

THE DEVELOPMENT OF EUROPE

Today European countries are known for their industrial development and their industrial products like cars, airplanes, ships, machines, electrical equipment, textile, etc. These industrial products of Europe are sold all over the world. Europe owes its power and prosperity to its industries. However, just two or three centuries ago industries had not developed in Europe.

A process of change swept Europe after 1700, which resulted in rapid industrial development. These changes began in England and eventually spread to all the other European countries. In this chapter we shall read about some aspects of this process.

Changes in Rural Life

Before 1500, most people in Europe lived in villages and cultivated land. Most of the land was owned by big landlords. The peasants cultivated their lands and gave the landlords a large part of their produce as rent.

- *Does a similar situation prevail in your region even today?*

In the period between 1500 and 1600 (the 16th century) trade between countries began to increase rapidly. The landlords of England thought that they should take over all the lands, produce and sell grain themselves, and profit from the increased trade. They began to throw out the peasants from their lands. These peasants began to wander in search of a living. In this way large farms were formed in which a new kind of agriculture was practiced using different kinds of machines. As a result production increased but the small peasants were deprived of their livelihood.

- *What could the small peasants have done for a living?*
- *How do you think the landlords managed without peasants to work on the land?*

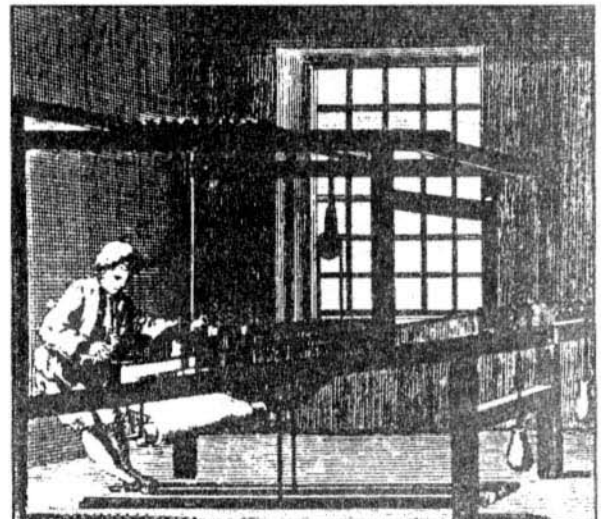
- *Discuss the problems being faced by small peasants and landless labourers in your region.*

Along with changes in farming, important changes were also taking place in craft production.

Changes in Craft Production

Before the 17th century, craftsmen living in villages and towns made things at home with their own hands and sold them in the local market. All members of their family

Fig. 1 A weaver weaving on his handloom at his home



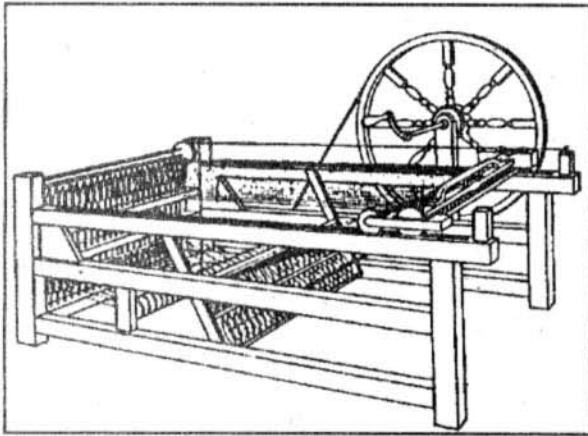


Fig.2 'Spinning Jenny' - A new machine to spin yarn

participated in this production in one way or the other. For example in cloth production, women spun yarn and dyed it while the men wove cloth and sold it in the market. As trade increased changes began to affect the artisans too.

After 1600, some weavers 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 and we can sell more and 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 of yarn in a short time (Fig. 2). 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 the machines could turn by themselves.' This dream also came 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 weights. With this in mind he made a machine

which would run with the help of steam and did 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 made a large number of steam engines and 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?*

DEMAND FOR IRON AND COAL

The use of machines became common in England. However, there was a great need for good quality steel and coal to make and drive these machines. The methods by which iron ore was made into steel were very expensive.

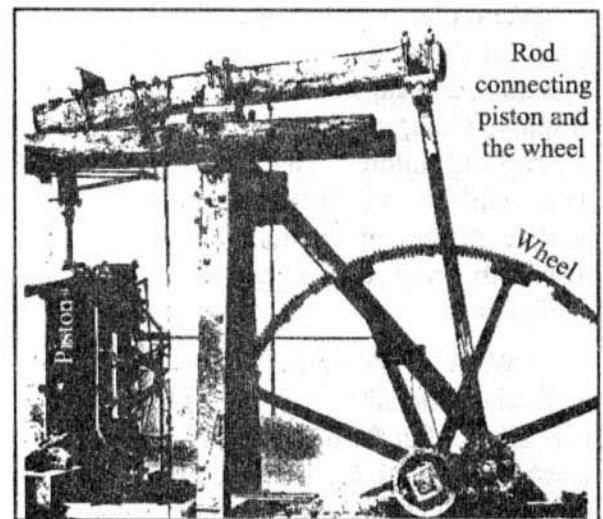


Fig. 3 This is one of the steam engines made by James Watt. The piston under pressure from the steam pushes the rod up and down which in turns the wheel

Yet, the steel that was made in those days was not strong enough. So the scientists, artisans and industrialists of England began to search for methods for making good steel. Many new methods were invented. The most important were:

1. The use of coal instead of wood or charcoal in the furnace for smelting iron ore. Coal was cheap. Besides, it also generated more heat in the furnace. However, it had to be mined from the earth.

2. The use of steam engine to blow air into the furnace to increase the temperature and reduce the time taken and improve the quality of steel.

The use of coal made it possible to produce good quality steel at low costs. It was also used to heat water for steam engines.

- *The use of coal in industry increased manifold during this period. Can you read the above section once more and list the reasons for this?*

Coal Mines and Industrial Centres

As the demand for coal increased, there were extensive surveys to identify coal deposits. Large coal deposits were discovered in several places. A list of coal belts has been given in the accompanying table. Extensive coal mining began in these places. Mine owners employed a large number of people including women and children to haul coal to the surface. These children were paid half the wages of the adult workers. Thus the mine-owners were able to sell the coal quite cheap and amass huge profits.

With growing mining and industrialization the landscape of Europe began to change. After the discovery of coal deposits, forests and lush fields in vast regions gave place to large coal mines, settlements of miners and small industrial centres. To begin with, the iron and steel industry developed around coal mines. This was because it took twice as much coal to

Coal Producing Areas of Europe

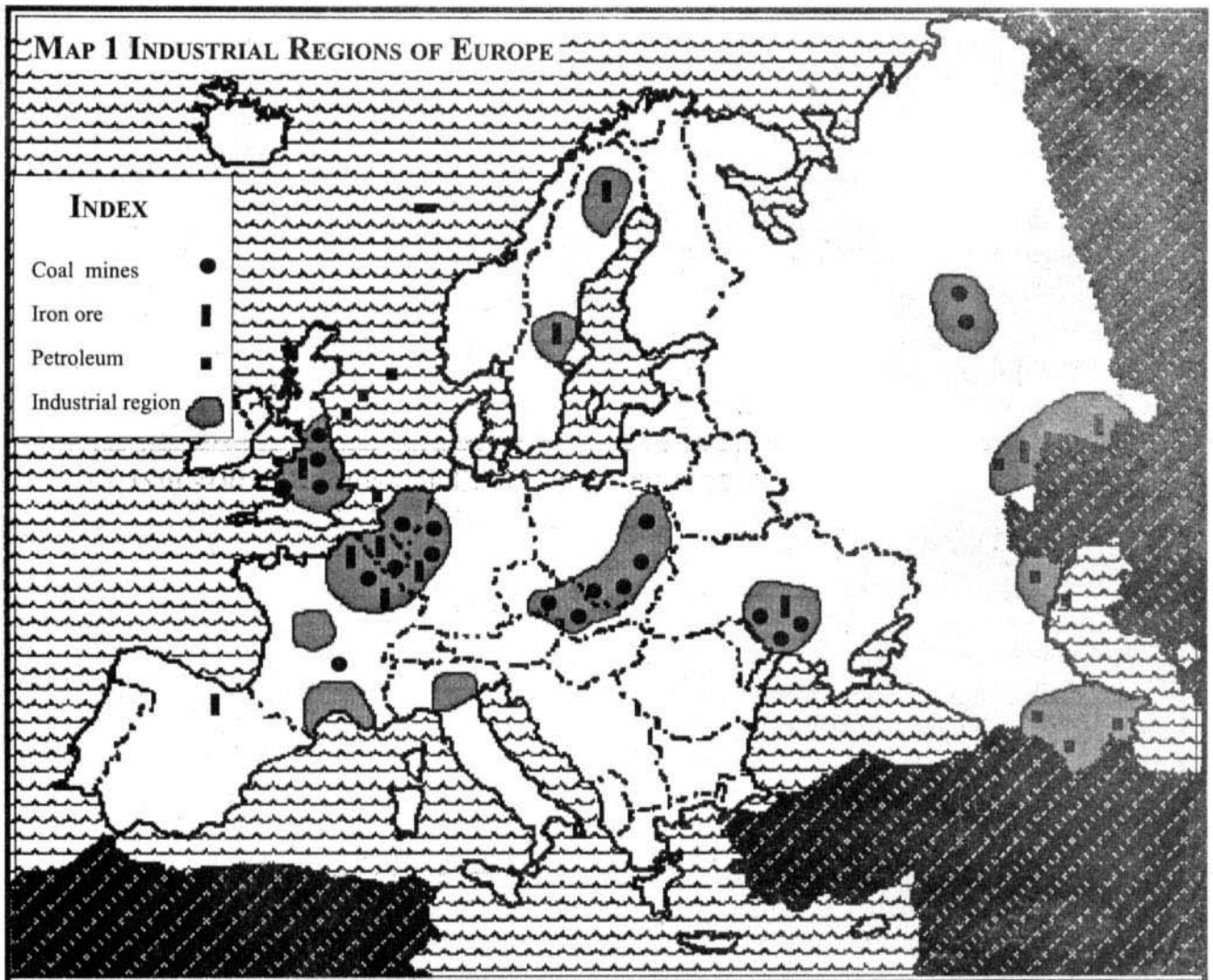
Germany –	Ruhr-Westphalia region and Zhar region
Poland –	Upper Silesia
Britain –	Yorkshire, Oxfordshire, central Appenine mountain region
Ukraine –	Donets river basin
Russia –	Moscow-Tula region
Hungary –	Pax and Comolo region

make steel as it did iron. It was, therefore, cheaper to transport iron ore to the coal mines than to transport coal to the iron ore mining regions. Thus coal mine areas also became centres of steel production.

Several other industries like machine making, textiles, etc. also began to develop in that area due to the easy availability of steel and coal. Thus large industrial cities began to develop around coal mines.

- *List the countries with major coal deposits in Europe using map 1.*
- *Mark the following statements true or false:*
 - Coal is found in Portugal.*
 - Industrial regions can be found wherever there are coal mines.*
 - Spain is part of a large industrial zone.*
 - Wherever there are industrial zones we find coal mines too.*

The process of industrialisation of Europe, which began 200 years ago, has now reached full development. A large majority of Europeans now work in industries and live in cities. Even agriculture is done largely with the help of machines and very few people work on the fields.



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 the factory owners. Subsequently the traders purchased the finished products and sold them in India, America, etc.

In order to serve the interests of their trade and industry the Europeans sought to subjugate these countries. Besides England, now 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). You will read more about this next year. These European countries

THE EXPERIENCE OF A 19TH CENTURY CHILD-WORKER

In the 19th century the industrial workers of Europe had to face severe hardships. Let us read about the experience 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. We are so tired by the time we return home that we collapse in our beds and sleep... 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.”

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.

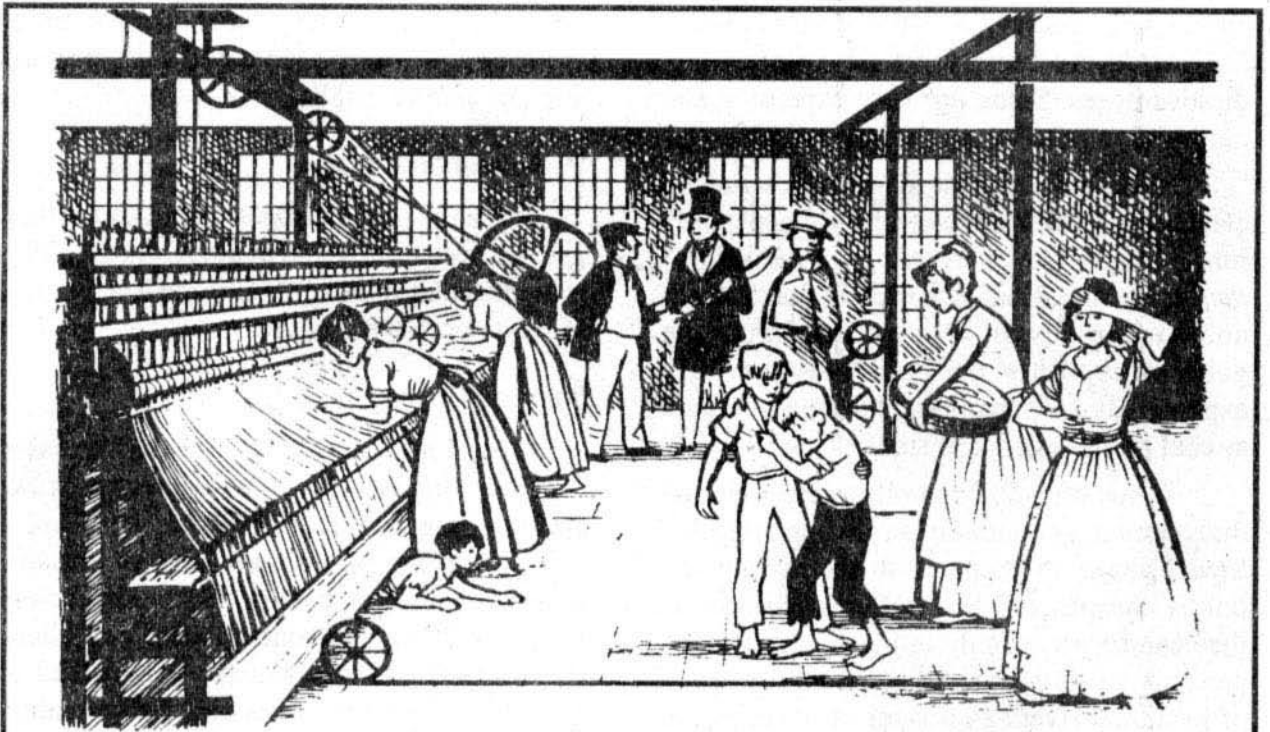
Machines cost a lot of money, and ordinary artisans could not afford them. Only wealthy merchants could set up mechanised factories.

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

“Every day we come for work at 6 a.m. and work till 8.30 p.m. There is a lunch break of only an hour. By the end of the day we are so tired that we cannot work. 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 organizations to fight against the conditions of work. In the beginning they demanded 10 or 8 hour 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 the workers improved.

- *Who were employed to work on the 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 the workers of the leather tannery with that of the English workers 150 years ago and find out the similarities and differences.*

Today, children are not employed in factories or mines in most European countries. The working hours have also reduced greatly; they now work for only 6 to 8 hours for five days a week. They also get sufficient wages to live in comfort. However, even today the problem of unemployment persists. Ten out of every hundred persons in Britain are unemployed. They get an unemployment allowance from the government.

exploited the colonies in other continents and grew wealthy in the process.

- *The industrialists of Europe purchased their from other countries and sold their in those countries.*
- *The cotton for England's textile mills came from and*
- *What impact would this trade have had on the artisans of countries like India?*

SOURCES OF ENERGY AND INDUSTRIAL DEVELOPMENT

You have seen that energy is needed to run the machines in a factory. Energy is available from coal, electricity, petroleum, etc. 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, solar energy, etc. have been harnessed. Each of these have their advantages and disadvantages. Some are very expensive and others harmful to the environment.

Nowadays almost all factories run on electricity. How are the electricity generators run? Initially they were run with the help of *thermal power*. Coal was used to make steam and steam power was used to run the generators. This method was not only expensive but also harmful to the environment as coal produces a lot of smoke.

Generators also run on waterpower and the electricity produced in this manner is called '*hydel power*'. Compared to thermal power, this is cheaper and less polluting. However, they can be set up only in places which have perennial rivers or waterfalls. Europe has plenty of perennial rivers as it rains all through the year. Melting snow also keeps the rivers flowing in the summers.

Today, in many countries of Europe, hydel-power is the main source of electricity. For example, almost the entire power requirement of Norway is fulfilled with hydel-power. You have read about the snow covered Alps in Central Europe. A large number of perennial streams and rivers start from the Alps. That is why countries situated in the Alpine valleys, like - Austria, Switzerland, Italy,

Germany, etc. generate most of their electricity from hydel-power plants fed by perennial streams and waterfalls.

Petroleum and Gas

A large reserve of petroleum and natural gas has been discovered in the North Sea. This provides countries like Britain and Norway fuel to run their power houses.

Nuclear Energy

Even nuclear power has been harnessed for generating electricity. Several countries like Britain, France, Russia, Ukraine, etc. have a large number of nuclear power houses. However, nuclear energy can be extremely harmful to the environment and can cause serious diseases and genetic deformities in people, animals and plants of the surrounding area. Sometimes radioactive materials leak from these power houses and kill a large number of people.

Since most sources of energy which we use are either environmentally harmful or are not likely to last forever, scientists and engineers have been trying to harness new sources of energy like solar, wind and tidal power. These are non-polluting and are likely to last forever. In contrast, the reserves of petroleum, gas or coal are limited and are likely

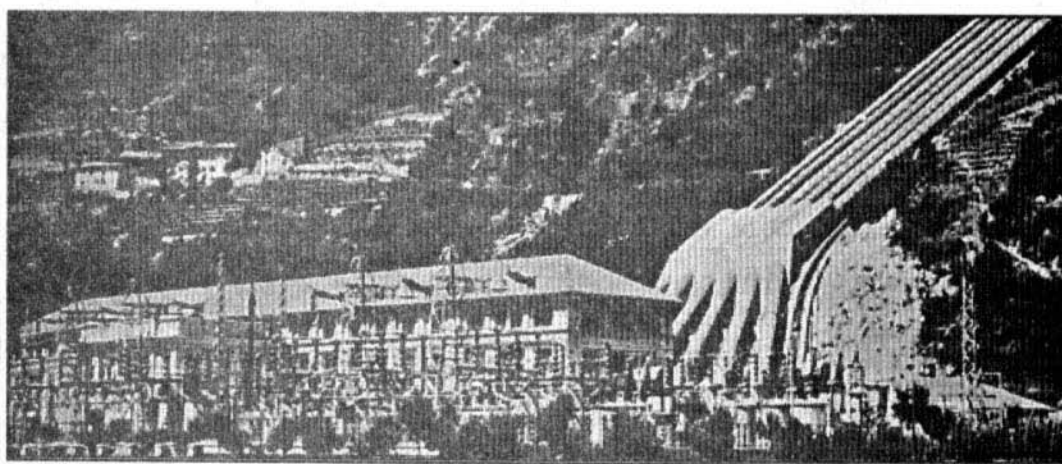


Fig. 4 A hydroelectric plant in northern Italy situated on the slopes of the Alps. Water is brought down the slopes in large pipes to the powerhouse. The waters descend with a force that turn the turbines of the generators.

to be exhausted sooner or later. However, till today the cost of harnessing these new sources of energy are very high and we have to wait till cheaper methods are invented.

European countries have made great progress in electricity generation and this has formed the basis of their industrial development.

- You have read about different sources of energy, which can be used to make electricity. Each of them has its advantages and disadvantages. Discuss in your class which method would be most suited to your district.*

Iron and Steel Industry

The metal industries are very important in Europe. Deposits of good quality iron ore are available in many places in Britain, France, Germany, Norway, Sweden, etc. Several other metals like manganese, cobalt and nickel are also needed for making steel. These are available in countries like Russia, France and Germany. That is why these countries are in the forefront of steel manufacturing in the world. Steel is used extensively in ship building, automobiles, aeronautic industries and also in heavy machinery. Today Europe accounts for nearly half of the world's steel production and is in the forefront of machine building industries.

It should be noted that today industries are no longer concentrated around coal mines. As new sources of energy have been harnessed it is no longer necessary to be near sources of coal. In fact the industries have shifted to ports and harbours to use sea transport easily. In this manner new industrial centres have developed.

Petrochemical Industries

Over the last 50 years the use of chemical fertilisers in agriculture has increased manifold all over the world. Besides this, the use of petroleum products has increased on a great scale. We get a very wide range of things from



Fig-5 A factory which produces chemicals from petroleum

petroleum. Besides diesel, petrol and aviation fuel we also manufacture chemical fertilisers (like urea), plastic, artificial rubber, dyes, pesticides, polyester and artificial woolen yarn, etc. after refining crude petroleum.

All this has contributed to the massive expansion of chemical industries after the 1950s. These industries use coal, petroleum, sulphur and different kinds of salts. Several European countries like Germany, France, Russia and Britain have developed chemical industries.

The petrochemical industry is concentrated in oil producing regions of Britain, Holland, Ukraine and Russia. Countries like France, Germany and Italy, which do not produce oil, import oil from other countries for their chemical industries. All these countries are important exporters of goods like chemical fertilisers, plastic, polyester, etc.

- Look at map 1 and name three countries which produce petroleum.*
- Which of these countries have a large chemical industry-*

<i>Spain</i>	<i>Hungary</i>
<i>Italy</i>	<i>Germany</i>
<i>Britain</i>	<i>Russia</i>

DECLINE OF OLD INDUSTRIES AND RISE OF NEW INDUSTRIES

These days even underdeveloped countries have industries of their own. As a result, the demand for European goods has declined. At the beginning of the previous century, the cloth produced in Birmingham was sold all over the world, especially in countries like India. Today the textile industry of our country is so developed that we are currently

the largest producers of cloth in the world. As a result of changes like this, the demand for British cloth has declined and this has led to a decline of the textile industry in Britain. Textile mills of Birmingham have closed down and this region is now called the 'graveyard of textile mills'. Heavy machinery industries have replaced the textile mills in Birmingham.

In the following lesson we shall read about France, a very important country of western Europe.

EXERCISE

1. Why were new machines invented in England?
2. Why did coal and steel assume importance in the early stages of industrialisation?
3. How did the traders of Europe get the resources to set up factories?
4. How did the establishment of factories affect the old artisans?
5. How did the introduction of new machines affect factory workers?
6. Why did people of other countries begin to purchase the products of British factories?
7. Why did Europeans establish their rule over other countries?
8. Where were the early factories established? Why do you think factories are being established in different areas today?
9. Why did the sailors of Europe set out in search of new countries and sea routes?
10. Name the countries which are important producers of iron and steel in Europe.