CHAPTER 8

TRANSPORT AND COMMUNICATION

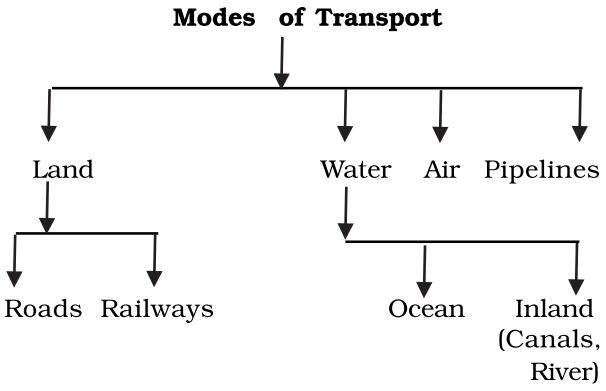
Natural resources, manufacturing enterprises and markets for products are rarely located at the same place. Transport, communication and trade link areas of production of goods and services with areas of consumption. Distance in modern times is being progressively reduced with each improvement in transport and communication facilities. The world economy today will rather grind to a halt but for an efficient transport and communication system. In earlier days, the means of transport and communication were the same. But with the advancement in science and technology, both have acquired specialised and distinct forms.

Transport refers to the carriage of goods and passengers from one place to another using humans, animals and different kinds of vehicles. Such movements take place through land, water and air. Roads and railways form part of the land transport. Waterways and airways are the other two modes. Pipelines are used to carry liquids like water and petroleum, and natural gas. Transport thus includes transport arteries, vehicles to carry people and goods, and the organisation to maintain arteries and to handle loading, unloading and safe delivery.

Communication means conveyance of information from the place of origin to the place of destination through a channel. Postal services, telephone, telegraph and fax services, internet and satellites are some of the major means of communication.

Trade means exchange of goods and services through market channels among places in response to differences in prices or demand and supply. It thus, refers to the flow of goods and services being exchanged between places.

It is now apparent that transport, communication and trade facilitate the movement and exchange of people, goods and services. Transport and communication provide the network of routes, channels and carriers, through which trade takes place. In this chapter, we will discuss about transport and communication. Trade will be taken up separately in the next chapter.



TRANSPORTATION

As we have read earlier, transportation of people, goods and services takes place using different modes — land, water, air and pipes. Each mode of transport has its own importance. Which mode should be used depends on the type of goods and services to be transported, transportation cost and the means of transport available. For example, it is economical to move bulk materials using waterways. International movement of goods in general is handled by ocean freighters. Waterways however, restrict transshipment of

goods from ports to inland destination and they are slow. Road transport is cheaper for small distances and is faster too. It renders door to door service. But if one has to move large volume of bulky materials over long distances especially within a country, railways are most suited. Perishable light and precious goods, on the other hand, can be best moved by air. In a well managed transport-system, the various modes supplement and complement each other.

Land Transport

Most of the movement of goods and services takes place over land. In early days, humans themselves were carriers. In some parts of the world *human portage* is still important, e.g. in thickly — forested regions or rugged mountains where roads are difficult to be constructed. Later, horses, mules and other animals were used as beasts of burden. With the invention of wheel, the use of animal driven carts and wagons, came into prominence. Horse has been the most popularly used animal for riding, carrying load or drawing carts and carriages. The use of animals improved the speed and efficiency of transport, but it was still slow and arduous when compared with the modern standards.

The revolution in land transport was witnessed only after the invention of steam engines in the eighteenth century. Although, the pathways and unmetalled roads have been used for transportation since the earliest times, development of internal combustion engine brought significant changes in the quality of roads and vehicles plying on them. The first railway line was built in 1830, which increased accessibility and connectivity. It opened continental interiors for commercial mining, manufacturing and agriculture.

Among the latest developments in land transportation are ropeways, cableways and pipelines. Ropeways and cableways have been developed in rough and difficult terrain especially the mountainous regions. Liquids like mineral oil, water, sludge and sewers are transported through pipelines.

Roads and Highways

Roads are the most economical means for relatively short distances. Freight transport by road is becoming increasingly important in comparison to rail transport particularly because it offers door to door service. In developed countries, good quality roads are universal and they provide long-distance link in the form of motorways, autobahn, and inter state highways systems facilitating rapid movement. Lorries of increasing size and power carrying very heavy loads are very common now. In developing countries, despite, the lack of good quality roads, the growth of road transport in recent years has been phenomenal.

Highways are metalled roads connecting distant places. Such roads are constructed in a manner that vehicles could ply in an unobstructed manner. As such, these roads are wide as much as 60 metres, smooth and often duel-carriageways with several traffic lanes, bridges, flyovers and embankments are en route to allow uninterrupted traffic flow.

In developed countries, number of vehicles is large and road network is dense. Every city and port town in Europe is linked through highways. In Russia, Moscow is linked by road to eastern city of Vladivostak. In North America, highways link cities located on the eastern and western coasts as well as towns of Canada in the north and those of Mexico in the south. Trans-Canadian-Highway links Vancouver in British Columbia (west coast) and St. John city in Newfoundland (east coast). Likewise Alaskan Highway links Edmonton in Canada and Anchorage in Alaska.

A large part of Pan-American highway has been constructed, which would connect the countries of South America, Central America, and the United States of America. Australia's one of the major road links is Trans-Continental Stuart Highway. It connects Darwin in the Northern Territory and Melbourne in Victoria via Tennant Creek and Alice Spring.

In China, cities in the north and the south, as well as those in the east and the west have been linked through highways. For example,

Tsungtso city located near the Vietnamese boundary in the south is linked with Beijing. Similarly, Shanghai has been linked with Guangzhou in the south and Beijing in the north through highways. A highway has been constructed recently to join Lhasa and Chengdu.

In India, there are a number of highways connecting important towns and cities. National Highway No 7, linking Varanasi with Kanyakumari, is the longest in the country. A golden quadrangle is being developed to connect our metropolitan cities of Delhi, Mumbai, Chennai and Kolkata.

In Africa, a highway joins Algiers across Atlas mountains and Sahara desert, with Conakry in Guinea. Similarly Cairo has also been connected with Cape Town. The construction of good, long distance roads has assisted tourism in many countries. Some of the major roads of this kind have been built in South America. Attempts have also been made to connect the ports with their hinterlands.

The quality of the roads varies greatly between developed and developing countries because construction and maintenance of good roads require heavy expenditure.

Railways

Railways are comparatively cheaper and more convenient mode of transport than roadways in moving goods in bulk over a long distance.

With the opening of the first public railway between Stockton and Darlington in northern England in 1825, railways became most popular and fastest form of transport for both passengers and goods during the nineteenth century. The growth of the railways was brought about by two interrelated factors. Firstly, the steam engine was developed and applied not only to industry but also to transport. Secondly, the rapid rise of industry made it necessary to improve existing transport systems. Railways were the cheapest and fastest carriers of bulky goods a large number of passengers, over a long distances. Commuter trains have become very popular in Britain, the USA, Japan and India. They carry thousands of people every day from one part of the city to the other within no time.

World Railway Patterns : The competitiveness of railways as a form of transport varies greatly from one country to another, because of the high cost of maintenance. Usually they are managed by the government as they come under essential services. Steam engines have been replaced by diesel and electric engines. Speed of trains has increased tremendously. Special services for passengers such as airconditioning, night births, reclining seats and restaurant services are provided for comfortable journey. Freight services have also been improved by introducing wagons with cooling facilities for perishable goods and tankers and containers. Containers can be unloaded directly from ships on to special rail wagons cutting out several loading and packing operations. However, railways all over the world are experiencing severe financial difficulties.

In Asia, railway network is good in India, Japan and China. India with about 93,000 km of railways cover 63,000 route km and more than 7,000 stations. It has the densest network in Asia. In Japan, the total length of railway is 28,000 km. China has more then 35,000 km route length. Other countries of Asia have relatively few rail routes. West Asia is least developed in rail transport because of vast deserts and sparsely populated regions.

In South America, the rail network is particularly dense in the Argentina's Pampas and the coffee-growing region of Brazil. Nearly forty per cent of the total route length of South America is concentrated in this region. There is only one trans-continental railway in South America linking Buenos Aires (Argentina) with Valparaiso (Chile) through the Uspallata Pass across the Andes located at a height of 3,960 metres above mean sea-level. Of the remaining countries only Chile has a considerable length of railway lines, running from Iquique to Puerto Montt, with branch lines that link coastal ports with mining sites in the interior. The railway routes of the other Andean states, e.g. Peru, Bolivia, Ecuador, Colombia and Venezuela, are short and consist mainly of single lines from ports to the interior with no inter-connecting links.

Fig. 8.1 *Trans-Siberian Railway*

Australia has about 40,000 km of railways, of which a quarter is found in New South Wales. There is one trans-continental line running from Perth to Sydney; passing through such towns as Kalgoorlie, Adelaide, Canberra and Melbourne. A major North-South line links Adelaide and Alice Spring but as yet this has not been joined to the line from Darwin to Birdum.

New Zealand's railways are mainly in the North Island linking the main towns of farming areas.

Africa, despite being the second largest continent, has only 40,000 km of railways. Some of the more important routes include the Benguela Railway through Angola to Katanga-Zambia copper belt; the Tanzania Railway from the Zambian copper belt to the sea at Dar-es-salaam, and the railway through Botswana and Zimbabwe linking the landlocked central African states to the South African system. Elsewhere, as in Algeria, Senegal, Nigeria, Kenya, Ethiopia, railway lines run from coastal ports to island centres but do not form a good network or link with lines in other countries. South Africa, with 18,000 km of railways has the densest rail network because of the gold, copper and diamond mining activities.

One of the densest rail network in the world is found in Europe. There are approximately 4,40,000 km of railways, most of which are double or multiple tracked. Important railheads are : Paris, Berlin, London, Brussels, Milan, Warsaw and Moscow. Industrial regions of Western Europe exhibit greatest railway densities. Belgium has the greatest density with one km of railway for every 6.5 sq. km of the country. Passenger transport by rail is more important than freight in many European countries. Underground railways are important in London, Paris and Moscow.

Trans-continental railway lines of Europe have now lost their importance with evergrowing quicker air transport and more flexible roadways.

North America has at present the most extensive network of railways making up nearly 40 per cent of the world' total. The railway network today is used extensively for the transport of bulky freight like minerals, grains, timber and manufactured product over long distance. It, however plays an

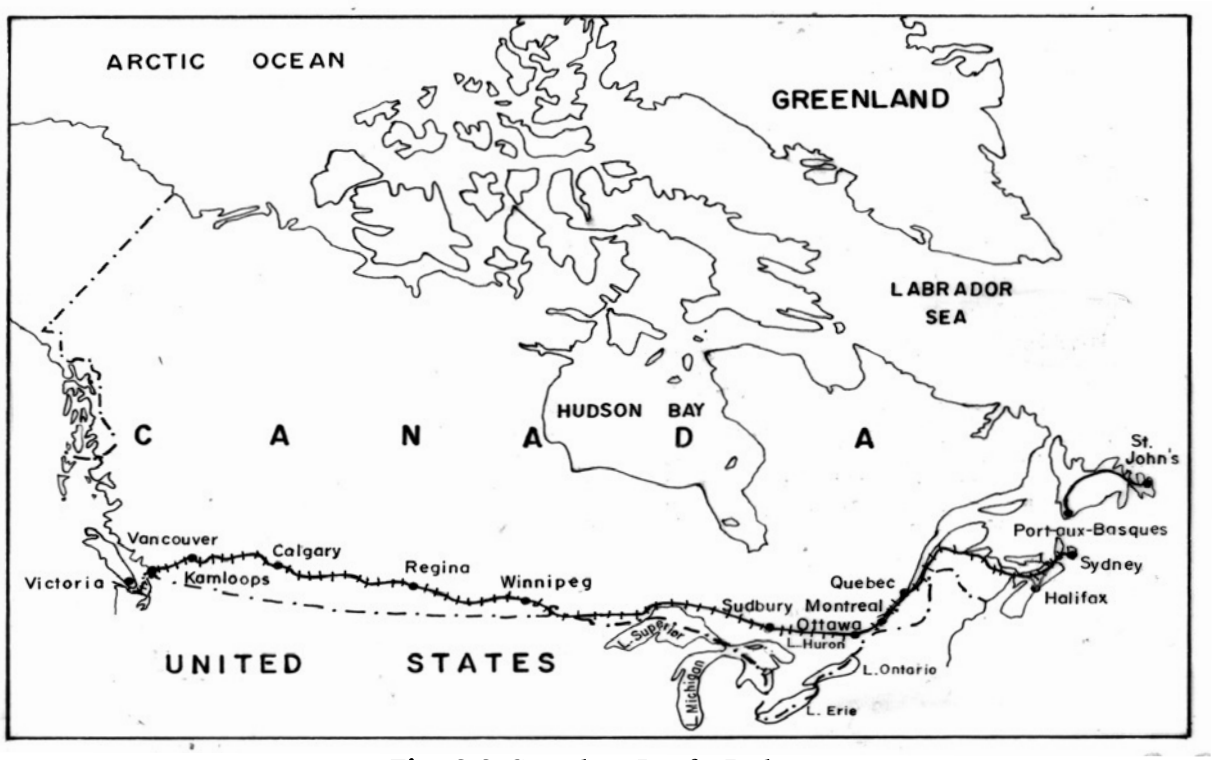


Fig. 8.2 *Canadian Pacific Railway*

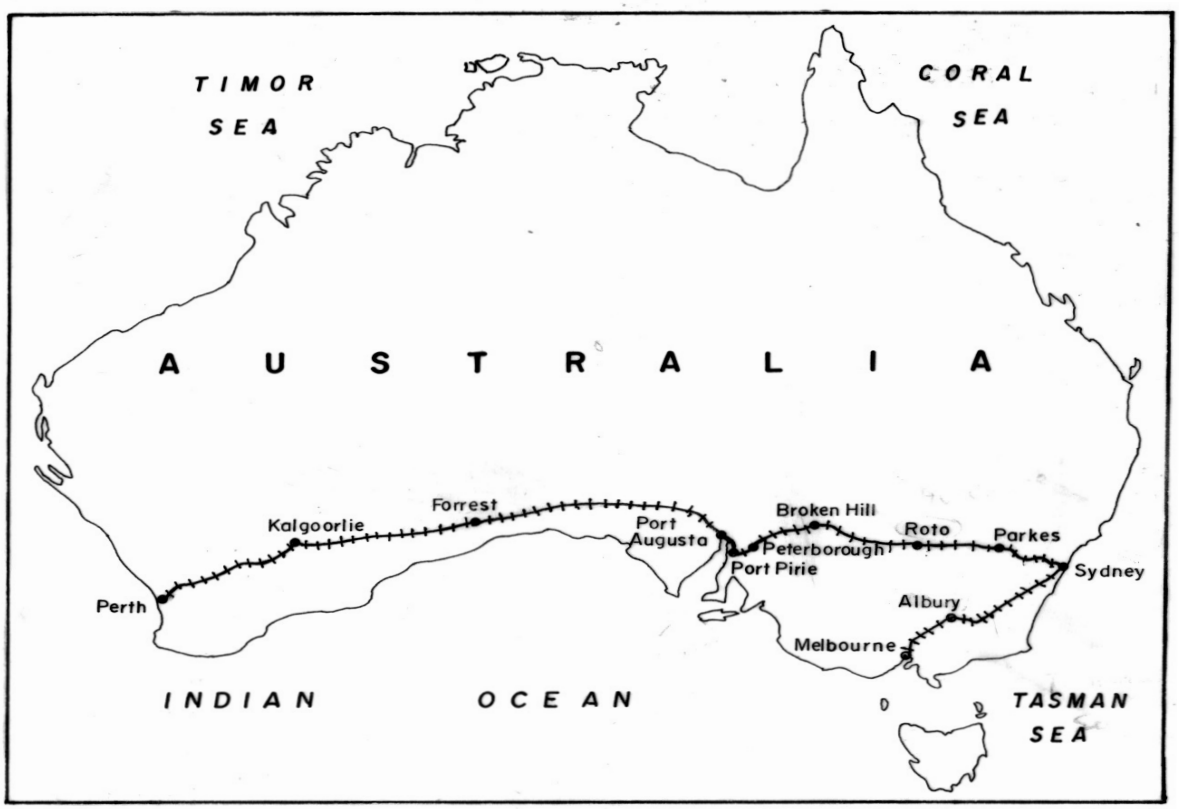


Fig. 8.3 *Australian Trans-Continental Railway*

unimportant role in passenger transport because more passengers prefer to travel by automobiles or aeroplanes than by railways.

The densest railway network is found in the east-central USA and southern Canada, south of the Great Lakes, and on the Atlantic coast.

The high level of economic development coupled with high urbanisation are the main reasons for the concentration of rail network in the eastern United States of America.

Trans-Continental Railways : Railways running across the continent and linking its two ends are called trans-continental railways. They were constructed for economic and political reasons.

The most important trans-continental railway in Asia is the Trans-Siberian Railway (Fig. 8.1). It runs in Russia from St. Petersburg in the west to Vladivostak in the east. It is a double-track route and runs for a distance of about 9,332 km. Some of the main stations en route are Moscow, Ufa, Novosibirsk, Irkutsk, Chita and Khabarovsk. It has connecting links to the south to Odesa in the Ukraine, Baku the Caspeian Sea, Tashkent in Uzbekistan, Ulan Bator in Mongolia, Shenyang (Mukden) in Manchuria and Beijing in China.

Canadian Pacific Railway connects Vancouver on the west coast and Halifax on the east coast of North America (Fig.8.2). It was constructed in 1886. It's total length is 7,050 km. Initially this railway line was built as a part of an agreement to make British Columbia join the Federation of States. It, however, assumed economic importance later on because it connected Quebec-Montreal industrial region with softwood forest region in the north and wheat region of the prairies. Thus, each region became complementary to the other. A loop line from Winnipeg to Thunder Bay, located on the northern shores of the Lake Superior, connects this railway line with one of the important waterways of the world. Wheat from the prairies could be brought through the waterways. This railway line thus became the economic artery of Canada.

Australian Trans-Continental Railway connects Sydney on the east coast with Perth on the west coast. It runs through the southern part of the continent. Main stations on this route are Broken Hill, Port Augusta, and Kalgoorlie (Fig. 8.3).

There is a proposal to build a trans-Asiatic railway linking Constantinpole in Turkey with Bangkok in Thailand via Saudi Arabia, Iran, Pakistan, India, Bangladesh and Myanmar.

Water Transport

One of the great advantages of water transportation is that it does not require route construction. The oceans are linked with each other and they are negotiable by ships of various sizes. All that needs to be done is to provide port facilities at the two ends. It proves to be cheap because the friction of water is far less than the friction of land or air. And hence, the energy cost of transportation is lower.

The waterways are divided into two groups: inland waterways and oceanic routes.

Inland Waterways

Rivers, canals, lakes and coastal areas have been important inland waterways from time immemorial. Boats and steamers are used as means of transport. They carry cargo as well as passengers. Rivers are the only means of transport in dense forests. Very heavy cargo like coal, cement, timber, metallic ores can be transported by waterways. In India, riverways were the main highways of transportation in ancient times. But they lost importance because of several reasons such as construction of railways, lack of water in rivers as they were diverted into canals for irrigation, making them unsuitable for navigation; and poor maintenance of inland waterways.

The development of inland waterway is dependent on several factors such as width and depth of the channel, continuity in the flow of water and transport technology in use.

Despite inherent limitations, inland water transport has developed in many parts of the world. In these regions, many rivers have been greatly modified to enhance their navigability. Building of dams and barrages for regulating the flow of water and dredging i.e. removal of silt from channel beds for maintaining a

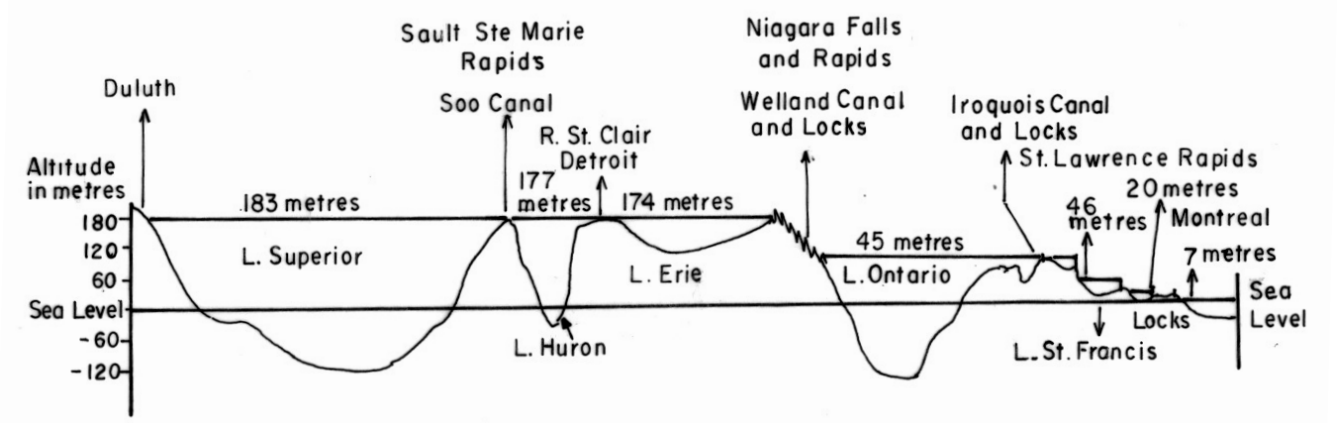


Fig. 8.4 *Ship Movement in Great Lakes — St. Lawrence Waterway*

constant depth of water, does help overcome many problems mentioned earlier. The river banks are stabilised in areas where shifting of channels is a problem. Some of the major inland waterways are discussed below:

There are two major inland waterways systems in North America : (i) the Great Lakes – St. Lawrence waterway, and (ii) the Mississippi waterway.

The Great Lakes–St. Lawrence Waterway: It is an unique waterway in the northern part of North America. The ports located on this route have developed just like ocean ports — with all facilities. As such large ocean freighters are able to navigate deep inside the continent, upto 3,760 km, through the estuary of St. Lawrence below Qubec. This waterway has helped in the industrial and economic growth of the region (Fig. 8.4).

The Mississippi Waterway: The Mississippi-Ohio waterway connects the interior part of the USA with the Gulf of Mexico in the south. Large steamer can go through this route upto Minneapolis.

There are a large number of navigable rivers and canals in western and central Europe and western Russia.

The world's densest network of inland waterways is found in France and Germany. Rivers Seine, Rhine and Elb together with their tributaries flow into the North Sea. Most of the rivers are interconnected through canals. One may travel in this part almost through rivers and canals from the Mediterranean Sea to the North Sea.

Rhine Waterway: The Rhine is the most important channel of navigation in this region. It is the world's most heavily trafficked waterway. Rotterdam is located at its mouth in the Netherlands. Its hinterland stretches up the Rhine and includes Belgium, France, Germany and Switzerland (Fig. 8.5).

Volga Waterway : Russia has a large number of developed waterways. The Volga is one of the most important waterways. The Volga river system discharges its water in the

Fig. 8.5 : *Rhine Waterway*

Caspian Sea. It provides a navigable route of 11,200 km. The Volga — Moscow canal connects it with the Moscow region. It is linked with the Black Sea through the Volga — Don Canal.

In many countries of southeast Asia, rivers play an important role in carrying people and goods. But inland waterways of eastern China and India are comparatively more important in terms of volume.

China has many large rivers but some of them, especially in the eastern part, are more developed for water transport. The Huang, the Chang Jiang and the xi rivers are navigable. The densely populated Sichuan region is linked with the Chang Jiang delta, where a dense network of canals has developed. Ocean vessels can reach upto Hankow through this route.

River Ganga in India is navigable upto Patna. There is a regular steamer service between India and Bangladesh through Sundarbans. Kerala is another state where inland water transport through the backwater is prospering. India has a long coast line. There are coastal services to carry passengers and goods.

Although the Amazon in South America is the longest river in the world and is also navigable upto Iquitos in Peru, which is 3,680 km from the Atlantic coast in the east, it has not yet developed due to sparse population and low economic development of the region.

Parana-Paraguay Waterway : It is the most important riverway in South America. This river system discharges its water in the Atlantic Ocean through the estuary of Rio de la Plata. As such large ships can enter the waterway. Parana is navigable for ocean vessels upto Santa Fe, located at a distance of 240 km. Paraguay provides accessibility to river steamers upto Asuncion. This waterway has a well developed hinterland and connects the productive interior to the Atlantic coast.

Ocean Transport

Ocean transport is the cheaper means of haulage (carrying of loads) than land and air. The oceans offer a free highway traversable in all directions with no maintenance cost. Ocean-going ships are capable of carrying far larger loads than any other carrier. The introduction of refrigerated chambers for transporting perishable goods such as meat, fruits, vegetables and dairy products, and the development of tankers and other specialised ships has greatly improved the efficiency of

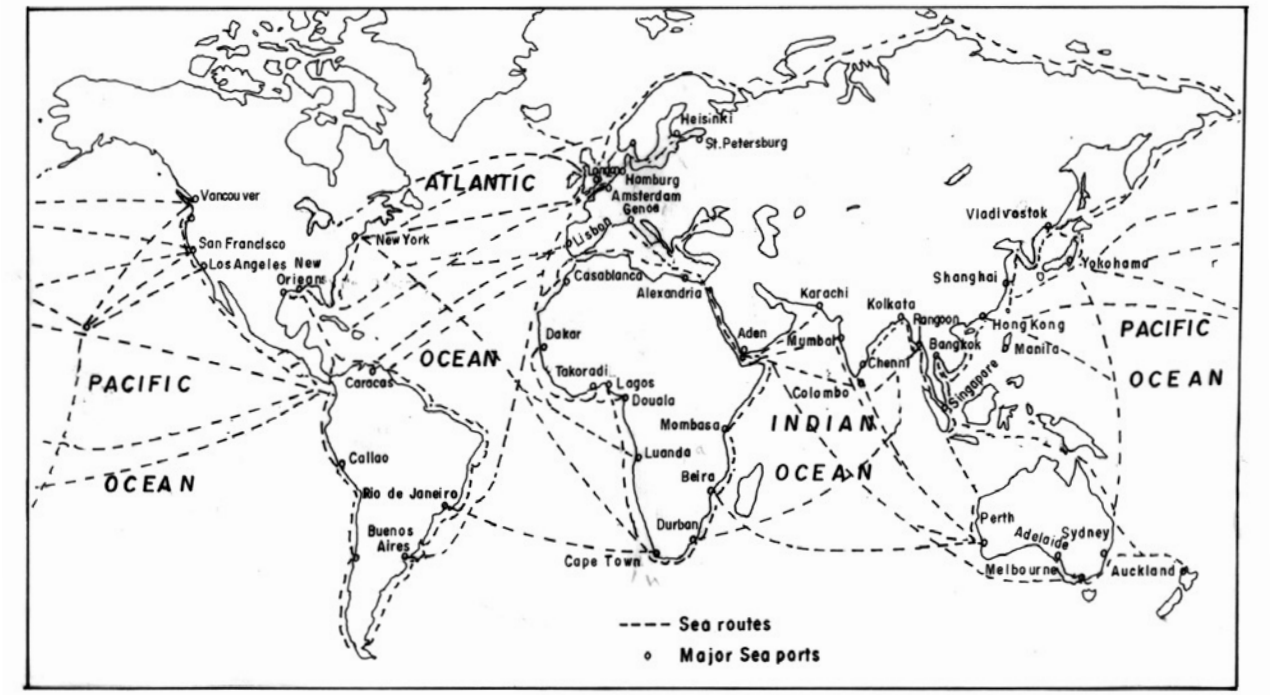


Fig. 8.6 *Major Ocean Trade Routes and Sea Ports*

ocean transport. The use of containers has not only made cargo handling easier but has eased the transfer of goods to land transport by rail or road at the world's major ports. Modern passenger liners and cargo-ships are equipped with radar, wireless and other navigation aids. As such they are little hindered by storms and bad weather and can cross the ocean at moderate speed reaching their destinations on schedule.

The ocean trade routes are shown in Fig.8.6. Some of the important ocean routes have been discussed in the following pages.

North Atlantic Route : It connects two most developed regions of the world, eastern part of Canada and the USA with the Western Europe. It is, therefore, the most important and busiest route. Both the coasts have good port and harbour facilities. Rich agricultural, commercial, and industrial regions of Europe export large quantities of manufactured items — textiles, chemicals, machinery, fertilisers, steel and wine to the United States and Canada. Bulky and large quantities of food grains and raw materials, like wheat, woodpulp, copper as well as iron and steel, transport equipment etc. are sent to the Western Europe through this route. The foreign trade of the North Atlantic Region is greater than that of the rest of the world combined.

The Mediterranean and the *Indian Ocean Route* : Industrially developed countries of Europe are connected with East Africa, South Asia and Southeast Asia through the Mediterranean Sea, the Red Sea and the Indian Ocean route. In fact, all ocean bound traffic from Europe to Africa, Asia and Australia passes through this route. The east bound cargo mainly consists of machinery and industrial products. The west bound cargo includes mineral oil and agricultural products such as cotton, rubber, tea, coffee and sugar. Port Said, Aden, Mumbai, Kochi, Colombo and Singapore are some of the important ports on this route.

The Suez Canal : It is a man-made waterway in Egypt which was constructed to link the Mediterranean Sea with the Red Sea (Fig. 8.7). It is a sea-level canal without locks. The opening of the Suez canal in 1869 reduced

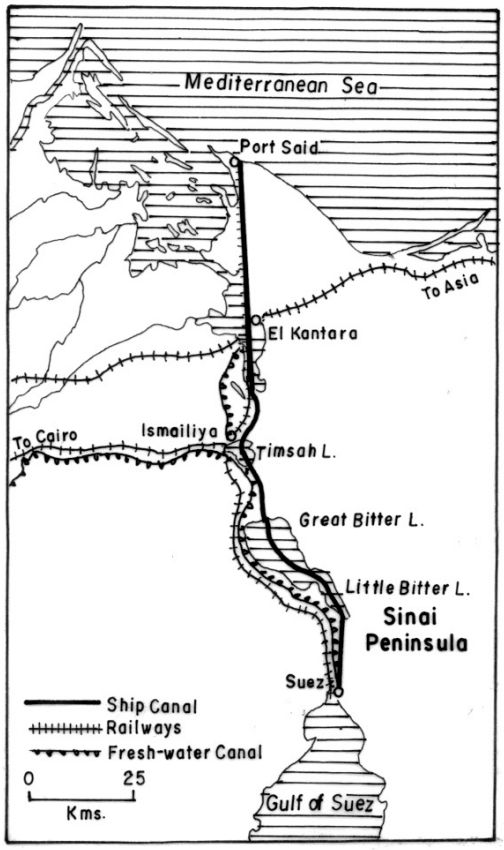


Fig. 8.7 *Suez Canal*

direct sea-route distances between western Europe and South east Asian countries by about one half. A number of ports have emerged enroute such as Port Said and Port Faud in the north and Port Suez in the south.

The Cape of Good Hope Route : This route was once the subsidiary alternative to the Suez. This route is 6,400 km longer between Liverpool and Colombo. It provides link between Western Europe and West African countries, South Africa, Southeast Asia, Australia and New Zealand. The ships coming from Europe directly head towards the Cape of Good Hope. With the increase in the tempo of economic development in the recently independent African nations and the exploitation of their rich natural resources such as gold, copper, diamond, tin, chromium, manganese, cotton, oil palm, groundnuts, coffee and fruits, the volume of traffic round the Cape of Good Hope and from ports in both East and West Africa is on the increase.

The South Atlantic Route : This sea route connects West European and West African countries with ports of Brazil, Argentina and Uruguay in South America. The ocean traffic in the South Atlantic is far less than that in the North Atlantic because South America is comparatively less densely populated and has limited economic development. Only south-eastern Brazil, the Plata estuary and parts of South Africa have large-scale industrial development. There is also very little trade on the east-west route between Rio de Janeiro and Cape Town, because both Africa and South America have similar products and resources. Coffee and cocoa from Brazil, and wheat, meat, wool and flax from Argentina are sent to the industrial countries of North America and Western Europe in return for manufactured and semi-finished commodities.

The North Pacific Route : It links the ports on the western coast of North America such as Vancouver, Seattle, Portland, San Francisco and Los Angles with the ports in Asia – Yokohama, Kobe, Shanghai, Hongkong, Manila and Singapore. Trade across the vast North Pacific Ocean goes by several routes which converge at Honolulu. The direct route farther north on the great circle links Vancouver and Yokohama, reduces the traveling distance (about 2,480 km) by half. Wheat, timber, paper and pulp, fish, dairy products and manufactured goods are the main exports from North America. The trade from Asia mainly consists of manufactured goods such as textiles, electrical equipment from Japan, Hongkong, South Korea and Taiwan, and tropical raw materials from Southeast Asia, e.g., rubber, copra, palm oil, tea and tin.

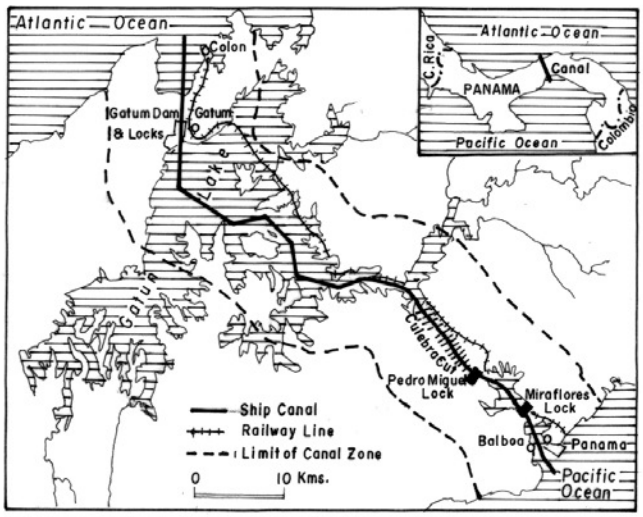


Fig. 8.8 *Panama Canal*

The South Pacific Route : It connects Western Europe and North America with Australia, New Zealand and the scattered Pacific islands via the Panama canal. This route is also used for reaching Hongkong, Philippines and Indonesia . Goods transported are mostly wheat, meat, wool, fruits, dairy-products and manufactured articles. The distance covered between Panama and Sydney is about 12,000 km. Honolulu is an important port on this route.

The Panama Canal : It connects the Atlantic Ocean in the east and the Pacific Ocean in the west. It has been constructed across the Panama isthmus, and therefore, separates the landmass of North America from that of South America. With the construction of Panama canal, the distance between the eastern and western coasts of North and South Americas has come down substantially. It also provides a shorter route between countries of Far East and Southeast Asia on the one hand and those of the Western Europe on the other (Fig. 8.8).

Panama canal has a lock system. Ships cross different levels of the canal through three locks before entering into the Gulf of Panama. The economic importance of Panama canal is comparatively less than that of the Suez.

Air Transport

It is the fastest mode of transport, as well as the costliest. The manufacturing of aircrafts and their operation require elaborate arrangements — hangar, landing, fueling and maintaining facilities. As such air transport is used only for high value goods and passengers. Air traffic is adversely affected in bad weather.

It has certain advantages too. Valuable cargo can be moved rapidly on a worldwide scale. Being fast, it is preferred for long-distance travel by passengers. Air transport is often the only way to reach difficult areas.

Recent developments may change the future course of air transport. Supersonic aircraft such as *Concorde*, had been developed, which could cover the distance between New York and London within three and a half hours.

A very dense network of air routes exists in Western Europe, Eastern United States of America and Southeast Asia. There are some nodal points where the air routes merge or radiate in all directions e.g. — London, Paris, Rome, Moscow, Karachi, New Delhi, Mumbai, Bangkok, Singapore, Tokyo, San Francisco, Los Angeles, Chicago, New York and Rio de Janeiro etc. Soviet Asia and Africa lack air services. There is a distinct belt of air routes from east to west in the Northern Hemisphere (Fig. 8.9).

Airports require wide ranging facilities for the passengers, goods and the aircrafts. The construction of airports is very expensive. Hence, they develop in areas where there is sufficiently large volume of traffic London, Paris, Rome, New York, Chicago, Tokyo and Singapore are some of the busiest airports of the world.

Pipelines

Pipelines are used extensively to transport liquids and gases such as water, mineral oil and natural gas for an uninterrupted flow. We are familiar with the supply of water and mineral oil through pipes. Even cooking gas or LPG is supplied through pipelines in may parts of the world. Pipelines can also be used to transport coal mixed with water. In the USA, there is a dense network of pipelines for carrying petroleum from the regions of production to the regions of consumption. A famous pipeline of the USA, known as the 'Big Inch' which carries mineral oil from the wells of the Gulf of Mexico to the north-eastern part. About 17 per cent of all freight per tonne-kilometres is carried through pipelines in the USA.

In Europe, West Asia(Fig 8.10), Russia and India, pipelines are being used to connect oil wells to refineries and to ports or internal markets. It is also popular for carrying natural gas. One of the longest pipeline, called COMECON, is 4,800 km long. It connects oil wells of the Ural and the Volga regions to the countries of East Europe.

COMMUNICATION

Humans used different means of communication ever since they appeared on the earth, but the pace of change has been rapid during modern times. Long distance

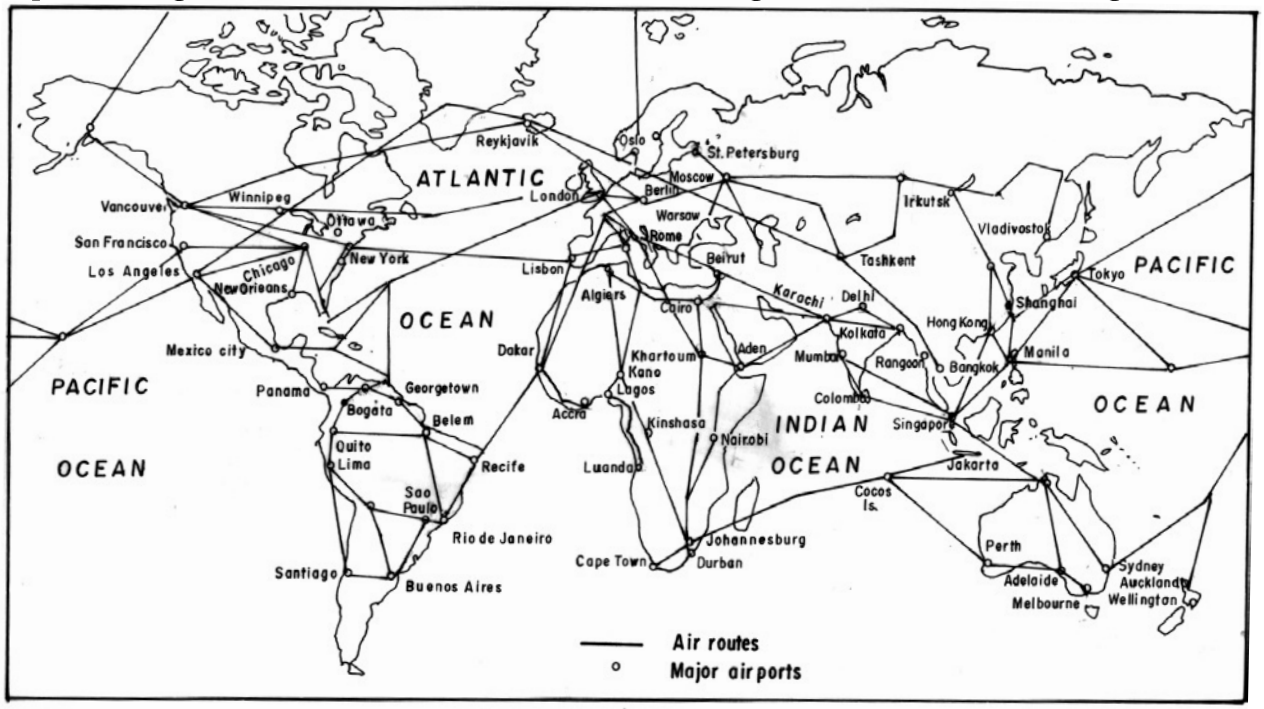


Fig. 8.9 *Major Air Routes and Airports*

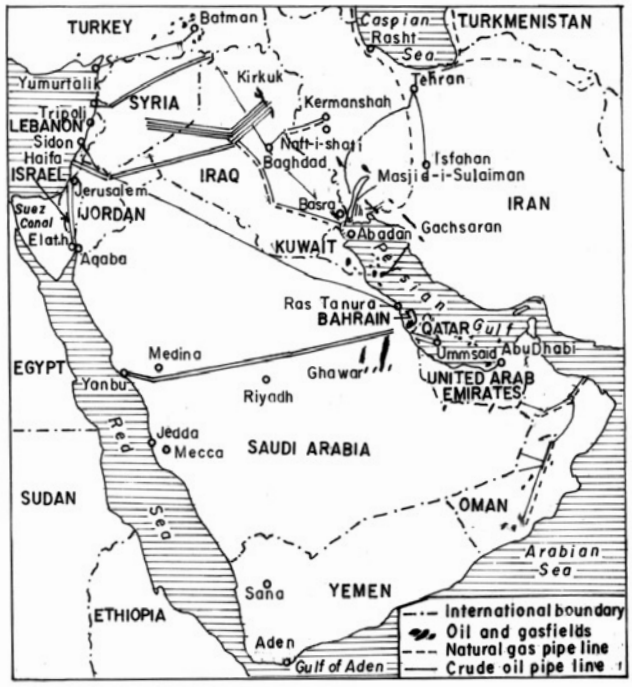


Fig. 8.10 *West Asia : Pipelines*

communication has been made far easier than ever before without physical movement of either the communicator or the receiver. The first major breakthrough in communication system was the telecommunication. Telegraph was instrumental in the colonisation of the American West in the late nineteenth century. Telephone was a critical factor in the urbanisation of America, enabling firms to have centralised functioning at their headquarters and locate their branches in smaller towns. Even today the telephone remains by far the most commonly used form of telecommunications.

Radio, television, fax and internet make communication more accessible to more people cutting across all barriers of time and space. Modern communication system more than the transport system, has converted the world into a global village. The contemporary social and economic space is closely tied to modern communication system.

During the early and mid twentieth century, the American Telegraph and Telephone Company (AT&T) enjoyed a monopoly over the US telephone industry. Faced with mounting competition, telephone companies have steadily upgraded their copper cable systems to include fiber-optic lines, which allow large quantities of data to be transmitted rapidly, securely, and virtually error free.

With the digitisation of information in the late twentieth century, telecommunication steadily merged with computers to form integrated networks through the internet. Today internet is the largest electronic network on the planet, connecting an estimated 100 million people in more than 100 countries.

Popular access systems of the internet allow any individual with a micro-computer and modem to plug into cyberspace, the world of electronic computerised spaces encompassed by the internet and related technologies such as the World Wide Web (WWW). Cyberspace may exist in an office, a sail-boat, or virtually anywhere.

As millions of new users log on to the internet each year, cyberspace has expanded rapidly in size and in use and importance, including e-mail and electronic commerce. Thus, cyberspace exists 'everywhere'. In short, telecommunication revolution has expanded the human, social and economic space considerably.

Satellite Communication

The United States of America and former Soviet Union have been pioneers in space research. Artificial satellites, successfully placed in the earth's orbit have brought revolutionary changes in the areas of communication. The satellite communication system deployed since the early 1970s have rendered the unit cost and time of communication invariant with respect to distance. It costs the same to communicate over 500 km as it does over 5,000 km via satellite. India, too, has made great strides in space research. Aryabhatt was launched on 19 April, 1975 from the Soviet Union with the help of its Intercosmos rocket. Bhaskar-1 was sent into the space on 7 June, 1979 and on 18 July, 1980, Rohini was launched from the Indian Cosmodrome at Shri Harikota.

On 19 June,1981, APPLE (Arian Passenger Payload Experiment) satellite was launched

through Arian rocket. Bhaskar-2 was sent into the space on 20 November, 1981, which was also a remote sensing satellite. INSAT 1-A was launched on 10 April, 1982 but in September the same year it stopped working. On 30 August, 1983 INSAT 1-B was sent to space through space shuttle, Challenger. INSAT 1-B has made radio, television, and long distance communication very efficient and effective. Now we receive information about the weather on television and forecasting about storm etc., is done effectively.

Remote sensing is the gathering, storing and extracting of geographic information from great distances when the gatherer makes no physical contact with the target. The process usually covers the large areas.

The best known satellite images have come from NASA series of Landsat satellites. The first, originally called the Earth Resources Technology Satellite (ERTS) was launched in 1972. The launch of Landsat, which will be operated jointly by NASA and the US Geological Survey, took place in April 1999. The satellites have provided a wealth of information about the earth to scientists as well as to map makers.

As the US and Russian Governments drop security restrictions on data gathered from reconnaissance satellites, private companies are increasingly using this information for non-military applications such as seeking potential energy sources, monitoring pollution, and analysing building sites, besides predicting weather, locating areas of deforestation and mineral deposits, identifying hundreds of other physical patterns and processes. As the technology develops, government, academia and business are continuing to find new applications for these images.

Exercises

Review Questions

1. Answer the following questions briefly:
   (i) Name the three important modes of transport.
   (ii) Differentiate between transport and communication.
   (iii) Why pipelines are used extensively to transport commodities such as mineral oil and natural gas?
   (iv) What are highways?
   (v) What factors contributed to the growth of railways?
   (vi) What is a trans-continental railway?
   (vii) What are the advantages of water transport?
   (viii) Name the two major inland waterways of North America.
   (ix) Which major ports are linked by the North Pacific Ocean route?
   (x) Which are the three major regions of the world having a very dense network of airways?
   (xi) What is an internet?
2. Write short notes on:
   (i) Trans-Siberian Railway;
   (ii) Inland Waterways of Europe;
   (iii) Suez Canal;
   (iv) Satellite Communication.
3. Describe the distribution of roads and highways in the world.
4. Discuss the importance of railways as a means of transport and its distribution pattern.
5. Describe the Atlantic Ocean routes.

Geographical Skills

6. On an outline map of the world show the following:
   (i) The Suez Canal;
   (ii) The Panama Canal;
   (iii) Trans Australian Railway;
   (iv) The North Pacific route between Vancouver and Hongkong;
   (v) New York, London and Singapore.

9 CHAPTER

INTERNATIONAL TRADE

Trade refers to the movement of goods and services from areas of surplus to areas of deficit. When exchange of goods and services takes place between two countries, it is called *international trade*. Throughout history, trade routes have played significant roles in cultural diffusion. You must have heard or read about the old 'silk route' between China and Southwest Asia. The caravans travelling on this south-land route used to trade in silk, iron wares, and condiments. Trading between different parts of the world, especially between Asia and Europe has a very long history. The chance discovery of America by Columbus was prompted by trade. The Indians, the Chinese, the Arabs, the Romans, the Dutch and the British — all have contributed in promoting trade relations.

Trade in modern time is no less important. In fact it is now the base of all world economies. Why do we trade and how does it contribute to the national economy? You will get answers to these questions in the following pages.

BASE OF INTERNATIONAL TRADE

The need for trade arises mainly from regional difference in production and productivity. There are great variations in the location and distribution of different kinds of natural resources on the earth's surface. All countries do not possess all resources in the same amount. Besides, the degree of utilisation of these resources also varies from country to country. A number of factors such as availability of resources, required capital, technology and skills, domestic and international demand and government policies influence and determine the production of various commodities and services. As a result, there are regions which have surplus in certain commodities while deficit in others. Hence, countries export goods and services that are in surplus and import those that are in deficit.

Specialisation in the production of certain goods and services, by some countries is another factor that gives rise to international trade. Some countries are known for specialised skills in the production of certain goods in great demand globally. For example, Chinese silk, Iranian carpets and Indian spices have formed part of international trade since ancient times. Today, Swiss watches and chocolates, Japanese camera and electronic goods, American Boeing aircrafts and West Asian petroleum are in demand internationally.

Production of any commodity in large volumes does not ensure that it will be a part of international trade. If the production exceeds local consumption level and is in short supply elsewhere, then alone it enters international trade channels. Certain food crops do not enter the world trade even if they are surplus, in order to regulate prices internally. For example, trading in rice is limited as most of its production is needed within the region, where it is grown at a price within the reach of the people.

There are cases where surplus production is destroyed or thrown in the ocean, to keep prices high enough to maintain production level. For example, maize production is quite high in the USA, so is the coffee production in Columbia and Brazil in South America. In order, to maintain world prices, the surplus production of these crops in certain years is thrown away instead of selling it at a lower

price. Among the food crops wheat is the most important trading item.

Several countries in Africa are heavily dependent on a limited range of primary products — agricultural and mineral commodities, such as coffee, cocoa, cotton and copper for foreign exchange to buy other goods. For example Mauritania, Zambia and Rwanda earn more than 95 per cent of their foreign exchange from a few primary products. In a few countries, a single product dominates export earnings e.g. copper in Zambia and coffee in Uganda provide more than 90 per cent of their foreign exchange.

The smooth flow of goods and services between different parts of the world is dependent on a number of factors. Peace and political stability in the producing region is a primary condition for it. One of the reasons for fluctuating petroleum prices is periodic disturbance in West Asia — Iranian Revolution, Palestinian-Israeli conflict and Iraq-Kuwait war. Conflicts and wars disrupt production and transportation of goods and services.

COMPONENTS OF INTERNATIONAL TRADE

There are three important components of international trade, that set the world pattern. They are : volume of trade; composition of trade; and direction of trade.

Volume of Trade

The volume of trade may be measured in terms of the actual tonnage of goods traded, but tonnage is rarely an indicator of value and hence, the trade of a country is usually measured by the *total volume* and the *value of goods exchanged*. Sometimes, however, it is measured on a *per capita* basis, that is how much trade (by value) is carried on per head of the population.

World trade has been changing constantly. Except for a few sudden dips during economic recession, the growth rate has been accelerating during the post World War II period. The volume of trade between countries differs markedly depending upon the nature of goods and services produced, bilateral agreements and trade restrictions.

Composition of Trade

The types of goods and services entering the world trade are also changing. The importance of manufactured goods has increased over the years. It is the largest and fastest growing component of trade. It has been possible due to fast growth of manufacturing industry in the later half of the twentieth century and reduction in tariff barriers especially under General Agreement on Trade and Tariffs (GATT) and now under the World Trade Organisation (WTO). A number of primary products such as coal, cotton, rubber and wool have lost importance in recent years. Petroleum occupies one of the most important places in the world trade now.

Direction of Trade

Until the eighteenth century, manufactured and high value sophisticated goods were exported from present day developing countries to Europe. The direction of trade changed in the nineteenth century. Manufactured goods from Europe were exchanged for the food stuffs and raw materials from three southern continents. In the first half of the twentieth century, much of the trade in manufactured goods was mainly between the USA and Western Europe. Japan, in that period, became another important trading country. In the second half of the twentieth century, the old pattern has started changing. The developing countries are now able to compete with developed countries in manufactured goods too. Emphasis is now laid on trade in technology.

TYPES OF INTERNATIONAL TRADE

International trade may be of two types. *Bilateral trade* is the exchange of commodities between two countries. It happens if the economies of the two countries are complementary. One country provides raw materials or energy in exchange for manufactured goods. This is possible only to a limited extent for certain commodities. *Multilateral trade*, on the other hand, is the exchange of goods and services among a number of countries.

BALANCE OF TRADE

The difference in value between imports and exports is referred to as *the balance of trade*. If exports exceed imports, a country is said to have a *favourable balance* of trade, while if imports exceed exports it has an unfavourable or *adverse or negative* balance of trade (Fig. 9.1).

INTERNATIONAL TRADE — THE CHANGING SCENARIO

Trade has undergone fundamental changes over time, both in quality and quantity. Economic value and the major types of commodities accounting for most of the value-added in international trade have proceeded through distinctive eras over time, with technology as a constant driving force.

In the *first phase*, primary commodities i.e. raw materials, minerals and food products dominated. In the *second phase,* beginning with the Industrial Revolution, manufacturing goods accounted for the largest share of international trade, and was the most lucrative sector. Trade in primary commodities during this phase still took place, but the technological upgrading of products made manufacturing trade of standardised products more attractive. In the *third phase,* services became global commodities, accounting for a growing share of international trade.

Twin technological revolutions in information and transportation have fueled the growth and upgrading of commodities in trade. Transport costs have continued to fall throughout the twentieth century. Advances in communications technology — telephone, fax, electronic mail, and video conferencing have facilitated the coordination and monitoring of production in diverse locations. Improvement in trans-Atlantic cable capacity and the corresponding increasing capabilities of global communication have also facilitated more interactions among firms in different countries.

Emerging Sectoral Composition of Trade

It has changed significantly in recent years showing high growth in capital goods, especially machinery and transportation and commercial services (Table 9.1). By contrast trade in primary commodities continue to fall, and its relative share of trade has been declining, especially over the last 30 years. It is mainly because of the cyclic decline of commodities price relative to manufacture and services trade. Manufacturing trade still predominated, but this market is becoming

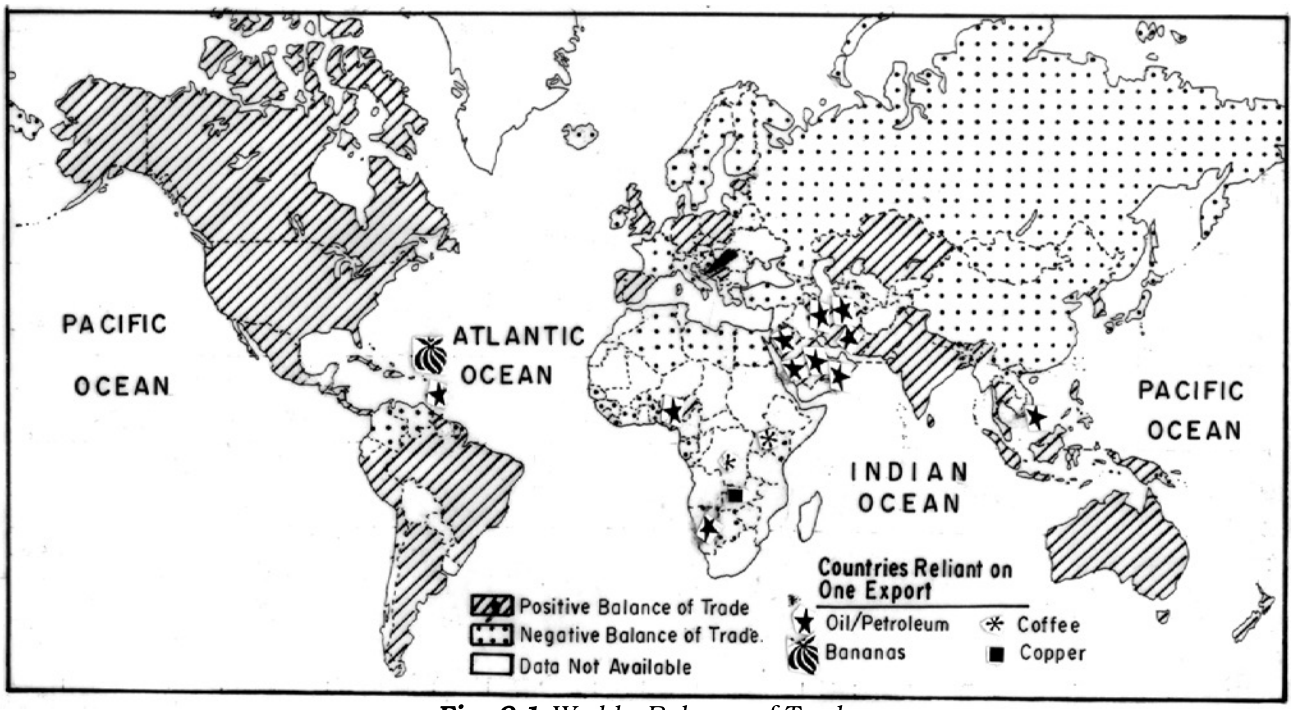


Fig. 9.1 *World : Balance of Trade*

Table 9.1 : Composition of World Trade 1965-96

GATT/WTO Breakdown* *Shares of Total World Trade*	***1970***	***1980***	***1990***	***1996***
Merchandise				
Agriculture	16.5	12.5	10.0	11.4
Mining	12.0	22.0	11.5	11.2
Manufacturing	50.0	45.5	57.0	73.2
(Not Specified)	2.5	3.0	2.5	3.0
Capital Goods	29.5	26.5	37.0	39.0
Services**	19.0	17.0	19.0	24.6
World Bank Breakdown				
Shares of Total World Merchandise Imports	**1965**	**1979**	**1990**	**1995**
Food	18.0	12.0	9.0	12.2
Fuels	10.0	20.0	11.0	9.0
Other Primary Commodities	17.0	9.0	8.0	7.7
Manufacturing	55.0	58.0	73.0	72.0
Machinery Transports	23.0	25.0	34.0	30.9

* *GATT 1992: Table 2; 1990: Table 8; 1989: Table 9; WTO; 1997: Table 11.2*
** *Services include shipping, transport, travel and private services*

more differentiated due to the customised delivery of products to seek new competitive advantages. Until 1960, most TNCs were either of from the USA or the UK. In recent years, Japanese, German and other companies have become important on global scene. The power and influence of TNCs continue to grow with liberalisation.

Changing Sectoral Components

The strong growth registered for services is a recent phenomena. Services account for 25 per cent of global export by 1996. Service trade is qualitatively different from manufacturing trade in that services are infinitely expansible and potentially weightless, many people can use them at the same time, and once the goods are produced, they can be replicated at a low cost. For some companies, such as IBM, more profits are generated from providing services than from producing goods in the traditional sense.

In twenty-first century, it is predicted that commodity trade will be further upgraded and that the highest rewards from trade will involve the selling of lifelike interactive or virtual reality experiences globally. The recent globalisation of production also has altered the type of commodities that are traded. For instance, a significant proportion of trade is now constituted as component parts rather than finished goods. Vertical specialisation takes place where countries acquire expertise in particular stages of the production process. A country may import certain goods from another country to use them for the production of its own goods and then export that to some other country. The sequence only ends when the final goods reach their destination. *Vertical trade* involves, for example, the skill intensive design and manufacturing of a *microchip* in one country and its labour-intensive assembly onto a mother board in another, whereas *horizontal trade* entails completing all stages of computer manufacturing in a single country (Table 9.2).

Table 9.2 : Trade Specialisation in Selected Countries

Country	*Vertical Trade (%)*	*Horizontal Trade (%)*
Australia	13	87
Canada	44	56
Denmark	27	73
France	28	72
Germany	19	81
Japan	3	97
The Netherlands	47	53
UK	30	70
USA	12	88

Global Pattern of Trade

International trade has become very complex with a high degree of specialisation in agricultural and industrial production. It has become an important component of the world economy. Global trade has grown much more rapidly over the past 25 years. Between 1985 and 1995, the average annual growth rate of the value of world exports was twice that of production. It was several times greater than that of world population growth. Today, roughly 25 per cent of the world's total output is traded among nation-states.

The fundamental structure of international trade has been based on a few *trading blocs* i.e. groups of countries with formalised systems of trading agreements. Most of the world's trade has been taking place within these blocs. Membership of these trading blocs is the result of the effects of (i) distance; (ii) the legacy of colonial relationship; and (iii) geopolitical alliances.

For most of the period during 1950-2000, international trade was dominated by :

- Western Europe, together with some former European colonies in Africa, South America, Asia, the Caribbean, and Australia;
- North America together with some Latin American countries;
- The countries of the former Soviet Union;
- Japan together with other East Asian Countries and the oil-exporting Countries of Saudi Arabia and Bahrain

Regional Trading Blocs

It is being recognised by most countries that protectionist barriers to trade are detrimental to national economies. Therefore, most governments, have reduced tariffs and quotas on import. Many countries have simple bilateral agreements with trading partners minimising or eradicating trade barriers on a product-by-product basis.

Since World War II, the primary vehicle for serving this purpose on the global level has been the General Agreement on Tariffs and Trade (GATT). Through series of negotiations, it has systematically lowered tariff rates worldwide. This has contributed to global economic boom in the post World War II period . Originally GATT membership was almost exclusive to developed nations. It soon expanded to include the developing world. Most countries of the world are now its members.

In 1995 the GATT metamorphosed into World Trade Organisation (WTO), a permanent rather than ad hoc organisation in Geneva that also settles trade disputes. The WTO regulates trade in services too, but has yet to include important non-tariff barriers, such as export restraints, inspection requirements, health and safety standards, and import licensing which inhibit imports.

In addition to these broad global agreements many nations have joined regional trading blocs, which were designed to reduce protectionism and enhance economic relations among member states.

European Union (EU)

Originally it was founded in 1957 by six members — Italy, France, Federal Republic of Germany, Belgium, the Netherlands, and Luxemburg. It was called the *European Economic Community (EEC)*. Later it expanded to include most of the western Europe.

The EEC contributed significantly to help Europe recover from the 1970s petro-shocks and slow economic growth. In 1992 the EEC launched an ambitious plan to eliminate several trade barriers among its members.

The EEC changed into the European Union (EU) in 1995. It has harmonised several production and trade regulations. A common currency, the euro, was launched in early 1999 for effectively binding diverse countries into a single economy. With 400 million people, the EU is the largest single market in the world.

European Free Trade Association (EFTA)

In 1960 seven countries i.e. United Kingdom, Austria, Denmark, Norway, Sweden, Portugal and Switzerland joined together to form EFTA with the objective of bringing cooperation in the field of trade. They abolished the tariff

between different member countries. In December 1972 United Kingdom and Denmark abandoned their membership and joined EEC while Iceland joined this association and Finland accepted its co-membership. Now again there are seven members.

North American Free Trade Agreement (NAFTA)

Compared to the EU, NAFTA is considerably more modest. NAFTA's origins lay in the 1988 US — Canada Free Trade Agreement, which gradually, eliminated trade restrictions between the world's two largest trading partners. In 1994 NAFTA was expanded to include Mexico. For the first time a developing nation was included in the trade bloc having developed nations as members. NAFTA has now been extended to included Latin American countries too. It has thus created a free trade zone extending from Alaska to Tierra del Fuego.

Organisation of Petroleum Exporting Countries (OPEC)

The 13 member countries of OPEC are — Algeria, Ecuador, Gabon, Indonesia, Iran, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela. This organisation was formed by the petroleum producing countries in 1960 to decide policies regarding crude oil prices.

Association of South East Asian Nations (ASEAN)

It was formed in 1967. Indonesia, Malaysia, Thailand, Philippines and Singapore are its members. Tariffs between ASEAN and the rest of the world is growing faster than within the region. ASEAN also helps its members by presenting a joint negotiating stance when dealing with Japan, EU and Australia and New Zealand. India has now become an associate member.

South Asian Association for Regional Cooperation (SAARC)

The South Asian countries, (India, Pakistan, Bangladesh, Nepal, Bhutan, Sri Lanka, Maldives, have formed SAARC. One of its objectives is to trade among the member nations. The progress on the trade front has been marred due to Indo-Pak relations.

SEA PORTS

Sea ports play an important role in international trade and hence, known as 'Gateways of International Trade'. Ocean routes are most economical for carrying bulk and heavy commodities in large quantity. *Port* is that place on the coast where cargo is received from other countries as import and sent out to other countries as export. It thus, acts as a point of entry and exit.

The quantity of cargo handled by a port is an indicator of the level of development of its hinterland. The importance of a port is judged by the size of cargo and the number of ships handled. The ports have arrangements for loading and unloading of cargo. Thus, the ports provide facilities of docking, loading, unloading and the storage facilities for cargo. In order to provide these facilities, the port authorities make arrangements for maintaining the navigable channel, arranging tugs and barges, and providing labour and managerial services.

Types of ports

Ports are classified in two ways: on the basis of their location such as inland ports and outports; and on the basis of the specialised tasks performed such as passenger ports and commercial ports. Most ports are, however, multipurpose.

Passenger Ports

These are the ports of passenger *liners.* They are concerned with passenger traffic. Mumbai, London and New York are the examples of such ports.

Commercial Ports

These are the ports which basically handle the goods for imports and exports.

Oil Ports

These ports deal in the processing and shipping of oil. Some of these are *tanker ports* and some

are *refinery ports*. Maracaibo in Venezuela, Esskhira in Tunisia, Tripoli in Libya are tanker ports. Abadan on the Gulf of Persia is a refinery port.

Ports of Call

These are the ports which originally developed as calling points on main sea routes where ships used to anchor for refuelling, watering and taking food items. Later on they developed into commercial ports. Aden, Honolulu and Singapore are its good examples.

Packet Stations

These are also known as *ferry ports*. These packet stations are exclusively concerned with the transportation of passengers and mail across water bodies covering short distances. These stations occur in pairs located in such a way that they face each other across the water body e.g. Dover in England and Calais in France across English Channel.

Out Ports

These are deep water ports built away from the actual ports. These serve the parent ports by receiving those ships which are unable to approach them due to their large size. Classic combination, for example, is Athens and its outport Piraeus in Greece.

Entrepot Ports

These are collection centres where the goods are brought from different countries for export. Singapore is an entrepot for Asia, Rotterdam for Europe, and Copenhagen for the Baltic region.

Naval Ports

These are the ports which have only strategic importance. These ports serve the warships and have repair workshops for them. Kochi and Karwar are the examples of such ports in India.

Inland Ports

These ports are located away from the sea coast. They are linked with the sea through a river or a canal. Such ports are accessible to flat bottom ships or barges. For example, Manchester is linked with a canal; Memphis is located on river Mississippi; Rhine has several ports like Mannheim and Duisbvrg; and Kolkata is located on River Hoogly, a branch of river Ganga.

Exercises

Review Questions

1. Answer the following questions briefly:
   (i) What is international trade?
   (ii) What is the need for trading?
   (iii) Name the world's five greatest trading nations.
   (iv) What are the three important components of international trade?
   (v) What is balance of trade?
   (vi) What are trade blocs?
   (vii) Name the countries constituting OPEC.
   (viii) Why are seaports called 'gateways of international trade'?
2. Distinguish between:
   (i) Bilateral trade and multilateral trade;
   (ii) Imports and exports;
   (iii) Vertical trade and horizontal trade;
   (iv) Out ports and inland ports.

3. Discuss the main bases of international trade.
4. Describe the changing pattern of international trade and growing importance of TNCs.
5. Discuss the major changes in the sectoral composition of trade in the present day world.
6. Explain the growing importance of regional trade blocs in international trade with special reference to EU, OPEC and ASEAN.

Geographical Skills

7. On an outline map of the world label and shade the following:
   (i) The world's five greatest trading nations;
   (ii) Member countries of the EFTA;
   (iii) Member countries of OPEC;
   (iv) Member countries of ASEAN.

Unit V

HUMAN SETTLEMENTS

10 CHAPTER

HUMAN SETTLEMENTS

One of the basic human needs is shelter. It may be in the form of a hut, a house, an apartment or a big mansion. *Settlement* refers to an organised colony of human beings together with the buildings in which they live or use and the paths and streets over which they travel. It includes the temporary camp of the hunters and herders; the permanent settlements called villages; and large urban agglomerations. Human settlements may consist of only a few dwelling units *(hamlets)*, or they may be as large as megalopolis with a big cluster of buildings accommodating millions of people.

Settlements can be studied in terms of their site, situation, size buildings, form, function, internal structure, external linkage, and roles in the national and global economy. *Site* refers to the actual piece of ground on which the settlement is built. *Situation or Position* refers to the location of the village or town in relation to surrounding areas. The site and situation of the settlements and the type of building may be studied in relation to the physical environment and cultural heritage. For example, a village may be sited on a hill or a river bank. Such a site will determine its access to water and the likely inundation in rainy season. The form of settlement in any particular region also reflects human perception of the natural environment.

The functions, linkages and roles reveal the nature of hinterland from which the settlement gets sustenance and the level of overall development. Settlements have evolved to the present form over a long period of time. Throughout history, each new innovation in agricultural and industrial techniques has had its effect on settlement structure and patterns in all parts of the world: developed or developing. In the agricultural era, rural settlements predominated. The Industrial Revolution gave rise to urban settlements both small and big. Changing cultural and social nodes are clearly reflected in the structure and functions of settlements.

SETTLEMENT TYPES: RURAL AND URBAN

Settlements are most commonly classified on the basis of size and functions. Accordingly, settlements are divided into *rural and urban or villages and towns*. The terms rural and urban are relative. There is no universally acceptable criteria to distinguish rural from urban. Different countries have evolved their own criteria to suit their own requirements. In fact, one finds a continuum of settlement ranging from hamlets to megalopolises. Rural settlements, are chiefly concerned with primary activities, be they agriculture, fishing, mining, forestry etc. On the other hand urban settlements are nodal in character having secondary and tertiary activities.

In Canada, settlements less than 1,000 persons are classified as rural, while in the United States, the upper limit is 2,500 persons. In India, a settlement with a population upto 5,000 persons is rural, while in Japan, settlement having a population upto 30,000 is rural. In some countries, size is not the basis for differentiating rural from urban rather it is the economic status or function. The basic difference is that while in villages most of the people are engaged in agricultural work, in towns the chief occupation of the people is non-agricultural i.e. industry, trade and services.