

THE ARTS 1836–1913

For all the arts, the period between 1836 and 1913 was a time of change and experiment. Painting and music in particular developed and flourished.



This lamp by U.S. designer Louis Comfort Tiffany (1848–1933) is in the Art Nouveau style, popular from about 1890.

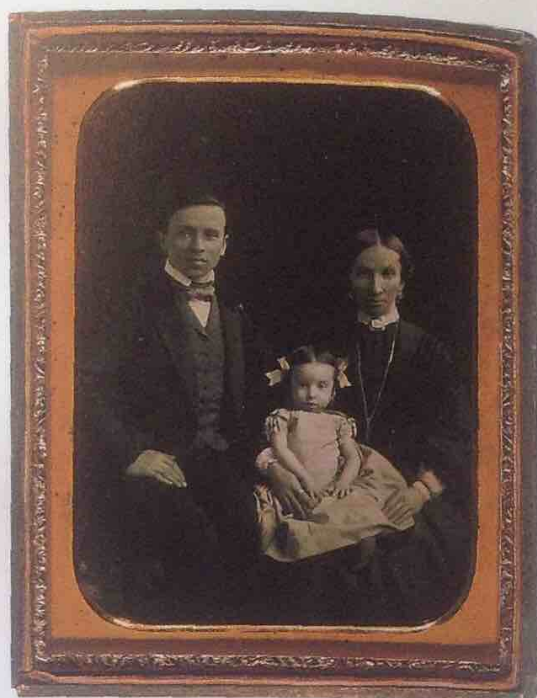


Mark Twain, the pen name of Samuel Langhorne Clemens (1835–1910), was a writer and humorist who wrote *The Adventures of Tom Sawyer*.

In the late 1800s, the French impressionists such as Claude Monet, Auguste Renoir, and Edgar Degas developed spontaneous styles, filling their canvases with bold strokes of color in an attempt to capture the fleeting effects of light. In England, a group of artists, poets, and writers called the Pre-Raphaelites rejected the position of Raphael as the ultimate master of painting.

In European literature, more and more novels were being written for a growing number of readers. Romantic adventure stories were written by novelists such as Sir Walter Scott—*Ivanhoe*—and Jules Verne—*20,000 Leagues Under the Sea*. The wretched life of the poor in the cities was described with great skill by Charles Dickens in novels such as *Oliver Twist*. William Thackeray evoked an image of country and town living among the middle and upper classes in *Vanity Fair*, and Elizabeth Gaskell depicted life in the new manufacturing cities of the north in books such as *North and South*.

▼ This is a scene from *David Copperfield* by Charles Dickens (1812–1870). Dickens's writing entertained and enlightened his readers about social problems.

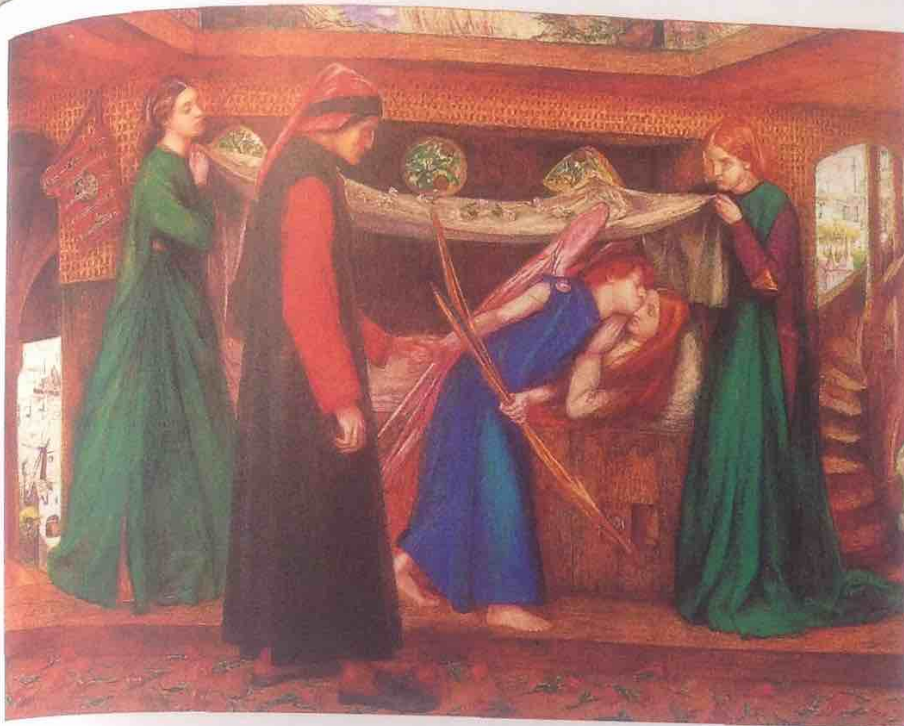


This English daguerreotype (early photograph) is from about 1885. Three years later, George Eastman's Kodak box camera made photography available for everyone.

Wagner developed a new form of grand opera, and the Russian ballet changed ideas about dance. Beethoven's dramatic and expressive music had opened the way for the romantic period with composers such as Schubert, Mendelssohn, Schumann, Chopin, Berlioz, Verdi, Brahms, and Tchaikovsky producing works full of passion and drama.

Giuseppe Verdi (1813–1901) was one of the greatest Italian composers of opera. His works include *Rigoletto*, *La Traviata*, and *Aida*.





▲ "Dante's Dream" was painted by Dante Gabriel Rossetti (1828–1882), an English artist and poet who helped form the Pre-Raphaelite Brotherhood.

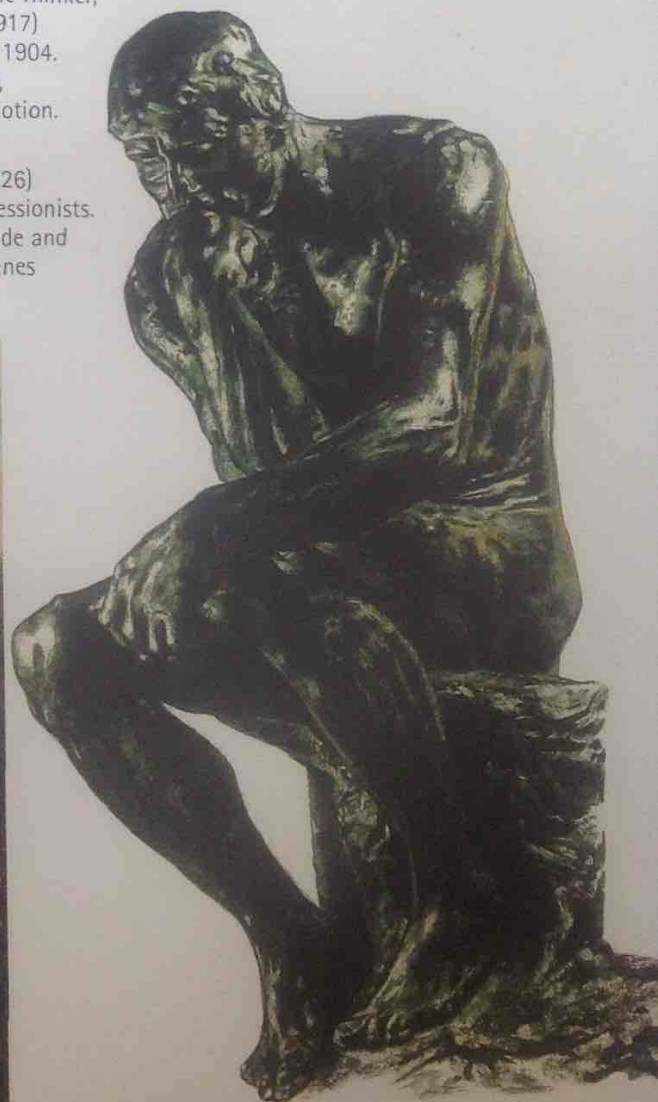


► Johann Strauss the Younger (1825–1899) toured Europe and the United States with his own orchestra. He was famous for his waltzes, such as *The Blue Danube*.

Drama became more realistic with plays by Ibsen, Chekhov, and George Bernard Shaw. In 1877, the British-born American photographer Eadweard Muybridge created the first motion picture sequences, and by the early 1900s, an entirely new form of performing art had appeared: the movies. Hollywood, in California, soon became the center of moviemaking.

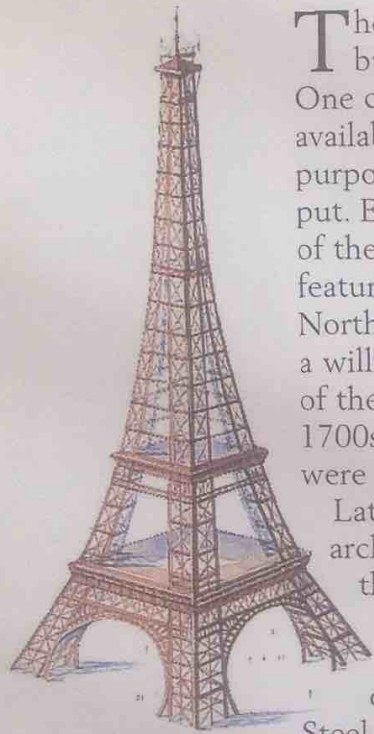
► This bronze sculpture, *The Thinker*, by Auguste Rodin (1840–1917) went on show in France in 1904. His figures were expressive, conveying the power of emotion.

▼ Claude Monet (1840–1926) was the leader of the impressionists. He frequently worked outside and painted landscapes and scenes of simple middle-class life.



ARCHITECTURE 1836–1913

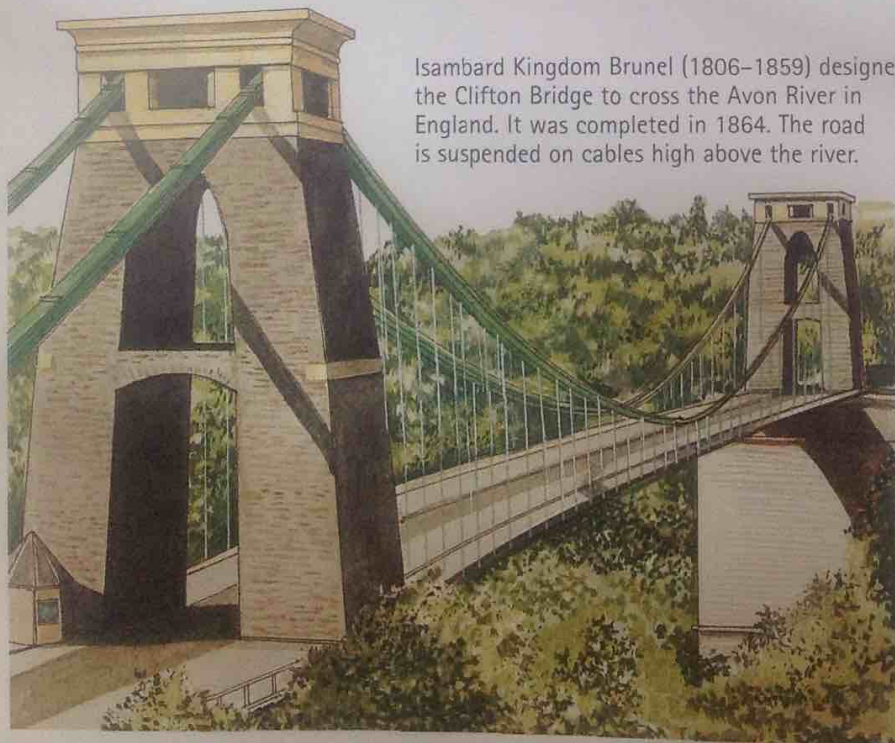
Architecture during the late 1800s reflected a new freedom of expression and a willingness to use modern technology.



The Eiffel Tower, named after its designer, Gustave Eiffel (1832–1923), was built for the Paris Exhibition of 1889. It is 989 ft. (300 m) high, made from iron, and held together by 2.5 million rivets.

The style of architecture used for a building can depend on several factors. One consideration is that of the materials available to the builders. Another is the purpose to which the building is to be put. Equally important is the imagination of the architects and their clients. The main feature of architecture in Europe and North America during the 1800s was a willingness to use all the great styles of the past, from ancient Greece to the 1700s. Sometimes, very different styles were used in the same building.

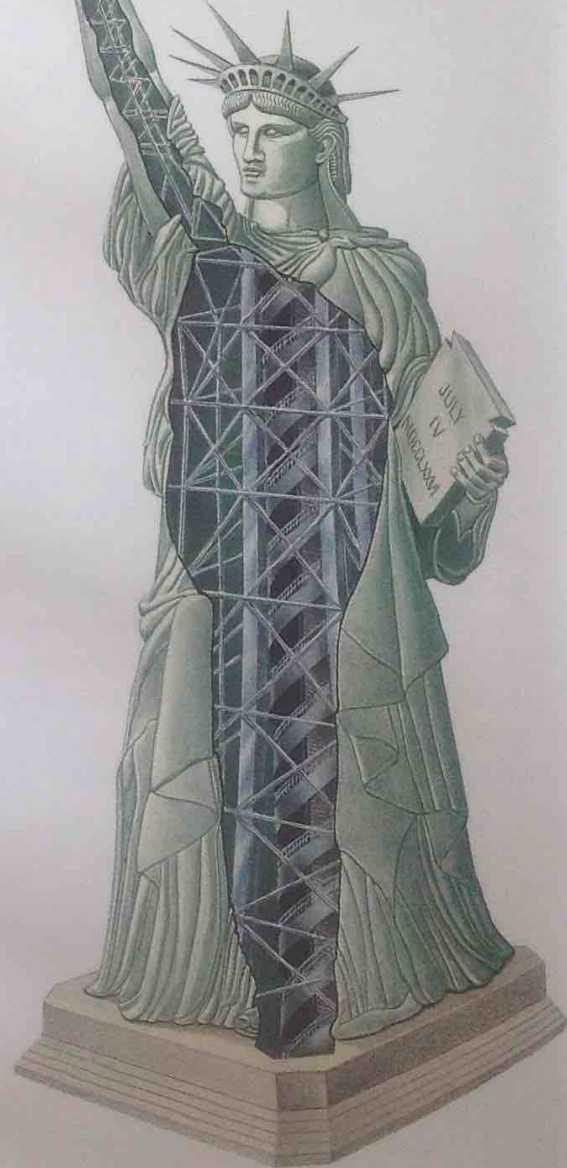
Later in the century, a new kind of architecture developed. It was based on the use of steel to form the framework, or “skeleton,” of a building. Since the walls did not have to support their own weight, buildings could be higher. Steel-framed skyscrapers were first made practical in the United States by the elevator, invented in 1852 by Elisha Otis (1811–1861). In 1884, William Le Baron Jenney (1832–1907) built the world’s first skyscraper in Chicago. At ten stories, it would not be a skyscraper today, but its metal-frame structure set a new trend.



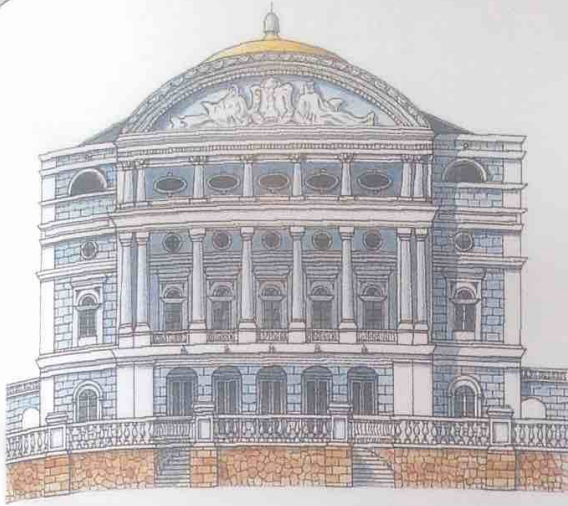
Isambard Kingdom Brunel (1806–1859) designed the Clifton Bridge to cross the Avon River in England. It was completed in 1864. The road is suspended on cables high above the river.



The Statue of Liberty, in New York Harbor, was a gift from France in 1884. It is made from copper sheets on an iron framework, designed by Gustave Eiffel. The statue—the work of sculptor Frédéric Bartholdi—rises 307 ft. (93.5m) from the bottom of the pedestal to the tip of the torch, and weighs 254 tons. A famous poem by American writer Emma Lazarus is on a plaque at its base.



As towns and cities became more and more densely populated, it was vital that services such as fresh water and removal of sewage were adequate. New water pipes were built under cities, and when cast-iron pipes became available it became easier to build drains. As engineering knowledge improved, it was also possible to build bridges that spanned ever greater distances.



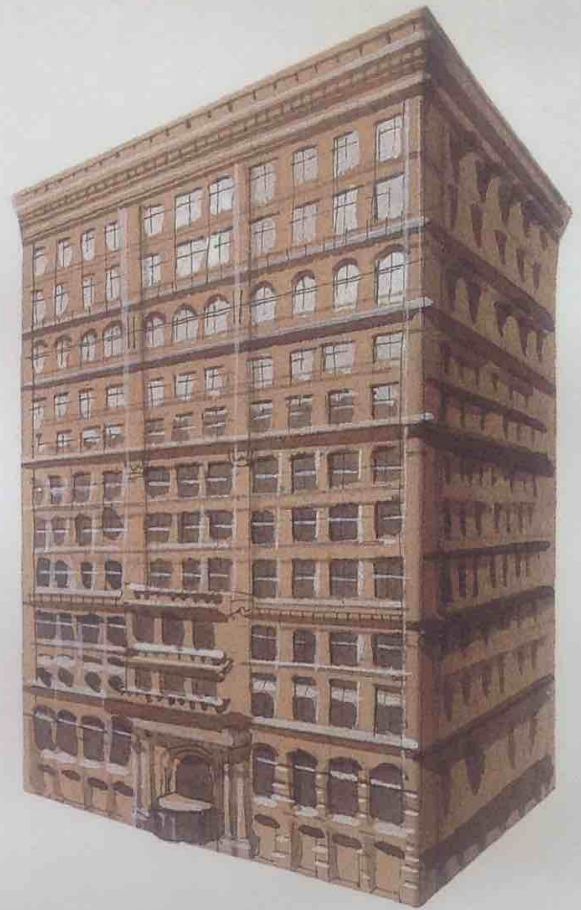
◀ Opera became very popular during the 1800s, and many elegant opera houses were built. This opera house is at Manaus, in the Brazilian jungle. The town was very rich for a short time thanks to profits from the local rubber industry.

NEW TECHNOLOGY

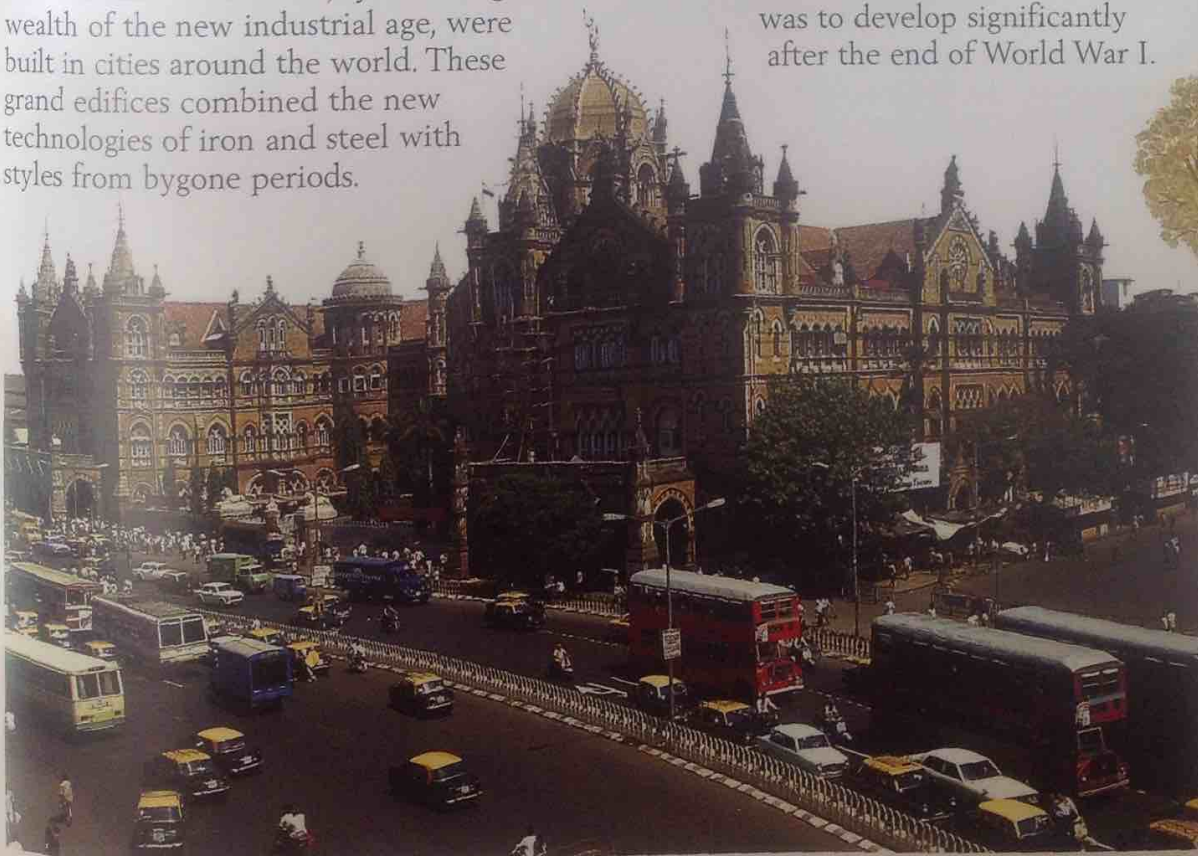
The architecture of the late 1800s was adapted to make use of the discoveries of engineers and the availability of iron and steel. In addition to skyscrapers, the use of steel frames also made possible structures such as the Eiffel Tower in Paris, built for the great exhibition of 1889, and the Statue of Liberty in New York Harbor, a gift and symbol of friendship from the people of France to the people of the United States to celebrate the centennial of the Declaration of Independence.

The railroad age brought with it many new opportunities for architects and builders. Railroad stations, symbolizing the wealth of the new industrial age, were built in cities around the world. These grand edifices combined the new technologies of iron and steel with styles from bygone periods.

▶ The ten-story steel-framed Home Insurance Building in Chicago is often described as the first skyscraper. After a fire destroyed most of the original city in 1871, the price of building land increased—if buildings were taller they needed less land.



However, the use of reinforced concrete in the early 1900s brought about a major change in architecture. Building design began to become simpler and less decorative. This “modern” style was to develop significantly after the end of World War I.



▲ During the 1800s in Europe and the United States, the prosperous middle classes lived in imposing townhouses set in quiet, tree-lined streets.

◀ The main railroad station in Bombay was opened in 1866. It was built in a mixture of the European Gothic and Renaissance styles, but the domes are Indian.

SCIENCE AND TECHNOLOGY 1836-1913

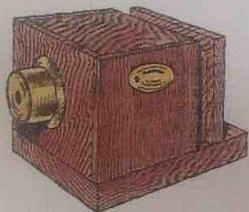
Technological progress continued at an ever-increasing pace. Major developments in communications and transportation were to change the world forever.



The telephone was invented by Alexander Graham Bell in 1875. The first public telephone exchange opened in Pittsburgh, in 1877.



An American, Whitcomb Judson, invented the zipper in 1891. The first one, called a clasp locker, looked like the hooks and eyes that it replaced.



The daguerreotype camera appeared in 1838. It was not until 1888 that George Eastman made photography available to all with the first roll film camera, the Kodak box.

Industry continued to develop, with new inventions, new products, and factories producing new types of goods. In 1850, coal and steam engines still provided the power for machinery, but by the early 1900s, electricity and oil were being used instead. In 1859, Edwin L. Drake found substantial reserves of oil at a depth of only 69 ft. (22m) in Oil Creek, Pennsylvania. Oil was to provide the fuel for the internal combustion engine. This, in turn, led to the invention of the first automobiles.

The German engineer Gottlieb Daimler invented the high-speed internal combustion engine in 1887. This was to prove convincingly better than the steam engines that had been used previously. In the United States, Frank and Charles Duryea produced their first vehicles in 1892, and Henry Ford made his first experimental car in 1893. Oil products also played a large role in the new chemical industry. They made possible the development of a huge range of materials such as plastics, detergents, fertilizers, paints, dyes, nylon, artificial rubber, and explosives.

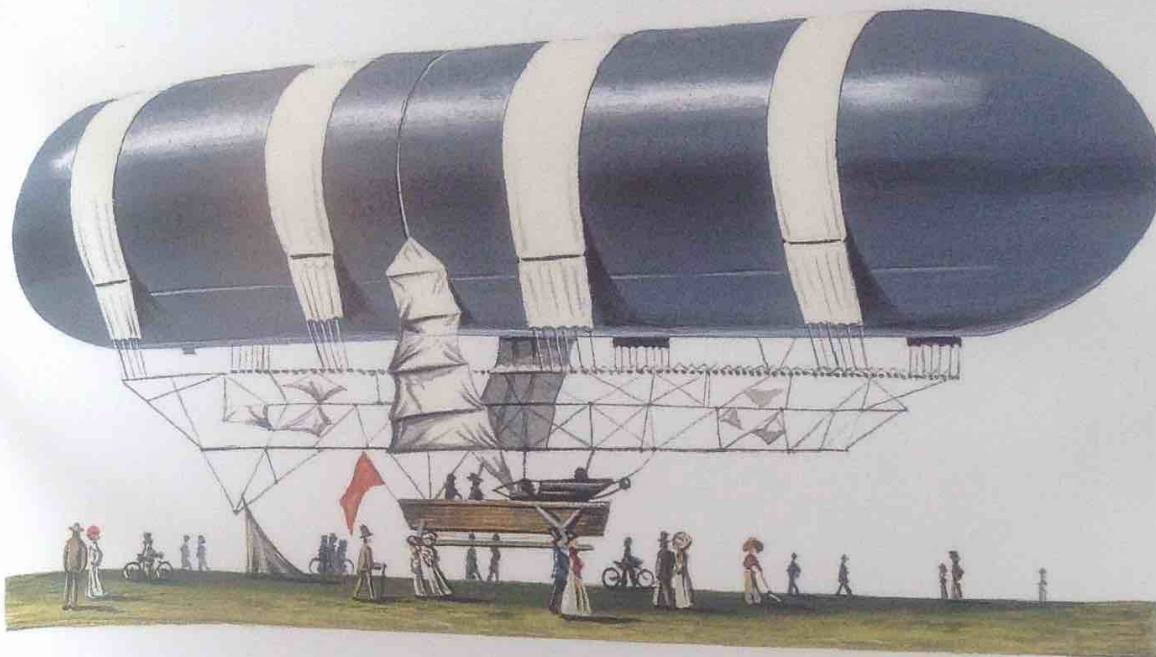


The first bicycles were uncomfortable and dangerous. The "penny farthing" was invented by James Starley in the early 1870s, and had solid tires and no brakes.

The Scottish-born American inventor Alexander Graham Bell invented the telephone, and the first public exchange opened in Pittsburgh in 1877. That same year, prolific inventor Thomas Alva Edison produced the phonograph. This enabled sound to be recorded and played back on a foil-coated cylinder.



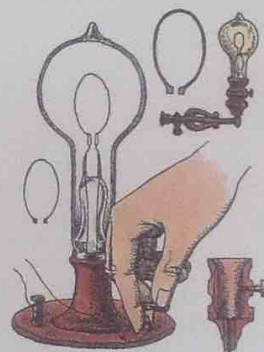
Henry Ford (1863-1947) began producing cars like this Model T in 1908, using an assembly line. By 1914, his factory was producing a car every 90 minutes. During 19 years in production, around 15 million Model Ts were sold.



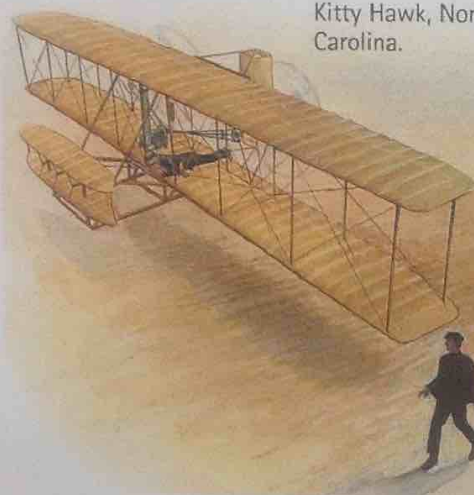
◀ Balloons were used for observation in the American Civil War. One of the observers was a retired German army officer named Zeppelin. He was an inventor of airships, which are sometimes called Zeppelins after him. Airships were more useful than balloons, because they could move under their own power.

▼ Wilbur and Orville Wright used gliders to test their experiments in controlled airplane flight. They made the first powered flight on December 17, 1903, at Kitty Hawk, North Carolina.

In 1879, Edison demonstrated the electric lightbulb, and in 1882, the world's first large-scale electric power station, designed and installed by Edison, was completed in New York City. The kinetoscope, used to produce moving pictures, was invented in 1891, again by Edison, and he was able to synchronize this with his phonograph to produce the first talking motion pictures in 1913.



Thomas Edison was a pioneer of the electric lightbulb. In 1880, his system was first used to light a steamship.



▼ An early radio, called a wireless, had glass tubes. No one knew that radio waves existed until German scientist Heinrich Hertz (1857-1894) proved it in 1888, by transmitting and receiving them in his laboratory.



WHEN IT HAPPENED

- 1837 Samuel Morse invents Morse Code
- 1856 Bessemer converter invented
- 1859 First oil well drilled in Pennsylvania
- 1867 Nobel invents dynamite
- 1868 Frenchman Georges Leclanché invents the dry-cell battery
- 1869 Mendeleyev devises periodic table
- 1875 First telephone call made by Bell
- 1877 Nikolaus Otto patents four-stroke internal combustion engine
- 1877 First public telephone exchange
- 1882 First hydroelectric power plant uses water to generate electricity
- 1885 First automobiles built in Germany
- 1887 Dunlop invents pneumatic tire
- 1896 Marconi invents first radio system
- 1903 First powered and controlled flight by the Wright brothers
- 1909 Leo Baekeland invents the first plastic, Bakelite



Scientists believed that all things were made up of atoms. Proof was provided by Ernest Rutherford's discovery of the atomic nucleus in 1911.