



Industrial Revolution

In the previous chapter, you learned about the 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 that 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 impact the lives of people.

Increasing Control of Traders

From 1500 BCE to 1800 BCE, 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 advance to small farmers and artisans to produce textile goods. During this period, income from farming was low and many peasants lost their farms and grazing lands. Therefore, textile work helped them to make a living.

Under putting-out system, a cloth trader in Britain purchased cotton from a supplier and carried it to the spinners. Then, the yarn was taken by the trader to the next stage of production - the weavers. The cloth was then 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, the 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 as in a factory - that is, the different stages of producing cloth did not happen in the same place but in different households. Each trader engaged 20-25 craftsmen at each stage of production.

Sometime later, the traders brought the craftsmen under one roof so that they could explain their requirements and organise the production more effectively. They set up small workshops called *manufactories*. The craftsmen brought their own tools and worked with raw materials given by the trader. Then, the trader took the product 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 entered craft production, traders established control over the workers, and a large market for craft products developed across the world.

Beginning of Industrial Revolution - 1750-1850 BCE

Many changes took place during this period. Around 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 and machine-made goods in our daily life. This was the beginning of the 'machine age' in Britain.

As the demand for cloth, and other handicrafts increased multiple times, many artisans wondered how they could increase the production to keep up with the demand. Some of them began to think, 'These days, there is a great demand for our cloth, but we are unable to produce more cloth to meet this demand. Besides, the cloth made in our looms is expensive. If we can make machines that can spin the yarn faster and weave cloth faster, we will be able to produce more cloth at a lower price. Then more people would buy our cloth and we could earn more money.'

As a result of the pressure of trade and work, several people attempted to make

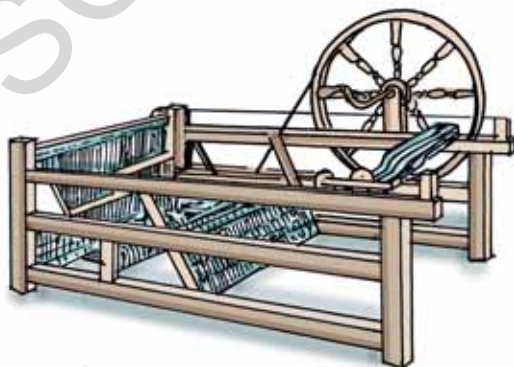


Fig 8.1 Spinning Jenny - A new machine to spin yarn.

such machines. Then came the long awaited invention – a machine which could spin a large amount 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 would it be if these machines could turn by themselves!' This dream also came true with the famous invention of James Watt's steam engine.

James Watt's Invention

James Watt was an English craftsman who invented machines. He noticed that steam had so much strength that it could move enormous weight. To tap this energy, he made a machine which would run with the help of steam and would not need men or animals to drive it.

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 paid a salary to Watt. Watt made the steam engine. They made an agreement

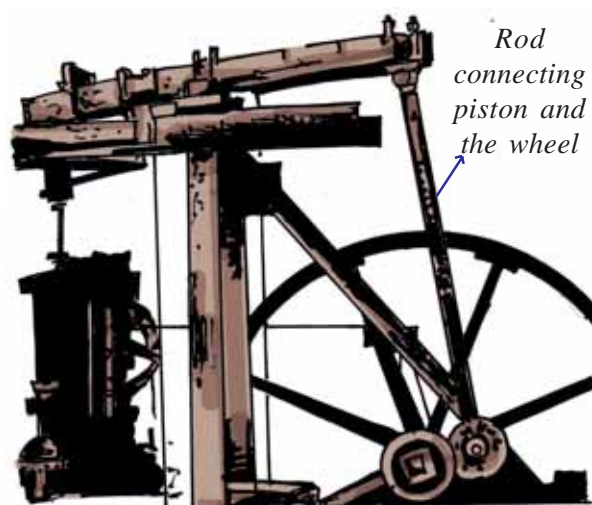


Fig 8.2 This is one of the steam engines made by James Watt. The piston under the pressure from the steam pushes the rod up and down which, in turn, turns the wheel.

between them to share the profits: two thirds to Boulton and one third to Watt. Together, they made a large number of steam engines, sold them and made huge profits. Once it was established that machines could run on steam, such machines were 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?
- ◆ Do you think the agreement between the scientist-inventor and the capitalist fair? Give reasons.

Factory System of Production

Between 1750-1850, a new system called the ‘factory system’ emerged. In place of simple tools and manual power, new machines and steam power came to be used increasingly. Production was now carried out in a place called ‘factory’, unlike what we read earlier, where production took place in houses. 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 the facilities needed for production were owned and managed by individuals called capitalists. They invested money on workers, raw materials, machines, etc. and owned them. Unlike in guild system, workers worked for wages and did not own the things they produced.

The early factories were dreadful places to work.

The Experience of a 19th Century Child Worker

In the 19th 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 a 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. By the time we return home, we are so tired that we don’t even feel like eating. Yesterday, I fell asleep on my way to home. My mother searched for me and carried me home.”



Fig 8.3 Children pushing a cart inside a coal mine.

Several movements were started to enforce a ban on employing children in factories and mines in such pathetic conditions. In response to these movements, child labour was banned both in Europe and US after 1936.

Inside Early Factories

Major changes swept the industries with the coming of machines. Machines could be worked on 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:

“Every day, we come for work at 6 am. and work till 8.30 pm. The lunch break is only for an hour. By the end of the day,

we are too tired to work. But the factory owner uses whips to goad us to keep working.

These days, new machines are being introduced constantly. Since they can do the work of several workers in the same time, fewer workers are required. Every time 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 for 8 or 10 hours working day, higher wages, disallowing children under 14 years of age from being employed in mines or factories etc. Over time, the struggles and their conditions were improved.

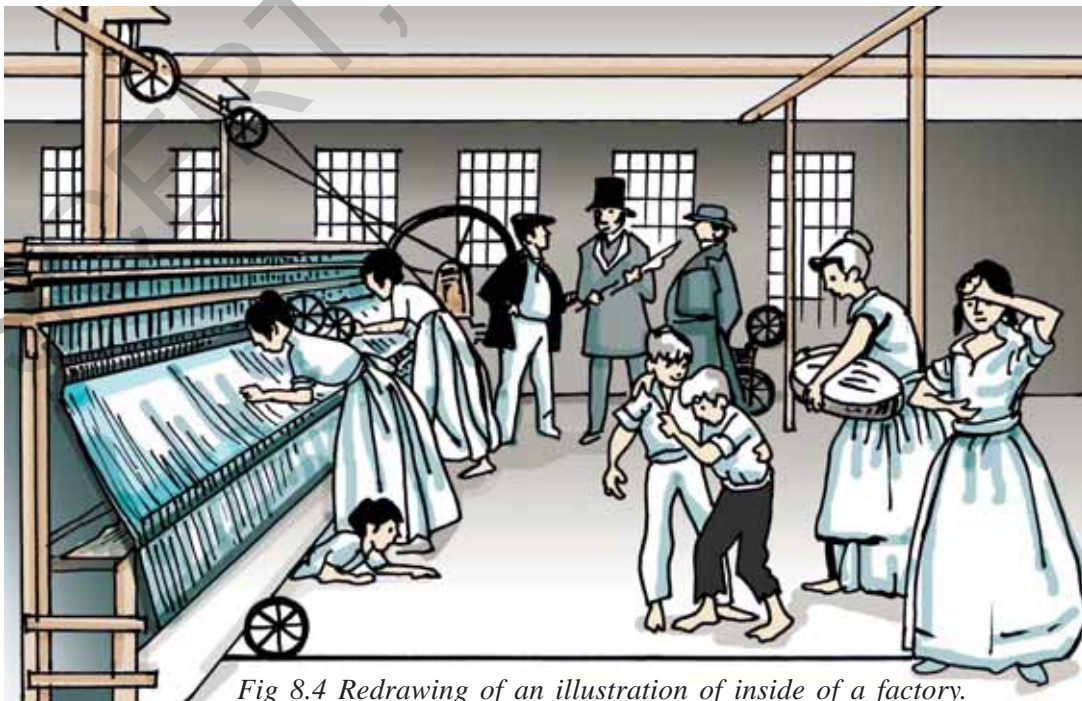


Fig 8.4 Redrawing of an illustration of inside of a factory.

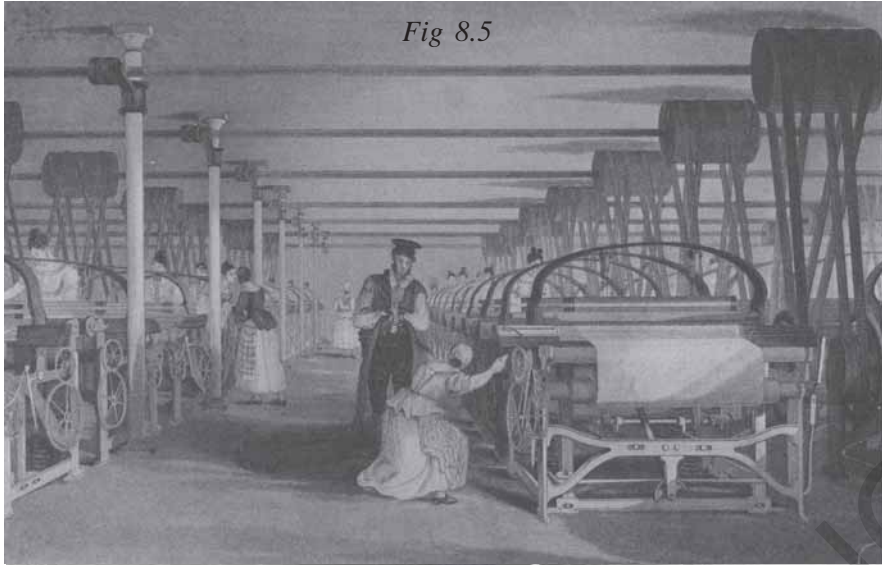


Fig 8.5

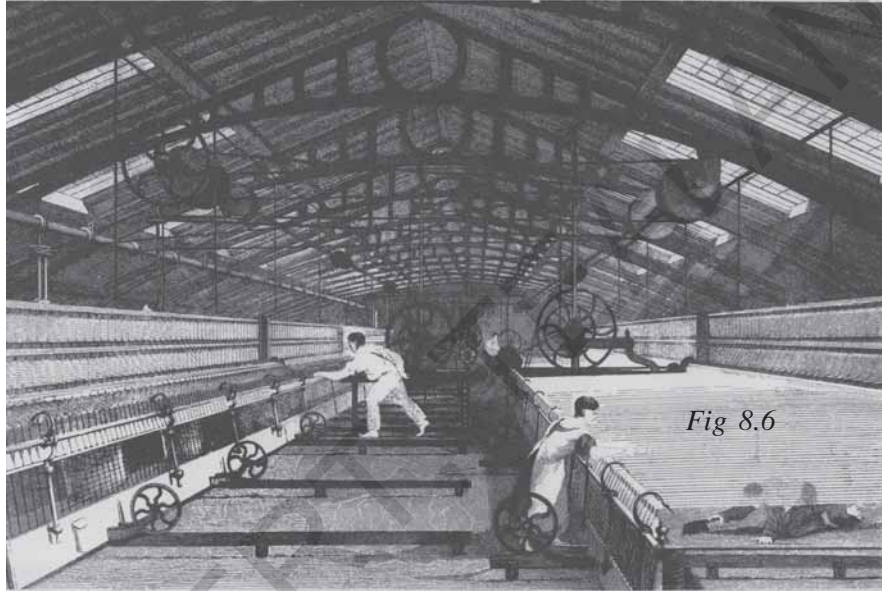


Fig 8.6

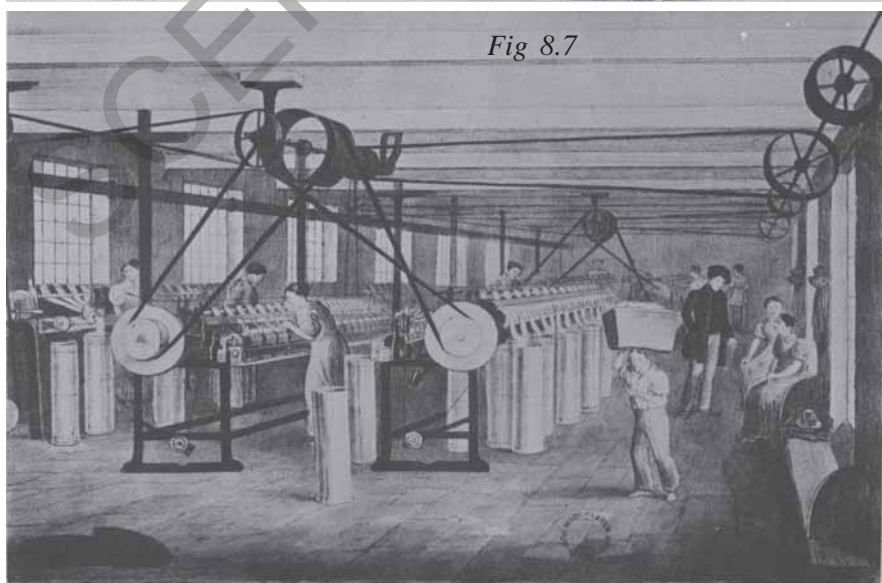


Fig 8.7

Fig 8.5, 8.6 & 8.7

♦ Look at these illustrations. They are called etching. There were no photograph, but the artists tried to show the details in them. They were made during the time of Industrial revolution There is also a redrawn illustration on the previous page in colour. How are these pictures different? Which illustration shows more detail? Do you notice children in these illustrations? What details of a factory do you see in them?

- ◆ Who were employed to work on machines?
- ◆ Do you know any factory nearby? Compare its conditions of work with that of English factories of 150 years ago.

The factories too have changed by now. Almost all the 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 the energy from coal and steam. Subsequently, they started using several other sources of energy like thermal and hydroelectricity, petroleum, natural gas, nuclear energy and solar energy.

Transport Revolution

The invention of steam engine boosted the shipping industry. It also reduced the cost of transportation to one third of the cost of road transport. Yet people looked for better means 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 a speed of 46 kilometers per hour.

In 1840s, John Loudon McAdam devised a method of laying the road using broken stones. This created a hard surface, which was an important advancement in the

construction of roads. 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 20th Century, an aircraft was developed by Wright Brothers and today, air transport is the fastest means 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, the interesting thing about them is they did not have the raw materials required for the 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.

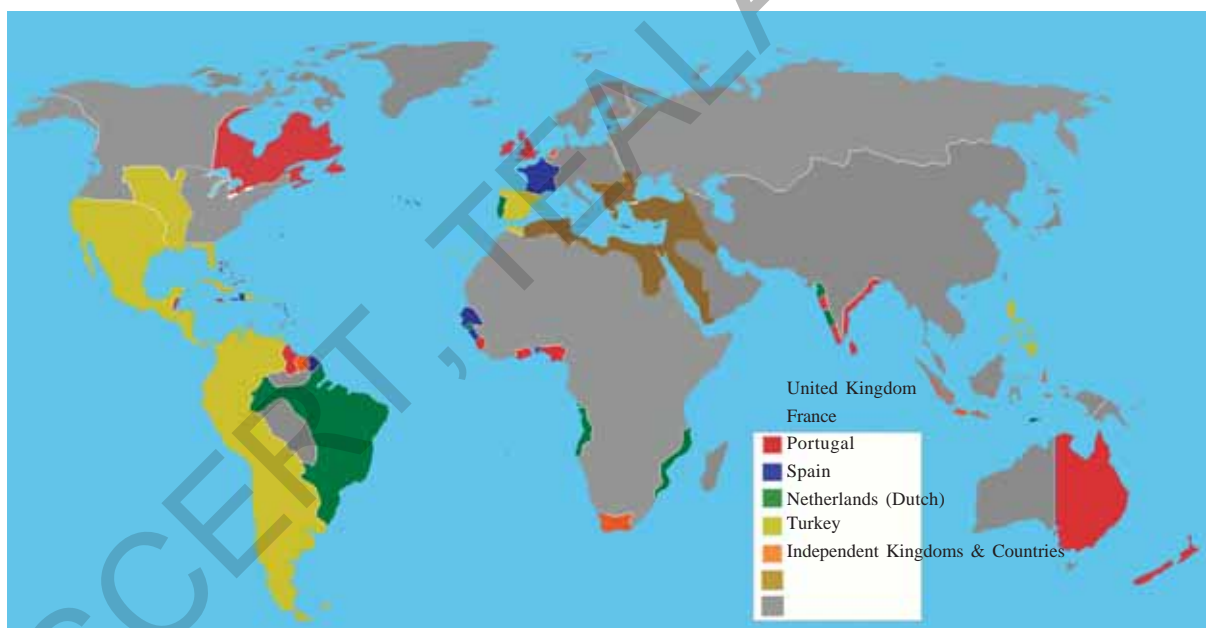
In order to serve the interests of their own trade and industry, the Europeans sought to subjugate these countries. Other countries like France, Germany, Spain, Portugal, Belgium, Holland etc, which considered themselves as mother countries, conquered colonies in Asia, Africa, Australia and America ('Colonies' 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. Look at the map given below showing the European countries and their colonies around the world in 1800.(map1)

Urbanisation and slums

Industrial revolution led to gradual shift of people from villages to towns. Industries and other urban activities gave livelihood to many people. As people moved to 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 the powerful. These areas well provided in terms of open spaces, sanitation, water supply, roads and other facilities. Slowly, people fought for their civic rights and the conditions of the workers quarters also improved.



Map 1: A world map showing colonies of European countries in 1800. Do you notice at this time most colonies were coastal areas including in India. Look at the map of Africa on page 61 and describe the change?

Keywords :

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 the 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 the 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 the colonial rulers”, how can you counter this statement?
 4. How will the increase in the wages of 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 are children not allowed to work in factories?
 9. Transport system helps the industry – justify this statement in the context of Industrialisation.
 10. Locate the following countries in the world map.
 - a) England
 - b) Portugal
 - c) France
 - d) Spain
 11. Read the para ‘Urbanisation and slums’ of page 84 and comment on it.



Project:

1. You may recall the chapter on agriculture and trade in Class VI. Compare the nature of farmers and traders in Telangana with traders in Britain or Europe. You can use a few criteria and tabulate.
2. Do you know any child working in a factory or shop? If you find, how do you respond?