

# The Industrial Revolution

During the late eighteenth century and the early nineteenth century, several changes took place in England and a few other countries in the field of industry. These important changes may be classified under the heading of '**Industrial Revolution**'. The term is used to describe both the changes that took place and the period itself.

The movement, which began in England in the eighteenth century, spread all over Europe and America in the nineteenth century. By the end of the nineteenth century, the western world had taken great strides in industrialisation. The invention of various heavy machines to do the work that was hitherto done manually and the great advance of technology were responsible for the Industrial Revolution.

As a result of industrialisation, there was an enormous increase in the production of goods. England became a prosperous country, and changed from being a land of farmers to a land of factories. This rapid change occurred during the reign of George III. The England over which 'Farmer George' began to rule in 1760 was still very much rural. But by the time he died in 1820, most of the farmers and craftsmen were replaced by mechanics and factory workers.

As industries began to develop, there was a growing need for money. This resulted in the flourishing of private investors and financial institutions. Financiers and banks thus became as important as industrialists and factories. For the first time in European history was born a class of people known as 'capitalists' who with their wealth controlled organisations.

Before the Industrial Revolution, nearly 90 per cent of the population lived in small towns and villages. The cities were mainly centres of fashion and culture and were inhabited by the rich and the aristocratic. The villagers were mostly farmers and spent their time cultivating food or looking after their cattle and sheep. There were a few cottage industries scattered here and there. These were found in the homes of the rustics where the entire family worked together. They produced cloth, pickles, jams and wooden carvings. Agriculture dominated the people's lives and they organised

themselves according to the seasons of sowing, cultivating and harvesting. The poor had to work really hard and they earned hardly enough to keep body and soul together. Life changed little from one generation to another until industrialisation. The rich landlords and aristocrats enjoyed all the benefits and even enjoyed political influence. The poor farmers were unrepresented and were exploited. All these social, economic and political conditions changed in England due to the Industrial Revolution.

There are several reasons why the Industrial Revolution began in England. The most important reason was that there were great deposits of coal and iron in England. These were the two natural resources that were necessary for industrialisation in its early stages. During the reign of George III, England had become a great colonial power. Its colonies all over the world not only provided the mother country with raw materials, but also served as a ready market for its finished products. There was a great demand for British goods in the 1700s. In order to meet this demand, English merchants had to increase their production manifold. True to the saying that 'necessity is the mother of invention', the hard-pressed Englishmen began to devise ways of multiplying their production. These resulted in the introduction of machines that ultimately brought about a revolution.

The Industrial Revolution affected and altered every sphere of British life. The chief industries to be modernised were the textile industry and the iron and coal industries. With the development of these industries, transport also was forced to undergo a transformation. With so many changes taking place it was only natural that society also underwent a drastic change.

The textile industry was the industry that was most affected by the revolution. Between 1750 and 1800, power-driven machinery was introduced into the textile industry. As the demand for cloth increased, merchants often had to compete with one another for the limited number of workers available. Since the number of workers was insufficient to satisfy the huge bulk of orders, there was an increasing demand for machinery in order to increase production.

For hundreds of years, spinning was done with the help of a spinning wheel. This allowed a person to produce only one thread at a time. Two new inventions altered this condition. One was the

'spinning jenny' invented by **James Hargreaves** and the other was the 'waterframe' invented by **Sir Richard Arkwright**. Both these inventions increased the speed of spinning and the production of yarn. A machine called the 'spinning mule' was invented by **Samuel Crompton** in the 1770s. This machine combined the features of the spinning jenny and the water frame and slowly replaced both. It was possible to spin fine yarn for high quality cloth. Earlier, such cloth had to be imported from India. With these inventions, the spinning wheel disappeared completely from English life.

Weaving was another problematic area since most of it was done on handlooms. In 1733, **John Kay** invented the 'flying shuttle', which performed the task of weaving (but often went out of control). In the mid 1780s, **Edmund Cartwright** invented a steam-powered loom. After the invention of the power loom, British textile industry took giant leaps forward.

Tremendous power was required to run the machines. Mere horse or water power was not sufficient. Industry needed a new, cheap and efficient source of power. It found a solution in the steam engine. As early as 1698, **Thomas Savery** had invented a pumping engine whose source of power was steam. In 1712, **Thomas Newcomen** improved on this engine. Yet there were many defects. Finally, it was **James Watt** who gave to the world the steam engine.

For the manufacture of these machines and engines, it was necessary to have good machine tools. James Watt found it extremely difficult to drill a perfectly round hole. **John Wilkinson** invented a boring machine that drilled precise holes. By 1830, nearly all the basic tools that were necessary for modern industry were available.

The two raw materials needed for industrialisation were iron and coal. Earlier, very primitive methods were used for smelting iron ore. From the 1720s, iron-making techniques began to improve. As coal was necessary to smelt iron, most of the iron industries were concentrated in coal-mining regions.

Transport played an important role in the industrialisation of England. Raw materials and finished goods had to be transferred across long distances. There was a revolution in the field of transport also. The rivers were widened and deepened in order to make them navigable. British engineers built canals, bridges and

lighthouses. Roads were also improved since they were in a very bad condition. A Scottish engineer, **John McAdam** revolutionised road building and turnpikes received a new lease of life. The new roads were stronger and lasted longer.

One of the most significant developments in the world of transport was the introduction of the railway. The earliest railroads were used to transport coal. In 1804, **Richard Trevithick** built the first steam locomotive. **George Stephenson** introduced the first passenger line between Stockton and Darlington in 1825, and with that the railway age began.

The Industrial Revolution caused great changes in the economic and social life of the people. First of all, it enhanced Britain's position in the world. Since goods were available at a cheaper rate, England captured world markets. She earned various titles like 'the Workshop of the World' and the 'Paymaster of Europe'. Her economic strength, in turn, was responsible for her ultimate victory against France in the Napoleonic Wars.

Socially, it altered the relationship between the workers and the employers. Earlier, a close and warm rapport existed between them; but with industrialisation, it became cold and impersonal. Besides, the workers were forced to work under harsh conditions and live in the crowded and filthy slums of the big cities. Work was monotonous and women and children were exploited. Most workers were very poor and lived in extremely unsanitary conditions. They had no right to vote and could do nothing to improve their conditions.

The middle and the upper-middle classes made a lot of money and they prospered tremendously because of the Industrial Revolution. Their living conditions improved. These people, who invested a lot of money in industries, claimed the right to manage their affairs in their own way. The French economists coined a phrase to describe this attitude—'*laissez faire*', which means 'Leave things alone'. The people who invested in industry wished to have complete freedom to manage their factories, with absolutely no interference from the State. In the Middle Ages, there was the guild system to regulate trade. Even in Tudor and Stuart times, the State played an active part in regulating the wages and the hours of labour. The policy of *laissez faire* wanted to do away with such a

practice and it was accomplished in the first half of the nineteenth century. **Adam Smith** was the upholder of this principle. He argued that any government interference was harmful to trade.

The revolution created a need for engineers, skilled workers and managers. Before the Industrial Revolution there were only two universities—Oxford and Cambridge. These were no longer enough to meet the new demands of the nation.

With the Industrial Revolution, the traditional way of life disappeared and there was a change in the attitudes of the people. What **Mathew Arnold** said in a different context could be used here to sum up the effect that industrialisation had on Victorian society: it 'materialises the upper class, vulgarises the middle class, and brutalises the lower class'.

# THE INDUSTRIAL REVOLUTION

*Synopsis* : Introduction – what is meant by the term Industrial Revolution – factors favourable in England for industrial development – the industries affected by the Revolution – Textile industry before – inventions which revolutionized the Textile industry – revolutions in Iron and Coal industries – improvements in means of transport – change for the better in inland navigation – use of steam of speeding up means of transport – conclusion – results of the Industrial Revolution.

## Reasons of Revolution:

During the second half of the eighteenth century and the first half of the nineteenth century British industry underwent great changes. These changes were so remarkable that the term Industrial Revolution has been applied to them. The word "Revolution" has the connotation of suddenness and violence. But the term Revolution also implies fundamental change. It is in this second sense that the term is applicable to the English industries because there was a fundamental and drastic change in the industrial methods of England. Before the Industrial Revolution, goods were produced in limited quantities by human hands in the houses of the workers ; but after the Revolution goods were produced in large quantities by machines in factories.

The Industrial Revolution started in Great Britain earlier than in other European countries chiefly because of the political and financial stability which she enjoyed after the Glorious Revolution. It is true that England was involved in most of the wars of the 18<sup>th</sup> century but they were all fought outside on the Continent or elsewhere. The fact that England was free from foreign invasion also contributed to the industrial development of the country. There was accumulation of capital which was available for investment in industry was partly due to the profit made by the trading companies. Capital was accumulated also as a result of abstinence and frugality practiced from religious motives by people like Puritans. Great Britain's geographical position was peculiarly suitable for world trade, as no part of the world was inaccessible to her ships. Her coastline offered excellent harbours and her many navigable

Some History of India  
rivers offered means of internal communication. Her climate was invigorating and promoted habits of industry. Natural resources were abundant and the vast supplies of coal and iron in close proximity to each other and to the coast were vital to industrial development.

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During the Industrial Revolution, textile, coal and iron industries and means of transport underwent a thorough change. Before the Industrial Revolution, textile work was done in the cottages by people who were also engaged in agriculture, and it was done by hand or with the help of handworked implements. In this cottage textile work, men, women and children were all engaged. Carding was undertaken by children, and the straightened fibres of wool or cotton were spun into continuous yarn by women. Weaving on a handloom was usually done by men. The supplementary processes such as dyeing or bleaching, fulling, printing and finishing were carried on in establishments maintained by the clothier. The system had many defects. The worst defect was that production was deplorably slow and could not meet the ever-increasing demand abroad for English textile goods. Some change, therefore, was necessary in the method of spinning if production was to be increased. In the course of time a series of inventions brought about an entire transformation of the Textile industry.

The first mechanical invention to be made was the flying shuttle by John Kay in 1733. The mechanism enabled cloths of any width of be made by a single weaver and also doubled the pace at which the weaving could be done. To keep the weavers engaged they had to be supplied with a sufficient quantity of yarn. Attention was therefore turned to the question of spinning and in 1764 a carpenter named James Hargreaves made the spinning-jenny, which speeded up the making of yarn. In 1769 a still better machine was invented by Richard Arkwright, a barber. Arkwright changed his machine to use with water-power and so it became known as the water-frame. Its great advantage over the spinning jenny was that it produced stronger yarn. In 1779 Samuel Crompton combined the jenny and the water-frame in his "mule" and added a contrivance to prevent the frequent breaking of the yarn which occurred when spinning with the jenny. The result was that a yarn much finer and stronger could

be produced. The power-loom made by Edmund Cartwright in 1785 helped to increase the speed of weaving.

By the middle of the eighteenth century there was an increased use of iron. In 1779 the world's first iron bridge was made spanning the River Severn. The development of iron trade was closely associated with the coal industry because a new method of smelting iron with coal was devised. The great development in the iron and coal industry took place in the early nineteenth century in places like South Wales, South Yorkshire and Tyneside regions where coal and iron were found together, either near the sea or with easy access to it by river or canal. Inventions connected with this trade were made by people like Newcomen and James Watt. In 1705 Newcomen made a steam engine to pump water out of coal mines. Later, in 1763, a young mathematical instrument maker named James Watt perfected this steam engine.

The Revolution took place in means of transport also. Before the Revolution there was no effective highway authority and most foolishly the upkeep of high roads was entrusted to the parish. Naturally enough the roads were in very bad condition. As a result of the Industrial Revolution, when goods were produced on a large scale, the need was felt for transporting goods to cities and seaports. After 1750 hundreds of Road Acts were passed and many turnpike trustees formed. Telford made many miles of good roads and many large towns were reached by coaches. In 1815 Macadam taught the art of road draining and perfected the surface of the road. By 1840 there were 22,000 miles of good turnpike roads in England with nearly 8,000 tollgates.

The improvement of inland navigation was as important as the improvement of roads in opening the way to industrial change. The first half of the 18th century had been a period of much activity in deepening the navigable rivers. The second half of the century saw the construction of new artificial waterways. The Duke of Bridgewater, who is known as "the father of inland navigation", connected his collieries with Manchester by canal. The canal movement began in the rapidly developing industrial region of South Yorkshire and West Midlands and soon spread over the whole country. The canals and the turnpike roads did more than stimulate the exchange



Very fast

of goods inside the island ; they also hastened the growth of overseas trade. Goods were distributed in much greater quantities throughout the length and breadth of the country.

George Stephenson invented the first locomotive, and the first railway line between Stockton and Darlington was opened in 1825. Liverpool and Manchester were linked by railway in 1830 ; London and Birmingham in 1838. Steam was also used for water transport. The first successful steamboat in Europe was *Bell's Comet*, which began to run between Glasgow and Greenock in 1812. A service was established between Dublin and Holyhead in 1820. The first steam-boat reached Liverpool from America in 1825 and two vessels steamed from the British Isles to New York in 1838. Since that time there has been remarkable progress in all matters connected with ocean navigation.

### Conclusion :-

The Industrial Revolution had good as well as bad results. During the period of Industrial Revolution the population of England increased to a very great extent. It is estimated that in 1710 the population of England was five and a half millions ; but in 1750 it increased to six millions. During the next fifty years there was an increase of 50 per cent. Thus the Census of 1801 revealed a population of nine millions. This was again doubled by 1851 and doubled again by 1901. Many new industrial towns like Sheffield, Birmingham and Manchester and Leeds developed with startling rapidity. The people clustered together in these smoky towns where lack of proper sanitation caused many kinds of diseases. The Industrial Revolution had yet another bad result. Although the new methods led to greatly increased wealth, that did not always lead to greater comfort and happiness. The old personal relations of the employer and the employee which in earlier days had kept master and worker on fairly friendly terms, now disappeared in many cases. This does not mean that the Industrial Revolution was without good results. In the first place England became the workshop of the world. The production of goods on a large scale paved the way for fall in prices. This led to increased demand for goods and in the end there was employment for more people.