

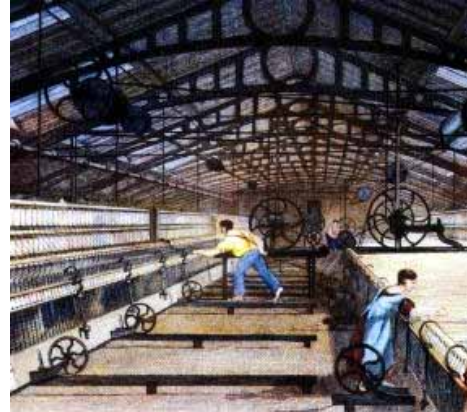


**TWO CENTURIES OF REVOLUTIONARY CHANGE**

**The Industrial Revolution**

**A Brief History of the Cotton Industry**

1733	Kay patented the Flying Shuttle.	1730
1742	Cotton mills were opened at Birmingham and Northampton.	1740
1743	Lancashire mill owners imported East India yarns to improve the quality of textiles	
1753	An angry mob of weavers wrecked Kay's house.	1750
1764	Hargreaves designed the Spinning Jenny. Arkwright designed the Water Frame.	1760
1768	An angry mob destroyed Arkwright's mill at Chorley	
1769	Arkwright patented the Water Frame.	
1770	Hargreaves patented the Spinning Jenny.	1770
1771	Arkwright opened his mill at Cromford.	
1773	The first all-cotton textiles were produced.	
1779	Crompton designed the Spinning Mule.	
1783	Arkwright's mill at Masson was opened.	1780
1785	Cartwright patented the power loom.	
1787	Cotton goods production was 10 times more than in 1770.	
1789	Samuel Slater brought textile machinery design to the US.	
1790	Arkwright's steam powered factory was built in Nottingham.	1790
1792	Grimshaw's factory in Manchester was destroyed by an angry mob of weavers and spinners. Eli Whitney invented the cotton gin.	
1804	Joseph Marie Jacquard invented a device using punched card to weave complex designs.	1800
1806	English textile mills were forced to close down as supplies of cotton from the US South ran short.	
1813	Horrocks invented the speed batton	1810



Wool loom shed (c. 1840)

During the second half of the 17th century, cotton goods were imported from India. Because of the competition with the wool and the linen industries, in 1700, the government placed a ban on imported cotton goods. Cotton had become popular, however, and a home-based cotton industry sprung up using the raw material imported from the colonies. Since much of the imported cotton came from New England, ports on the west coast of Britain, such as Liverpool, Bristol and Glasgow, became important in determining the sites of the cotton industry. Of course, the wool and linen manufacturers made sure that many restrictions were imposed on the import of cotton, but, as cotton had become fashionable, there was little they could do to stop the trend.

Lancashire became a center for the cotton industry because the damp climate was better for spinning the yarn. Also, because the cotton thread was not strong enough, "fustian" wool or linen had to be used to make the warp for weaving. Lancashire was also a wool center.

Two processes are necessary in the production of cotton goods from the raw material - spinning and weaving. At first, these were very much home-based, "cottage" industries. The spinning process, using the spinning wheel, was slow and the weavers were often held up by the lack of thread. In the 1760's, James Hargreaves improved thread production when he invented the Spinning Jenny. By the end of the decade, Richard Arkwright had developed the Water Frame. This invention had two important consequences. Firstly, it improved the quality of the thread, which meant that the cotton industry was no longer dependent on wool or linen to make the warp. Secondly, it took spinning away from the home-bases to specific areas where fast-flowing streams could provide water power for the larger machines. The west Pennines of Lancashire became the center for the cotton industry. Not long after the invention of the Water Frame, Samuel Crompton combined the principals of the Spinning Jenny and the Water Frame to produce his Spinning Mule. This provided even tougher and finer cotton thread.

These inventions turned the tables, and it was the weavers who found it hard to keep up with the supply of thread. In 1770, John Kay's Flying Shuttle loom, which had been invented in 1733 and doubled a weaver's productivity and was widely in use. In conjunction with the Spinning Frame, this new loom was used in factories built in Derbyshire, Lancashire and Scotland.

The textile industry was also to benefit from other developments of the period. As early as 1691, Thomas Savery had made a vacuum steam engine. His design, which was unsafe, was improved by Thomas Newcomen in 1698. In 1765, James Watt further modified Newcomen's engine to design an external condenser steam engine. Watt continued to make improvements on his design, producing a separate condenser engine in 1774 and a rotating separate condensing engine in 1781. Watt formed a partnership with a businessman called Matthew Boulton, and together they manufactured steam engines which could be used by industry.

In 1785, the Reverend Edmund Cartwright invented the power loom. His invention was perfected over a ten year period by William Horrocks. Henry Cort replaced the early wooden machines with new machines made of iron. These new iron machines needed coal, rather than charcoal, to produce the steam to drive them.



Power looms (late 19th century)

By 1800, cotton mills were constructed using the latest technology. The Spinning Mules provided the fine, but strong thread which was used by the weavers on their power looms. These looms were operated by steam engines. The steam had been produced using coal as the fuel. In less than one hundred years, the cotton industry had developed from a home-based, cottage industry to a factory based industry housed in cotton mills.

The spinners and weavers no longer worked for themselves. The equipment and the raw materials needed in the industry were far too expensive. The spinners and weavers were now the workers, or employees, of the person who owned the factory and who could pay for the raw materials. Instead of working for themselves, at home and at their own pace, the workers were now paid a wage to carry out a job of in a cotton mill for a specific period of time each day. This also meant that, in order to find work, many people needed to move into the areas where the cotton mills had been built.

With the technological advances in both spinning and weaving, it might be supposed that the supply of raw materials could have been a limiting factor to production. Even in this area, however, technology had lent a hand. A machine called a Cotton Gin, invented by an American, Eli Whitney, made extracting the cotton from the plant much easier. The cotton growers were able to keep up with the demand for raw materials from across the Atlantic.

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