 1903, the Wright Brothers, successfully flew the first airplane.
7. The fastest human being (a sprinter, over short distances) could move under his own power before the industrial revolution was 25 miles/hr. Now, in a spaceship, a person can move at the speed of 25,000 miles/hr!

G. The Importance of Communication Technology

1. One needs means of communication to survive and thrive, whether this means calling 911 to reach the fire department, or calling Nconnects.com to reach a history teacher and get educated!
2. Books, music, television, the Internet, and other means of communication also allow us gain knowledge, relax, be entertained, and find inspiration to do the work that life requires.

H. The Communication Revolution: The Great Leap in the “Speed of Ideas and Information”

1. Before the Industrial Revolution, ideas could only be communicated over long distances by physically transporting them (in paper form).
2. The mail service from St. Louis to Sacramento could transmit a letter between the two cities in 22 days.
3. Then the Pony Express cut that time in half, to only 10 days, and the railroad cut it even further to 2 days.
4. In 1832, an inventor named Samuel Morse, wondered if information could be passed along a wire using electricity, which moves “instantaneously.” He invented the telegraph that sent a signal at the speed of electricity, which is 400,000,000 miles/hr!!!!

I. From the Telegraph to Wireless Telegraphy

1. Morse's telegraph could only send information using “Morse Code.”
2. The next improvement in communication came when Alexander Graham Bell discovered how to send sound along an electrical wire, thus inventing the telephone.
3. The last great advance of this early period of invention was accomplished when Guglielmo Marconi, an Italian inventor, discovered that sound could also be transmitted using invisible “radio waves.” Marconi sent the first wireless signal across the Atlantic Ocean in 1902.