

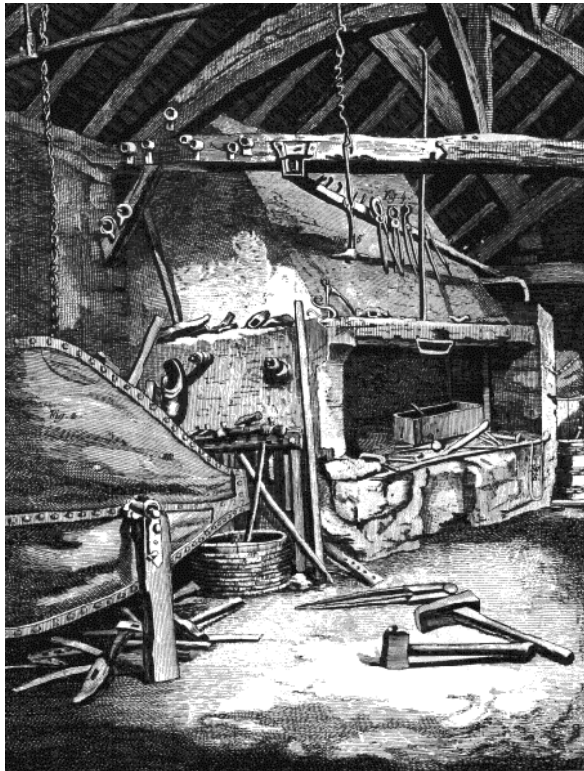


Brief History of the Industrial Revolution

Carefully read the following brief overview. When you have finished, fill out the attached timeline activity sheet by selecting important events and writing a description of the event.

In 1775, James Watt built the first modern stationary steam engine, and one year later the United States of America gained its independence from England. The Grand Trunk Canal was dug in Great Britain in 1777 that established a cross-England route connecting the Mersey to the Trent and connecting the industrial Midlands to the ports of Bristol, Liverpool, and Hull. England's Industrial Revolution was in full swing.

In America, one generation was needed to consolidate and establish its political system. During this time the old colonial economy which was dominated by landowning country squires gave



way to a mercantile society, where trade, and particularly the national trade gained increasingly in importance. In 1791 the first ten amendments to the Constitution, the Bill of Rights, were ratified. These rights clearly established a vision for America that was based on individuals having the freedom to act on their own behalf, without a great deal of governmental control.

A string of inventions, like Crompton's power loom of 1787 and Eli Whitney's cotton gin in 1793 began to dramatically alter the cotton industry in America. Eli Whitney's machine to comb and deseed bolls of cotton made possible a revolution in the cotton industry and the rise of "King Cotton" as the main cash crop in the South. Instead of making him rich, farmers built bogus versions of their own.

Whitney, however, was a genius. In 1797 Whitney contracted to manufacture 10,000 muskets for the U.S. Army. At the time, an

entire musket would be hand made by a single person, without standardized measurements. Whitney divided the labor into several discrete steps and standardized each part. This method of interchangeable parts made it possible to manufacture gun in mass quantities. It also enabled soldiers to repair a broken gun with parts from another. Without interchangeable parts, the manufacturing and assembly line processes could not exist.

While using steam power to pump water out of mines was by now being used, Robert Trevithick's application of steam power to a carriage in England in 1801, was a great inspiration.

With the Louisiana Purchase of 1803, Florida in 1819 and the Lewis and Clark expedition of 1804, room was being made for the extension of the new nation. People needed to be moved in a faster and more efficient manner. Robert Fulton's first successful application of steam power to a boat, the Clermont, as finally successful in 1807.

A unique new immigration policy sprang as much from the generous idealistic principles of democracy as from the economic pursuits of the nation's leaders. As the country grew in size and people, the needs for an efficient transportation system linking the coastal cities with the rich agricultural interior countryside became more and more pressing.



The first significant progress in national transportation was river steam navigation, pioneered by Fulton. Steam navigation cut the time of a journey between New York and Albany by two thirds. The second major improvement was canal construction. Prominent people in New York who supported the building of the Erie Canal which began in 1817. The Erie Canal, which linked the Hudson River to Lake Erie, was opened in 1825 and its impact on the economic development of New York City and its hinterland was huge. It firmly established New York as the first city in the United States, against its rivals, Boston, Philadelphia and Baltimore. The latter reacted by their own canal projects, notably the Chesapeake & Ohio and the Delaware & Hudson which started in 1826.

Other western canals, built between 1845 and 1869 in Ohio, Indiana, and Illinois diverted freight traffic out of the north-south river system and into the Great Lakes. The Great Lakes had been made navigable by a series of canals that connected them. The most important of these were the Welland Canal from Lake Ontario to Lake Erie bypassing Niagara Falls, built in 1833, and the Sault-Saint Marie or "Soo" Canal built in 1855 that linked Lake Superior and Lake Huron. This latter canal allowed Duluth, Minnesota and Thunder Bay, Ontario to be ports and provided an outlet for the grain of the Dakotas and abundant minerals in Minnesota and the Upper Peninsula of Michigan. The effect upon New Orleans was dramatic. In 1835, 70 percent of Western exports of flour, 98 percent of corn, and 95 percent of whiskey went through the port of New Orleans. By 1860 the percentages were 22, 19, and 40, respectively.

But canal building was expensive and slow, so when the first true railroad was opened in 1824 and a commercial railroad was built in England between Manchester and Liverpool in 1830, entrepreneurs in America closely followed their development.



In the United States the first regularly scheduled public steam train was run in Charleston, South Carolina in 1830. However, that August, the Tom Thumb made a 13 mile run from Baltimore to Ellicott's Mills pulling a single car carrying the Directors of the B&O. Almost a year later, on 9 August 1831 the DeWitt Clinton pulled a train between Albany and Schenectady, New York.

The first ocean-going steam ship, the Great Western, was tested in 1837. This application of steam power began a new era of ocean-going transportation and U. S. Navies.

With the commercial use of the telegraph by Samuel F.B. Morse in 1844, it was now possible to coordinate action at a distance for the first time in human history. The railroad and the telegraph were highly complementary technologies that revolutionized the conduct of business. Mass transportation and mass communication were a reality in the United States by 1850.

The beginnings of the railroad system were difficult and it took another generation of railroad building until the first large fortunes derived from railroads appeared. In 1853, the merger of 15 local railroads into the 600 miles long New York Central was the first major consolidation in the industry and made some of the entrepreneurs moderately rich, among them Erastus Corning, John Jacob Astor III, and Edward Cunard.

U.S. declared war on Mexico in 1846 in effort to gain California and other territory in Southwest. The war ended with the signing of Treaty of Guadalupe Hidalgo in 1848. Mexico recognized the Rio Grande as the new boundary between Mexico and Texas, and for \$15 million, Mexico agreed to cede territory comprising present-day California, Nevada, Utah, most of New Mexico and Arizona, and parts of Colorado and Wyoming to the US.

Other railroads grew in length during the 1850's, the most successful being the Pennsylvania and the Baltimore & Ohio. These companies were funded by leading merchants and bankers of these cities and also benefited from the support of local communities and were generally successful. Railroad building was still on a relatively modest scale, but this soon changed with the further push into the West and the building of a Transcontinental Railroad.

The invention of the Siemens-Martin open hearth process, along with the Bessemer converter, made high quality producible in bulk. Steel began to replace iron in building. Steel framing and reinforced concrete made possible the new "curtain-wall" architecture for the skyscraper. It also made the manufacturing of rails for the railroads very economical.

The Civil War ended in 1865 and on December 6 Congress ratified the 13th Amendment prohibiting slavery. Prior to the war, Southern states had been opposed to funding a railroad west because they were afraid of cotton competition, especially from Texas. After Civil War that raged between the industrial North and the agricultural South ended, transcontinental rail supporters pushed through federal funding while southern congressmen were still being kept out of Washington. In 1865 Congress approved a transcontinental railroad and chartered two companies to build it, the Union Pacific building westwards from Omaha, and the Central Pacific that started in Sacramento and built eastwards through the Rocky Mountains.



Heavily funded by government through credit and land grants, this giant building project created great fortunes and great scandals. In a less publicized yet certainly as significant move, shipping magnate Cornelius Vanderbilt bought control of the New York Central Railroad and extended it with other roads from New York through to Chicago. Vanderbilt's railroad ventures were so successful, they made him the richest man in America by the time he died in 1877.

The Industrial Revolution rolled on and railroad construction, finance, operation and consolidation created millionaire estates on a scale never seen before. But while some successfully built profitable local railroads into large regional systems without government support, others piled up huge debts in schemes that ended in bankruptcy, and still others, like Edward Henry Harriman, managed to blow life back some companies. All these men had in common an outstanding sense for business in general and transportation in particular; all of them left lasting marks on the communities in which they acted and most of these men died very rich and left millions to their descendants.

A major innovation was developed by Alfred Nobel by producing dynamite, the first manageable high explosive in 1867. Christopher Sholes invented the Remington typewriter in 1873 and Alexander Graham Bell invented the telephone in 1876 and Thomas Edison invented the phonograph and 1877 and the incandescent lamp in 1879.

Warfare moved from the musket and rifle to mechanization with the invention of the machine gun in 1884. and Ben developed the first automobile to run on internal combustion in 1885. As the 19th century passed into the 20th, Marconi patented his wireless telegraph and managed to transmit the first trans-Atlantic radio message in 1901 and Henry Ford began mass producing the Model T.

The saga of the American railroad barons ended with the innovations of the 20th century, the popularization of the automobile, and commercial aviation which began with the flight of the Wright Brothers in 1903. The vast corporations and estates of Titans of Industry were reduced by taxes and the spending level of the heirs. Governmental regulations on the railroad industry crippled it by reducing profitability. The automotive industry began to dominate transportation by mid-20th century.