

# Industrial Revolution

In the previous lesson, you learned about various ways in which things are made by artisans. We also read that many of them are not able to compete with machine made products and many people have stopped practising their professions. In this chapter we shall explore how machines have come to dominate the way in which products are made and how they impacted the lives of people in societies where they happened.

## Increasing control of Traders

During 1500 AD to 1800 AD trade between countries in America, Europe, Africa and Asia increased manifold. Textile trade too began to expand. Now European traders began to use putting out system – that is they gave advances to small farmers and artisans to produce textile goods. During this period, income from farming was low and many peasants were already losing their farm and grazing land. Therefore doing textile work helped them in making a living.

Under putting out system, a cloth trader in Britain purchased cotton from supplier and carried it to the spinners. Then the yarn was taken by the trader to next stage of production - the weavers. The cloth was taken to the fullers and finally to the dyers who gave it colour. These different activities could be done in different parts of the country. But all finishing work was done in London before it was sold in other countries. Thus, textiles goods were

produced by a large number of producers who were controlled by traders. There was no system of factory - that is, all different production aspects of producing a cloth did not happen in the same place but in different households. Each trader engaged 20-25 craftsmen at each stage of production.

Some time later the traders brought together the craftsmen under one roof so that they did not have to go to each one's home or explain their requirements to each person. They set up small workshops called *manufactories*. The craftsmen brought their own tools and worked with raw materials given by the trader. The trader then took the produce and sold it in the market. In this way slowly the control of the trader over the craftsmen increased. This phase is called 'proto-industrialisation' – a phase in which more and more people took to craft production and traders established control over the workers and a large market for craft produce developed across the world.

## Beginning of Industrial Revolution 1750-1850 AD

Many changes occurred during this period. In about 1750, machines and steam power began to be increasingly used to produce goods, to move goods and people from one place to another. Several people living in villages moved to towns and cities for work. Today we use many machines in our daily lives and use goods produced using machines. This was the beginning of 'machine age' in Britain.

As the demand for cloth and so on increased manifold, many artisans wondered how they could increase production to cope with the demand. Some of them began thinking, 'These days there is a great demand for our cloth. But we are not able to produce more cloth to meet this demand. Besides, the cloth made with our looms is expensive. If we can make machines which can spin yarn faster and weave cloth faster, we will be able to produce more cloth at a lower price. Then more people will want to buy our cloth and we can earn more money.'

As a result of the pressure of trade and work several people attempted making such machines. Then came the long awaited invention – a machine which could spin lots

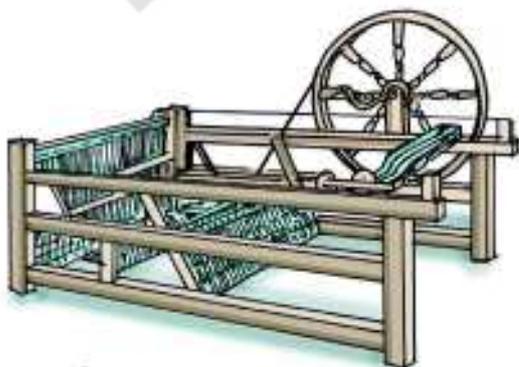


Fig 10.1 Spinning Jenny - A new machine to spin yarn.

of yarn in a short time. However, these machines were very heavy and the artisans thought, 'It is so tiring to turn these machines with our hands or feet. How nice it would be if these machines could turn by themselves.' Their dream also became true with the famous invention of James Watt – the steam engine.

### James Watt's Invention

James Watt was an English craftsman who made machines. He noticed that steam had so much strength that it could move enormous weight. With this in mind, he made a machine which would run with the help of steam and would not need to be driven by men or animals.

He showed his invention to an industrialist called Boulton and the two entered into a partnership to make such machines. Boulton invested the necessary money and also paid Watt a salary. Watt made the steam engine. The understanding between them was that if they made profit then two thirds of it would be Boulton's and one third would be Watt's. The two together

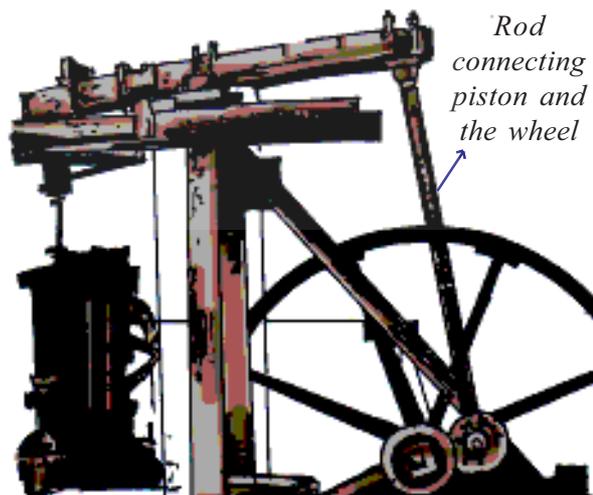


Fig 10.2 This is one of the steam engines made by James Watt. The piston under the pressure from the steam pushes the rod up and down which in turn turns the wheel.

made a large number of steam engines, sold them, and made huge profits. Once it became clear that machines could be made to run on steam, then such machines came to be made for all kinds of work – spinning, weaving, making iron tools, driving vehicles and ships, etc.

- ◆ How did the need for self-driven machines emerge in England?
- ◆ This example shows the arrangement between a scientist-inventor and a capitalist. Do you think it was a just arrangement?

## Factory System of Production

During 1750-1850, a new system called the ‘factory system’ emerged. In the place of simple tools and manual power, new machines and steam power came to be increasingly used. Production was now carried on in a place called ‘factory’, unlike what we read earlier where production was happening in homes. Hundreds of workers were brought together to work in these large factories. Machines became important in place of minor tools and handlooms. They produced goods on a very large scale.

All facilities for production were owned and managed by individuals called capitalists. They invested money to bring workers, raw materials and machines. Everything belonged to the owner of the factory, from raw materials and machines to finished products. Unlike in guild system workers worked for wages and did not own things that they produced.

The early factories were dreadful places to work.

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## The Experience of a 19<sup>th</sup> Century Child Worker

In the 19<sup>th</sup> century the industrial workers of Europe had to face several hardships. Let us read about the experiences of a child employed in an English coal mine.

“I have been working in these mines since I was four. Workers hew coal with pickaxes and fill the large wagons with it. Our job is to push these loaded wagons to the point from where horses or mules can haul them. This is a very difficult job. Hauling the loaded wagons through water and slush and over very steep slopes leaves us very tired. We have to work in this way for more than 12 hours a day. We are so tired by the time we return home that we don’t even feel like eating. Yesterday, I fell asleep on the way to my house. My mother searched for me and carried me home.”



*Fig 10.3 Children pushing cart inside coal mine.*

There were several movements to stop employing children in this manner in factories and mines. In response to these movements child labour was banned and now it is a thing of the past in most European countries.

### Inside Early Factories

Major changes swept industries with the coming of machines. Machines could be worked by even unskilled persons. Thus skilled artisans were no longer required. In their place a large number of women and children were employed and made to work for meagre wages.

Machines cost a lot of money, and ordinary artisans could not afford them. Only wealthy merchants could set up mechanised factories.

This is what the workers had to say about their plight:

“Everyday we come for work at 6 am. and worked till 8.30 pm. There is lunch break of only an hour. By the end

of the day we are so tired. Then the factory owner uses whips to goad us to keep working.

These days new machines are being introduced constantly. These machines can do the work of several workers at the same time and therefore fewer workers are required. Everytime a new machine is introduced many of us are thrown into the street.”

Most of these workers had no other option as they had been expelled from their lands and if they were small craftsmen, their shops had closed down. Gradually, workers of factories and mines formed their own organisations to fight against the conditions of work. In the beginning, they demanded 10 or 8 hours working day, higher wages, disallowing children under 14 years of age from being employed in mines or factories, etc. Over time, their struggles were successful and the conditions of workers improved.

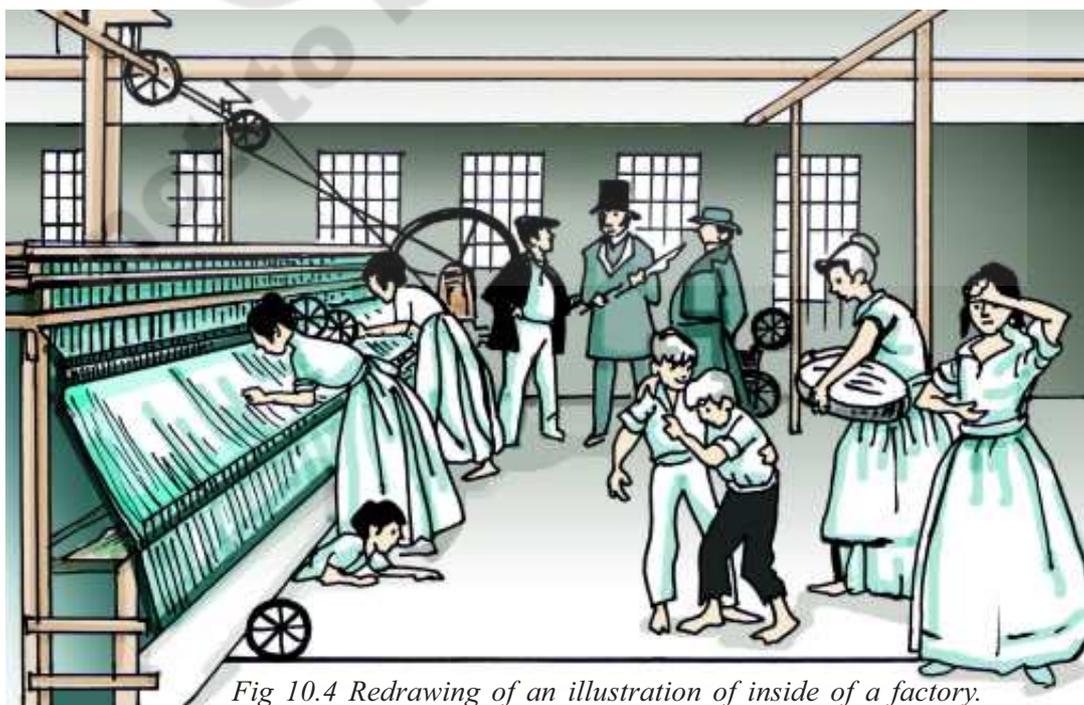
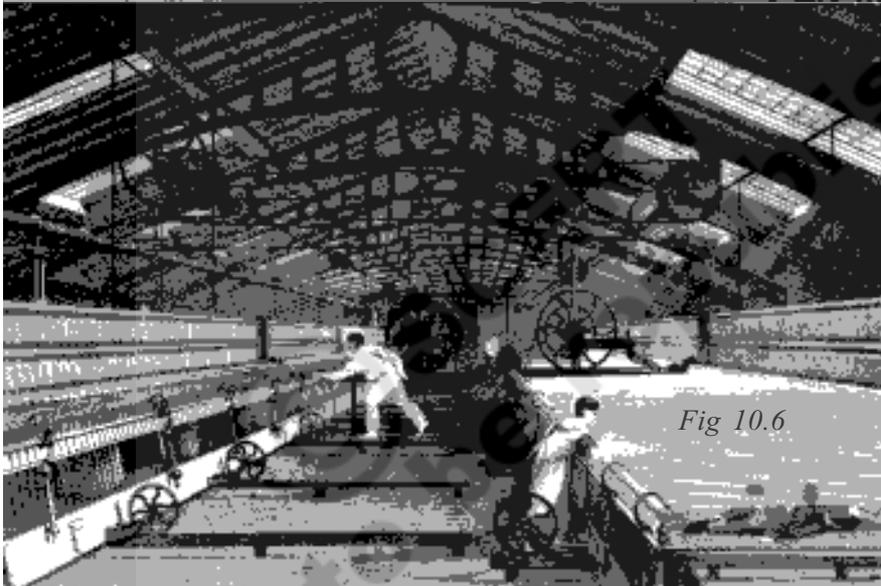


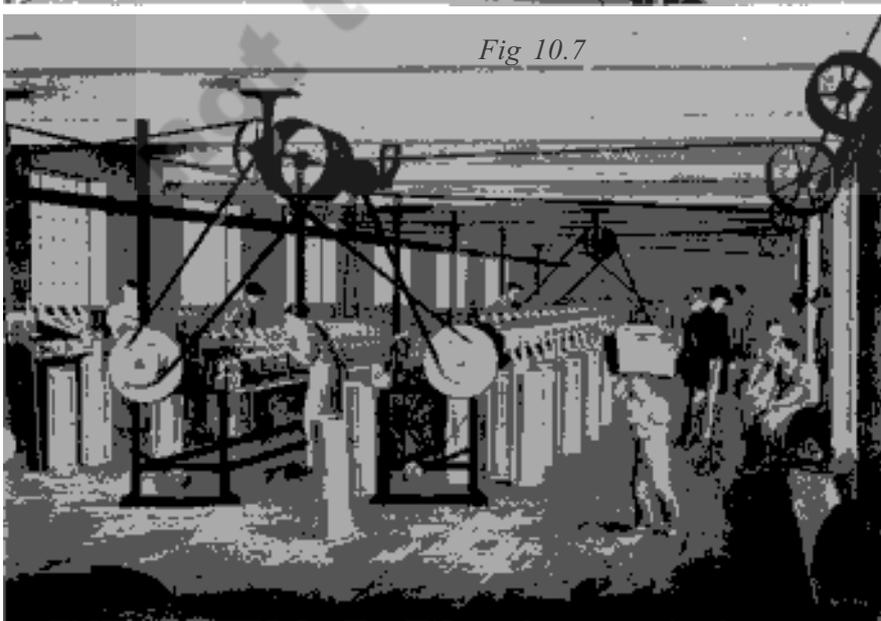
Fig 10.4 Redrawing of an illustration of inside of a factory.



*Fig 10.5*



*Fig 10.6*



*Fig 10.7*

*Fig 10.5, 10.6 & 10.7*

- ◆ Look at these illustrations. These were made during the time of Industrial revolution.
- ◆ What details can you see in these pictures? Describe them.

- ◆ Who were employed to work on machines?
- ◆ Do you know of any factory nearby? Compare the conditions of work of that factory with that of English factories 150 years ago.
- ◆ Compare the conditions of workers of a leather tannery with those of the English workers 150 years ago and find out similarities and differences.

The factories too have changed by now. Almost all work has become automated, with machines directed by computers. They require very few people and little manual work to run them.

## Sources of Energy and Industrial Development

You have seen that energy is needed to run machines in a factory. Energy is available from coal, electricity, petroleum, and so on. Initially industries depended upon energy from coal and steam. Subsequently, several other sources of energy like thermal and hydro electricity, petroleum, natural gas, nuclear energy and solar energy have been harnessed.

## Transport Revolution

The invention of steam engine boosted shipping industry. It also reduced the cost of transportation by one third of cost of road transport. Yet people looked for better ways of transportation. The next big thing in the context of transport was adaptation of steam engine to locomotives. George Stephenson's locomotive pulled heavy loads along a 64 kilometre track from Liverpool to Manchester at 46 kilometer speed per hour.

In 1840s, John Loudon McAdam devised a method of laying road using broken stones. This created a hard surface which was an important advancement in road construction. Within another decade bitumen-based binding which we see in our areas as tar(mac) roads were built. This was further followed by the use of motor cars.

In the early part of the 20<sup>th</sup> century aircrafts were developed by Wright Brothers and today air transport is a major method of transport.

## Trade in Industrial Products

Industrial production increased so much that it was not possible to sell all the products in their own countries. The factory owners began to sell them in other countries too. Machine made goods were cheap and durable. Hence the demand for them increased all over the world. This gave a boost to the industries in England and other countries. However, what is interesting is that these countries did not have the raw materials required for production of these goods. For example, the cotton needed for producing cloth was grown in India and America. English traders purchased these raw materials from India and other countries and sold them to factory owners. Subsequently, the traders purchased the finished products and sold them in countries like India, America, etc.

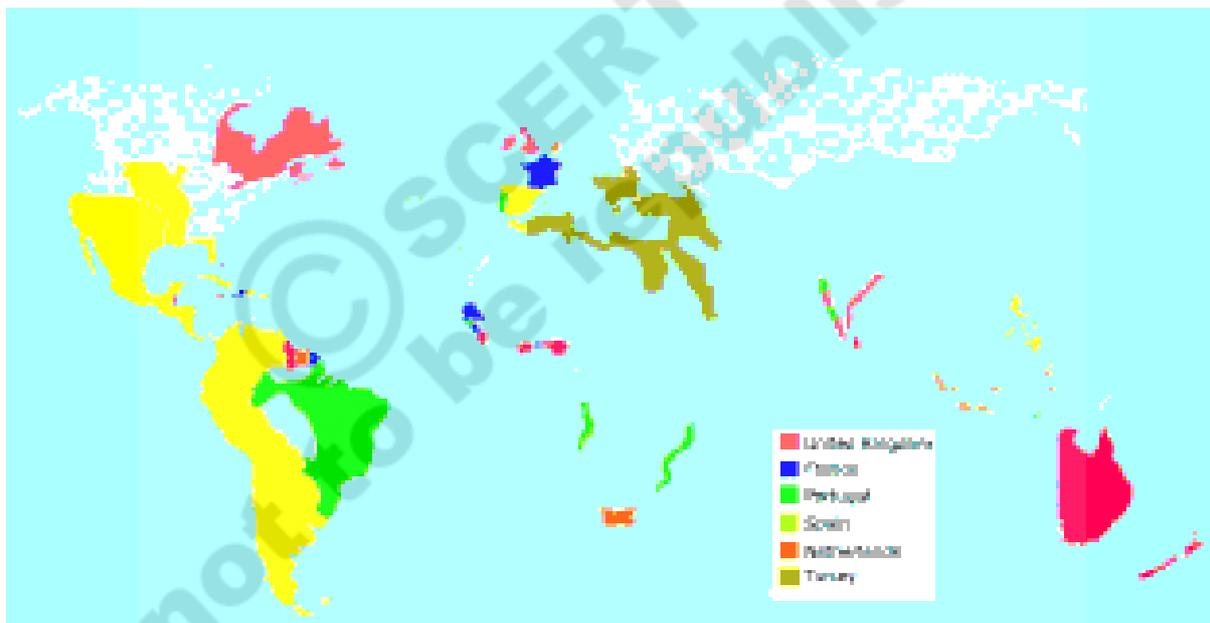
In order to serve the interests of their trade and industry the Europeans sought to subjugate these countries. Other countries like France, Germany, Spain, Portugal, Belgium, Holland and others conquered colonies for themselves in Asia, Africa, Australia and America ('Colonies' are

those countries whose resources are used for the benefit of another country). These European countries exploited the colonies in other continents and grew wealthy in the process.

## Urbanisation and slums

Industrial revolution led to gradual shift of people from the villages to the towns. Industries and other urban activities gave people the necessary livelihood. As people moved to the towns which were newly emerging, they settled down in makeshift houses and shelters which were cramped

and had little sanitation or other facilities. Accidents, diseases and epidemics were common. Most workers' residential areas lacked proper ventilation, health and sanitation facilities. Slums became common scenario in towns and cities especially near the factories and mines. At the same time, distinct quarters came up for the rich and powerful which were well provided in terms of open spaces, sanitation, water supply, roads and other facilities. Slowly people fought for civic rights and the conditions of the workers quarters also improved.



Map 1: A world map showing colonies of European countries in 1800

### Key words :

1. Revolution
2. Production
3. Factory
4. Organisation
5. Nuclear Energy
6. Urbanisation
7. Child worker
8. Slums

## Improve your learning

1. Correct the false sentences:

### Under the putting out system

- a. *Spinners took cotton to the weavers.*
- b. *Unlike in guild system traders controlled what product was to be made.*
- c. *All work was done by the same group of people.*

### Under the Guild system

- a. *All small farmers were allowed to learn weaving.*
- b. *Weavers determined prices and quality of the products.*

2. Putting out system is better than factory based production of textiles. Do you agree? Give reasons for your answer.
3. If Kruthika argues “Railways in India were built only for the benefit of the people by colonial rulers” what can you provide to counter it?
4. How will increase in the wages of the workers affect industrial production?
5. Why did factory owners pay low wages and force workers to work for longer hours?
6. Why do you think the working conditions in factories should be improved?
7. Why is it necessary for government to enact laws to improve the working conditions?
8. Why should children not be employed in factories?
9. Transport system helps the industry – justify this statement in the context of Industrialisation.
10. Locate the following places in the world map.  
a) England                      b) Portugal                      c) France                      d) Spain

### Project work :

- ◆ You may recall lessons on agriculture and trade in Class VI. Compare the nature of farmers and traders in Andhra Pradesh with traders in Britain or Europe. You can use a few criteria and tabulate.
- ◆ Do you know any child in your neighbourhood working in a factory or shop? If you find, how do you respond?