THE NEW GEOGRAPHY SERIES

STANDARD VIII

THE WORLD

BY

S. F. DE SILVA

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COLOMBO:
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THE NEW GEOGRAPHY SERIES
Standard VI. Lands Round the Indian Ocean
Standard VII. Europe and the Two Americas
World Geography for the S.S.C.

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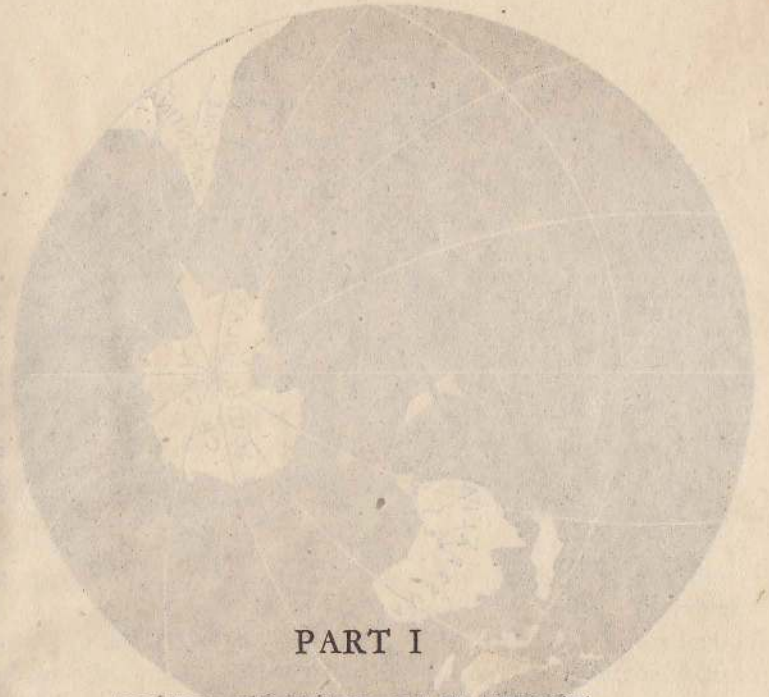
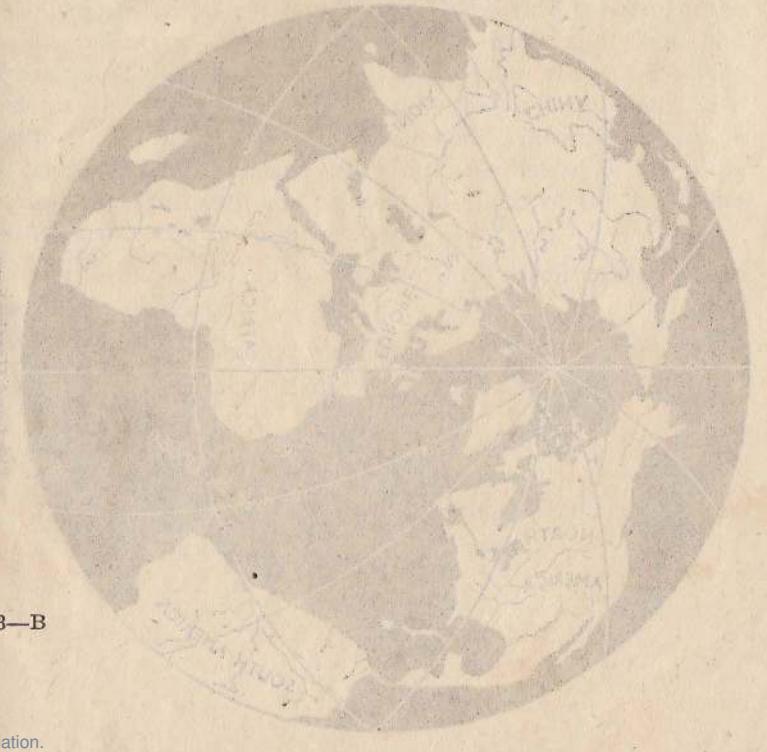
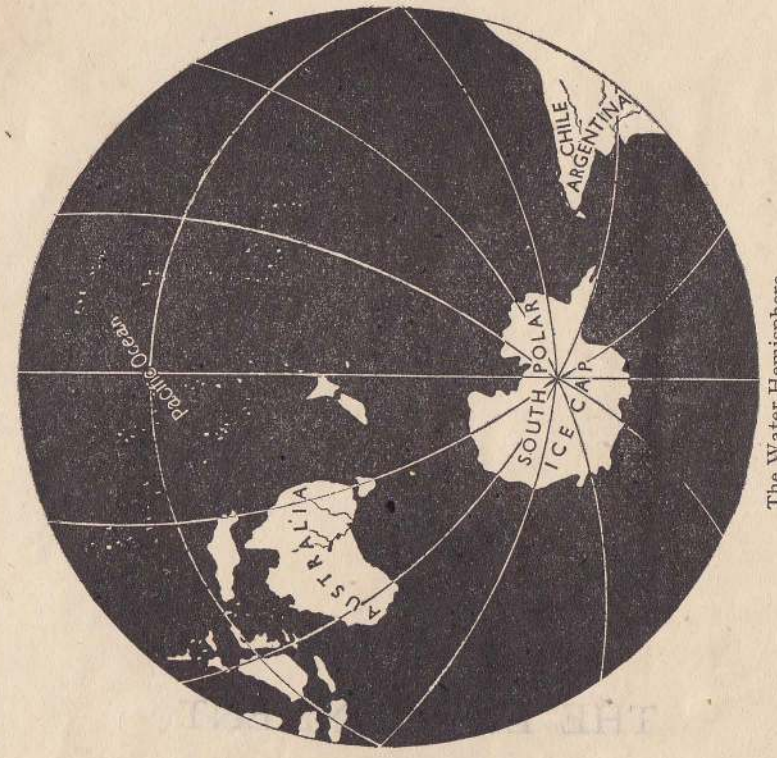


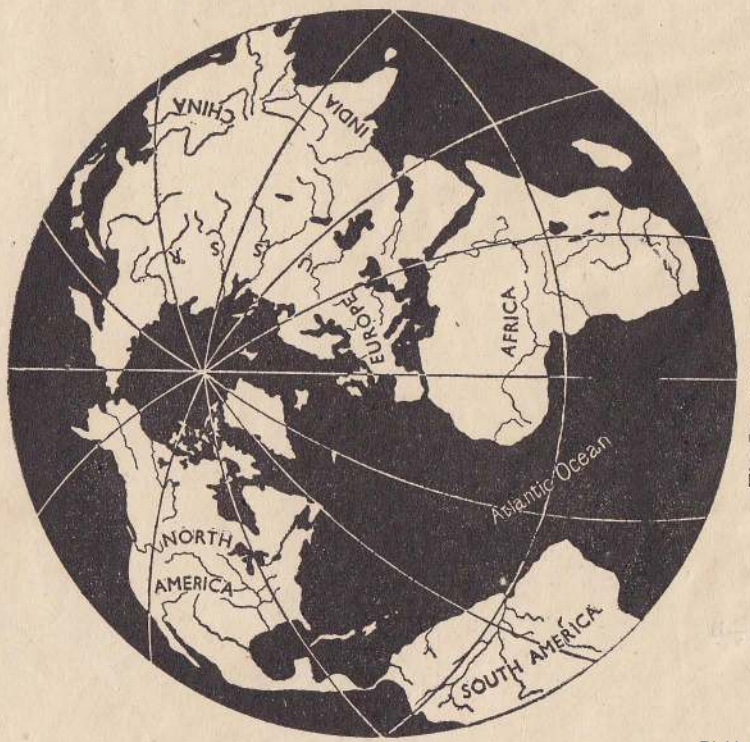
PART I

THE ENVIRONMENT





The Water Hemisphere



The Land Hemisphere

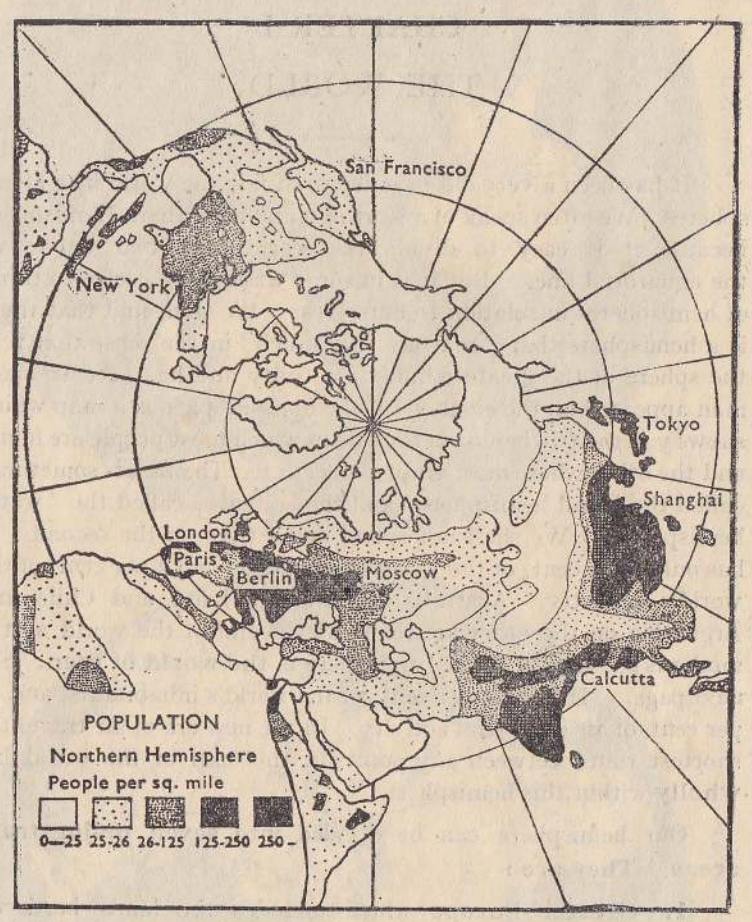
CHAPTER I

THE WORLD

It has been a very old practice to divide the world into hemispheres. We often speak of a Northern and a Southern Hemisphere because it is easy to divide the world into two halves at the equatorial line. But it is in some ways more useful to think of hemispheres in relation to ourselves. We shall find that there is a hemisphere that 'matters very much' in the sense that it is the sphere of the greatest human activity and has been so since man appeared on the earth. On the opposite page is a map which shows you the two hemispheres, one in which most people are found and the other where most empty spaces are. The first is sometimes called the 'land hemisphere' and the second is called the 'water hemisphere'. We shall not spend much time on the second. It has only 6 per cent. of the world's population and 2 per cent. of the world's industry. Australia on the one hand and Chile and Argentina on the other are really at the end of the world as the moderns see it. The other hemisphere is **the world of men.** (See next page). It has 94 per cent. of the world's inhabitants, and 98 per cent. of its industrial activity. In the new era of air travel the shortest route between any points in this half of the world lies **wholly** within this hemisphere.

Our hemisphere can be divided into **seven major trade areas. They are :**

1. **Greater Europe** which includes the lands bordering the Southern Mediterranean.
2. **Russia.**
3. **North America.**
4. **The Indo-Pacific Lands** consisting of the lands bordering the Indian and the West Pacific.



The World of Men

5. **Africa.**

6. **The Central American Lands** consisting of the islands of the West Indies and the states of Mexico, Venezuela and Colombia.

7. **South America** comprising Brazil and Argentina.

These regions are interesting in many ways. Russia is a large political unit and there are 'gateways' leading to it which are of special concern to the Union. One for example is Alaska. Another is the Persian Gulf gate to the Caspian. In the second world war much war material reached the Russians along the Bandar Shahpur to Bandar Shah railway. A third is the 'Turkish' gate through the Dardanelles. On the other side of the gate is Greece and you will now perhaps realise why in recent times Turkey and Greece were objects of the 'deepest concern' to those who disliked Soviet Russia. The Soviet too was deeply concerned that those who disliked her were very anxious about Greece and Turkey. Two other gateways to Russia are the Baltic and the White Seas. In the second world war the Germans controlled the former but failed to control the latter so that Britain and the United States of America were able to send help to the Russians.

Greater Europe is geographically a peninsula. The long arms of the Atlantic almost encircle her via the Baltic and the Mediterranean. Peninsular Europe has many things in common and it is therefore nothing surprising that at the present time there are plans for a Western Nations Union. Peninsular Europe has very little in common with Continental Europe which today is either a part of Russia or is controlled by her.

The North American region is made up of a large English-speaking community living in Canada and the United States of America. Canada although she is a Dominion within the British Commonwealth, is nevertheless drawn more and more into the sphere of influence of the United States of America. Two air approaches to the United States of America are over Canada. One is the Alaskan way and the other is the series of stepping stones

from the European mainland. They are Iceland and Greenland. When the Nazis held the European mainland the United States of America occupied these islands because if the Nazis had occupied them they could have easily menaced the United States of America as well as Canada. Similarly the United States of America carried the war into Japan via Alaska. These approaches will become more important with the development of air travel. In the same way the Hudson Bay area and the Arctic islands have become important because as your map will show you the shortest air route from Central United States of America to Russia and *vice versa* lies over the North Polar region.

The Central American region is also of high military significance. It has been said that whoever controls the Panama Canal will control the Atlantic and Pacific Oceans. The South American region is of increasing importance. Study on your map the Atlantic Ocean and you will see at once that North-East Brazil and West Africa approach each other and so narrows the Atlantic. In the second world war Dakar in West Africa became a place of great importance because in enemy hands the New World could be attacked by air from Dakar.

Africa is a continent whose resources have not been fully utilised by man. The North African coast was in the second world war, the Nazis way to India and some of the decisive battles of the war were fought here. West Africa is economically important because of her resources in tin, coal, cotton, palm oil and in recent years, her groundnuts. Kenya and Tanganika and South Africa occupy important positions on the western side of the Indian Ocean.

The Indo-Pacific lands are densely populated. The people are poor but there are very valuable resources not fully utilised especially in India, Indo-China and the East Indies. Positions such as those of Singapore and Ceylon are of the highest strategic importance. Similarly Hongkong, the Philippines, the islands off Japan were scenes of battle in the second world war. By far the most important area in this section is Manchuria. It has

great resources and in addition, it is the gateway to Mongolia and Eastern Russia. This was why Japan grabbed Manchuria in spite of the protests of the League of Nations.

There are other reasons why this hemisphere is really the modern world. 86 per cent. of the world's cultivated land is concentrated in the four regions of Greater Europe, North America, Russia and the Indo-Pacific lands which together comprise about 60 per cent. of the total ice free area in the world. North America represents 14 per cent. of the world's ice free lands of which the United States of America contributes about two-fifths, Canada, Alaska and Newfoundland three-fifths. Of the total of cultivated land the United States of America contributes seven-eighths while Canada makes up one-eighth. Russia comprises 16 per cent. of the total area and 22 per cent. of the cultivated area of the world. Greater Europe represents only 9 per cent. of all the lands in the world but has as much as 20.6 per cent. of the total cultivated area. In fact it has, though smaller in area of land, as much land under cultivation as Asia or Russia. Europe has a larger cultivated area than North America.

Over half the world's people live in Asia but very few of these live in cities. In North America, however, 44 per cent. live in large cities. In Europe live one-fifth of the human race and a large majority of the white peoples of the world.

The Relief of the Continents

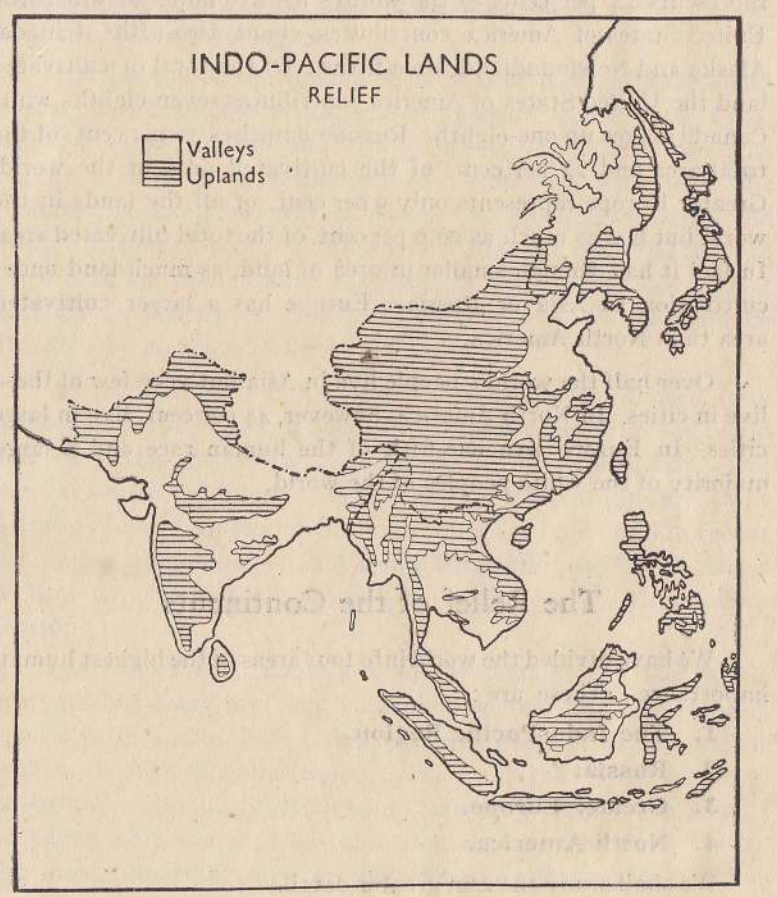
We have divided the world into four areas of the highest human importance. These are :

1. **The Indo-Pacific Region.**
2. **Russia.**
3. **Greater Europe.**
4. **North America.**

We shall study these in greater detail.

The Indo-Pacific Region

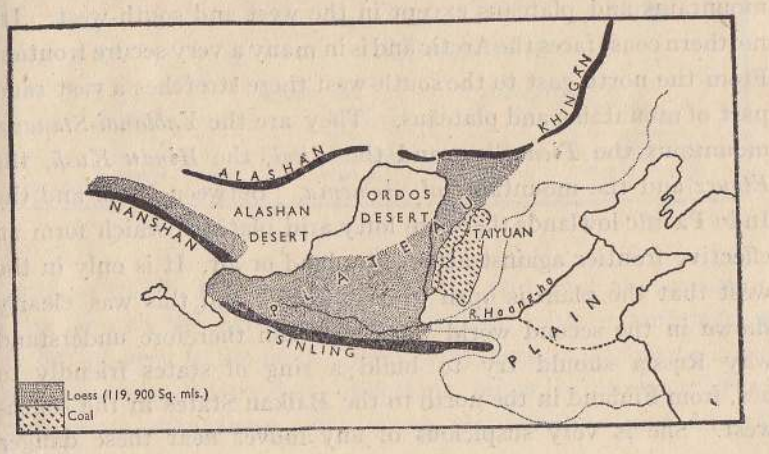
The Indo-Pacific Region is made up of a series of river basins separated by plateaus or mountains. Let us begin from the west. The first important river basin is **Mesopotamia.** It is a downfold of the earth's crust lying between the Plateau of Arabia and the Zagros mountains which form the western edge of the Plateau of Iran. The river basin has been filled with alluvium



and the fertile soil is the abiding wealth of Mesopotamia. There was a time when civilised people such as the Babylonians, flourished here and the waters of the Euphrates and the Tigris were used to irrigate the land. These canals have been destroyed and the land has lost much of its former prosperity. But a time will come when the life-giving waters of these rivers will once more make Mesopotamia a land of plenty.

The next river basin is **Indo-Gangetic Basin.** This too lies between the plateau of the Deccan and the Himalayan fold mountains to the north and north-west. The Plateau of Iran has separated Mesopotamia from the Indo-Gangetic Basin but all the same even in ancient times there was traffic between these plains by land as well as by sea.

The third series of river basins are found in **Indo-China** the peninsula that lies between India and China. This name is most appropriate because the people who live here derived their civilisation from India although they are people of Mongolian stock. The important valleys are those of the **Irrawady,** the **Menam** and the **Mekong.** The peninsula of Indo-China stretches south into the Malay peninsula. South of it lies the festoons of islands of

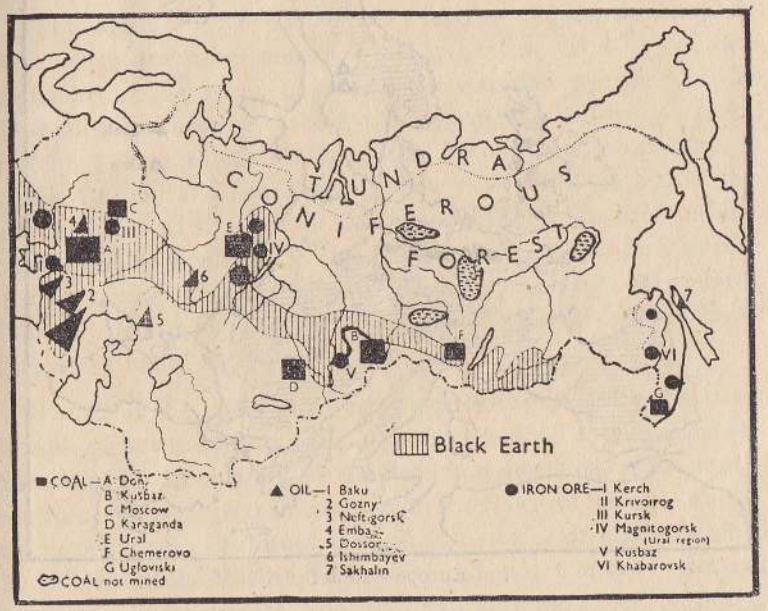


which Java and Sumatra are the most important. The Pacific lands of Asia also consists of a series of river basins which have been the homes of millions of people. The basins of the **Sikiang,** the **Yangtsekiang** and the **Hoang-ho** and the plain of **Manchuria** are geographically the most important regions. The island festoons of Eastern Asia extend from the Kuriles to the East Indies but those constituting the Japanese realm are the most important. They are also very densely populated and it was the need of living room that prompted the Japanese war lords to think of expansion by conquest. They felt they could make splendid use of the scantily populated valleys and islands of South-East Asia to grow rice, rubber and other products as well as develop the mineral wealth of oil and tin. The densely populated areas were to be the markets for Japanese goods so that all Eastern and South-Eastern Asia would have become subject to Japanese interests. This was their famous ' New Order for Asia '. Their defeat in the second world war saved the rest of Asia from Japanese tutelage.

Russia

Russia is made up of a vast plain backed by high mountains and plateaus except in the west and south-west. Its northern coast faces the Arctic and is in many a very secure frontier. From the north-east to the south-west there stretches a vast rampart of mountains and plateaus. They are the *Yablanoi-Stanavoi* mountains the *Tien Shan* and the *Altai*, the *Hindu Kush*, the *Elburz* and the mountains of *Armenia*. Between these and the Indo-Pacific lowlands there are lofty arid plateaus which form an effective frontier against attacks by land or air. It is only in the west that the plain is open to easy attack and this was clearly shown in the second world war. One can therefore understand why Russia should try to build a ring of states friendly to her, from Finland in the north to the Balkan States in the south-west. She is very suspicious of any moves near these danger

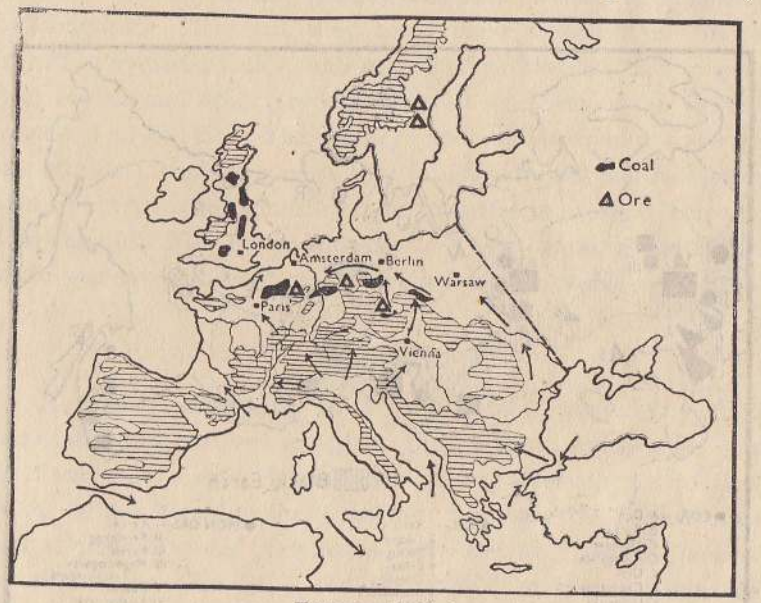
zones especially *Finland*, the *Baltic Coast*, the *Dardanelles* and *Persia* and the *Persian Gulf*. The great plain is not everywhere fertile. Along the Arctic coast are barren lands where the subsoil is frozen all the year round. South of it is a great forest region where the soils are arable. Root crops and fodder grasses grow well here. Southward still is a large zone of loess soil and here one finds the famous ' black earth ' region. This is perhaps the finest agricultural land to be found anywhere in the world.



South of this belt of fertile soil lies the arid land of Turkestan. Even here on the foothills of the Central Asian mountains are pockets of very fertile land. These only need irrigation to make them fruitful. Russia has important mineral resources. They are iron ore, manganese, gold, silver, platinum, coal and mineral oil.

Greater Europe

The centre of this region is the Mediterranean. It includes what has been called ' Peninsular Europe ' and the northern coast lands of Africa, which once formed a part of the Roman Empire. Peninsular Europe lies west of a line joining Danzig and Odessa on the Black Sea. No part of this peninsula is over 400 miles from the sea and the lowlands are all open to the Atlantic. The northern part of Greater Europe is an ancient upland greatly denuded by glaciers of long ago. The coasts have sunk and the glacial valleys



Europe—Relief

today form the 'fjords' of Scandinavia, Western Scotland and Ireland. The Scoto-Scandinavian highlands are bleak and barren but along the sheltered coasts fishing has been carried on from early days. The ' fjords ' were the home of the Vikings, those daring sailors who centuries before Columbus, crossed the Atlantic via Iceland and Greenland and reached Labrador. The Vikings made the North Sea ' *their sea* ' and ruled the lands round it.

The Baltic and the North Seas are very rich in fish. The chief kinds of fish are cod (Dutch, Dogger = Cod) herring and mackeral. It is believed that the daily catches of fish in the North Sea are about 2,800 tons and about 100,000 tons for the year. The North Sea fisheries yield about 182 cwt. of fish for every square mile whereas the Mediterranean yields only 19 cwts. The most important section of Greater Europe is the plain. It extends from Poland through Germany to the Low Countries and to the plains of Eastern and Central England. In France it breaks up into three river basins, the Seine, Loire and the Garonne.

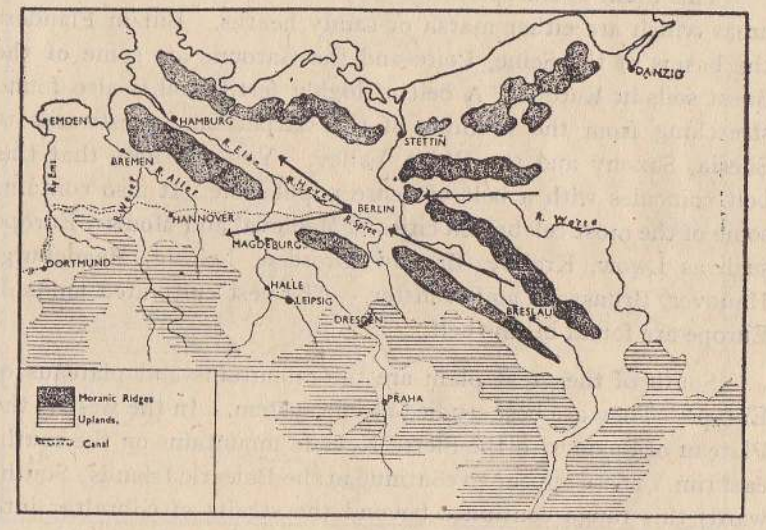
This Plain of Europe is not very fertile. There are extensive areas which are either marsh or sandy heaths. But in Flanders the basins of the Seine, Loire and the Garonne are some of the finest soils in Europe. A belt of highly fertile soil is also found stretching from the foothills of the Carpathians, westwards to Silesia, Saxony and the Rhine Valley. You will note that this belt coincides with a belt of dense population. It also contains some of the most celebrated cities of Medieval and Modern Europe such as Lwow, Krakov, Breslau, Dresden, Leipsig, Magdeburg, Hanover, Brunswick and Munster. The best cultivated lands of Europe are found in this belt.

South of the great plain are the mountains and plateaus of Europe. They are best studied as one system. In the west is the Plateau of Spain with the Sierra Nevada mountains on the south-east rim. These appear to continue in the Balearic Islands. Southwards this range continues beyond the straits of Gibraltar into the Er Rif and the Maritime Atlas. To the north of the Plateau of Spain are the Pyrenees and the Cantabrians. The former is separated from the Auvergne and Cevennes by the 'gate of Toulouse'. The Rhone makes a corridor into the north between the Cevennes and the Alps.

The Alps are the highest mountains of Europe. Branches of these curve south and extend to the ' toe ' of Italy. Another branch goes south to the Balkans as the Illyrian Alps and the

Pindus Mountains. An eastern offshoot is called the Balkan Mountains and the Mountains of Rhodope. Another interesting chain of mountains is the Carpathians, which encircle the Plain of Hungary.

The plateaus of Central Europe are very old. A good deal of rifting has taken place and the Rhine Valley is a good example of a rift valley. South Germany is another plateau which has many rift basins. The Plateau of Bohemia is encircled by the Bohmer Wald, the Moravian Heights, the Erzgebirge and the Sudetes. Within the plateau are areas of very fertile soil, e.g. the Eger Basin



near Praha. The central plateau is drained east by the Danube which has been for centuries the great natural 'way' to Central Europe from the East. Towns such as Constantinople (now Istanbul), Sophia, Belgrade, Budapest and Vienna have stood as sentinels on the route. Another natural ' way ' to the centre of Europe is provided by the Rhone. Through this came Roman influences to France and through the Belfort gap into Germany. The other way into Central Europe is the River Rhine. Along it are also many celebrated towns.

The Mediterranean has been the centre of the Graeco-Roman world, hence the name. It is still in many ways the centre of the world. Examine a map of the Mediterranean and you will notice that it is made up of many basins. One is the western basin almost encircled by the Atlas Mountains, Sardinia and Corsica, Southern France and the Plateau of Spain. Another basin is the Tyrrhenian Sea. A third is the Adriatic Sea. The Eastern Basin is made up of the Ionian Sea, the Aegean Sea, the Levant and the Eastern Mediterranean. The island studded seas were the first schools for seamanship. Here flourished the Phoenicians, Cretans, Greeks and Carthaginians, Romans and finally the Merchant City States of Venice and Genoa. The sea gates to the various parts of the Mediterranean are naturally very important, in peace as well as in war. The Dardanelles for example was famous even in the days of the Greeks and it has been so to this day. Another is the ' landbridge' which connects Asia with Africa. It is now pierced by the Suez Canal and here again is an important ' gate way '. The Ancient Egyptians, Assyrians and Babylonians fought for the possession of this zone, and today the great powers of the modern world are no less concerned as to who should hold this valuable site. Malta is yet another of the strategic points in the Mediterranean. It stands right on the threshold to the western and eastern basins and whoever holds it controls the Mediterranean seaway. This was well illustrated in the second world war. The last gate-way which the Greeks thought was the ' Pillar of the end of the world ' is really the doorway to the lands round the Atlantic.

The Central European plateaus have a number of areas very suitable for human settlement. There are for instance in Spain the valley of the Ebro, the coastal districts of Valencia, Malaga and Murcia. Above all there is the famous Vale of Andalusia which was the heart of the Moslem kingdom of Spain.

South Germany is a plateau containing a number of fertile basins and these have been political units since the Middle Ages. The Rhine Valley has been celebrated in German history because it was a great thoroughfare from the south to the north across the plateaus of Central Germany. There were many cities in the

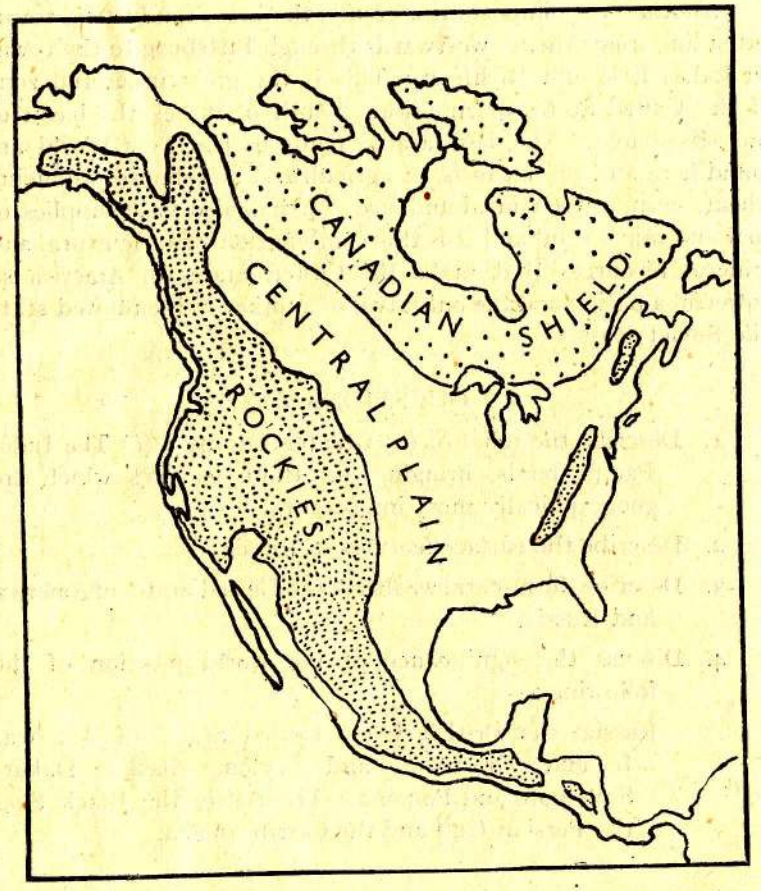
valley and the eastern border was known as ' burg straat ' i.e. the road of cities. The South German Plateau is drained eastwards by the Danube and where it leaves the plateau to enter the Plain of Hungary stands the German fortress town of Vienna. The Plain of Hungary was once an inland sea but it has been filled up through the ages and is now a very flat level plain. It has very fertile soil but cultivation is hampered by the relative dryness of the region. Nevertheless excellent crops of wheat and maize are grown here. The other Danubian plains of Roumania and Dobruja are also very fertile and grow wheat and maize.

The Balkans occupy a very strategic position in Europe. It is a great land way to Asia and for many centuries it was the centre of rivalry between the German States of Austria and Germany on the one hand and the Slav State of Russia on the other. The German States wished to control the peninsula so that they might have an open door to the east. You might have heard of the Berlin-Bagdad Railway which was one of the reasons why the Central European powers were viewed with suspicion by England and France and this railway project was an indirect cause of the first world war. Russia desires to appear as the champion of the Slav peoples of the Balkans and also to secure an ice free port on the Mediterranean. She has today control over all the Balkan States save Greece.

Greater Europe has very valuable supplies of coal and iron and the early development of these gave Europe the leadership in trade and industries which has only been challenged by the United States of America The coalfields are found in the Midlands of Scotland, Durham, Newcastle, Yorkshire, Lancashire, Birmingham and South Wales in the British Isles. On the continent the important coalfields are the Franco-Belgium, the Westphalian, the Saxony and Silesian and the coalfields of Poland and Czechoslovakia. The important deposits of iron ore are found in Sweden, in Lorraine (France) and in Spain at Santander and Bilboa. The Swedish-ores are mined at Gellivara, Kiruna and Dannemora.

North America

The North American region consists of (*a*) A coastal plain of the Atlantic side backed by the Appalachians. (*b*) A central plain extending from the Hudson Bay to the Gulf of Mexico. (*c*) A system of mountain chains and plateaus in the west and (*d*) A



series of valleys in the west namely the Wilamette and Californian Valleys.

The Atlantic coast plain owes its importance to the fact that it faces the old world and that it has a number of excellent harbours

which have developed into great ports. Chiefs among them is New York. The St. Lawrence Valley is the Heart of Canada with all her important cities and industries located in it. It is also the region where Canada has all her important power stations.

Another very important region is the belt of industrial towns extending from Albany westwards through Pittsburg to the towns on Lakes Erie and Michigan. This is the great industrial zone of the United States of America. South of it lies the basin of the Mississippi. The best arable lands of the New World are found here and the basin is an agricultural storehouse producing wheat, corn, cotton in abundance. It has also vast supplies of coal and mineral oil and it is this combination of agricultural and mineral resources that make the United States of America so powerful a nation and the only rival of another well endowed state like Soviet Russia.

QUESTIONS

1. Describe the relief of (*a*) Greater Europe. (*b*) The Indo-Pacific lands, bringing out those features which are geographically most important.
2. Describe the surface features of Russia.
3. Describe the mineral wealth of the United States of America and Russia.
4. Discuss the significance of the world position of the following :—

   Russia, the British Isles, United States of America, Iceland, Greenland and Ceylon. Alaska, Dakar, Singapore and Panama. The Baltic, the Black Sea, the Persian Gulf and the Carribean Sea.

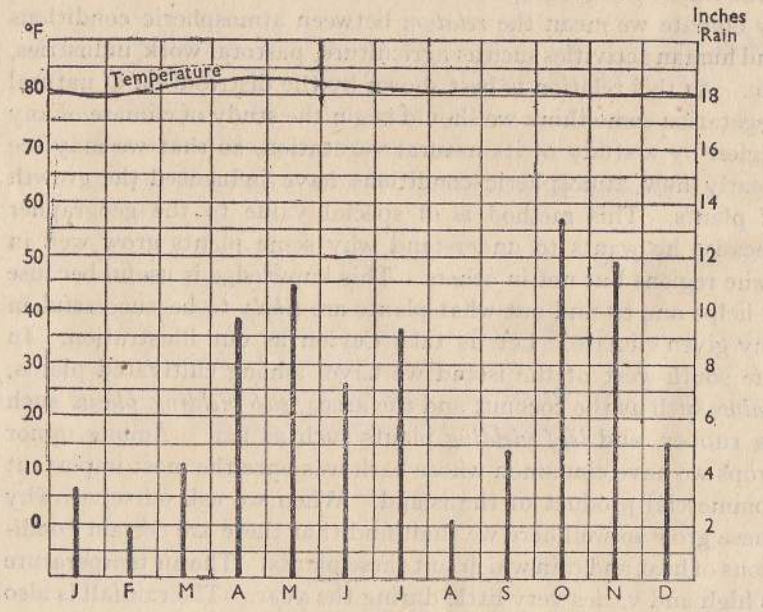
CHAPTER II

THE CLIMATIC REGIONS OF THE WORLD

Let us first make sure what we mean by climate. You have no doubt heard people speak of ' good ' and ' bad ' climates. What they meant was that a certain climate was good or bad for something. It may be that a climate which is good for one thing is bad for another, so that we should always think of climate in **relation** to something such as man's health, his crops or his flocks, etc. It is therefore not correct to speak of climate as good or bad unless it is with reference to one or the other of the human activities with which the geographer is concerned. We shall then say that by climate we mean the *relation* between atmospheric conditions and human activities such as agriculture, pastoral work, industries, etc. As this relation is best shown by the distribution of natural vegetation some think we should begin the study of climate of any region by a study of its natural vegetation, so that we may see clearly how atmospheric conditions have influenced the growth of plants. This method is of special value to the geographer because he wants to understand why some plants grow well in some regions but not in others. This knowledge is useful because it helps one to find out what plants are *likely* to be successful in any given climate. Let us take Ceylon as our illustration. In the south-west of the island we have among cultivated plants, *palms* such as the coconut and the areca, *sap yielding plants* such as rubber, and *leaf yielding* plants such as tea. Among minor crops we have cinnamon whose bark was once the most important commercial product of the island. When we ask ourselves why these grow so well here we shall find that there are certain conditions of heat and rain which suit these plants. The air temperature is high and varies very little during the year. The rainfall is also heavy and there is no dry season so that there is always sufficient

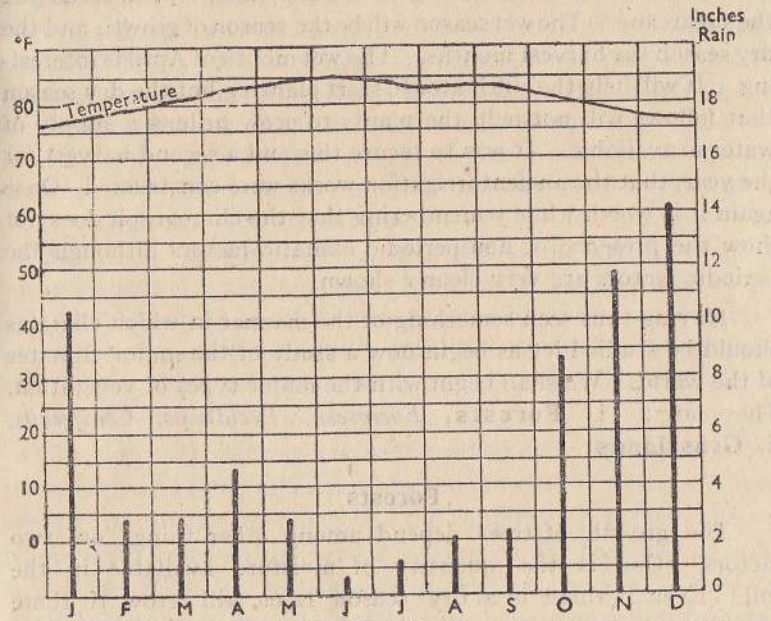
moisture to meet the demands of these plants. The combination of heat and rain enable the plants to grow vigorously developing leaf, bark and sap. In terms of heat and rain, etc. we say that the temperature is for instance 80°F but we must not fail to note at the same time that there is very little variation of temperature for if there were, then the palms will not grow, nor will the rubber tree thrive. The quantity of rain is over 75″, for the year but we must also remember that this is well distributed and that there is no dry season. This information is well summarised in a diagram known as a climograph. Here is such a diagram for the south-west of Ceylon.

This diagram shows a number of things. We can see the **'march'** of temperature and rainfall from January to December. We can also see the **relation** between the temperature and the rainfall. For example, the two 'peaks' of rain occur when the temperature is highest, i.e. at the time of the overhead sun. The temperature curve shows that there is very little range of temper-



Wet Zone. Ceylon

ature during year while the rainfall columns show that there is no dry season. February and August are the driest months of the year. This diagram is also useful in that it **appeals to the eye** in a way that no figures of rainfall and temperature can. But there is still something that the diagram cannot show, namely those sudden changes in atmospheric conditions which though not revealed in averages yet profoundly influence us. Take for example the heavy rain that falls with a cyclone. Our diagram shows that August is a dry month but in August 1947 we had unprecedented rain which caused disastrous floods. For example, in Kandy the average rainfall for August is 5.7″ but in 1947 as much as 28″ of rain fell in August. Other stations also reported very heavy rain, e.g. Peradeniya 32″. Madulkelle 50″. Hatton 53″. Maskeliya 58″ in August which for all these places is a relatively dry month. These non-periodic factors cannot be shown either in maps of average rainfall or temperature nor can a climograph bring these out. But a climograph however shows very clearly



Dry Zone. Ceylon

the **periodic** factors and it is on these that plant cultivation will in the long run depend.

Let us now compare the climate of the South-West with that of the North-East. On page 21 is a climograph for the north-east of the island.

We have here quite another picture. The **'march'** of temperature remains much the same but the **'march'** of rainfall is very different. We have a well marked **wet** and **dry** season. The former is from September to December while the latter prevails from May to August and from January to March. The total quantity of rain is 50" to 75" and if you remember that the rate of evaporation is very great, you will realise that plants will have less moisture here than in the South-West. In the north and east of the island plants need a **resting** time during the dry months so that plant growth is not as rapid, as in the South-West. On the other hand the succession of a wet and dry season is very suitable for the cultivation of grains, fruits, fibres and oil seeds and the sugarcane. The wet season will be the season of growth and the dry season the harvest months. The wet month of April is interesting. It will help the cultivator to start planting but the dry season that follows will not help the plants to grow **unless** a supply of water is available. It was to secure this and a second harvest for the year, that the ancient irrigation works were constructed. Once again it is worth while remembering that the climograph does not show the presence of non-periodic climatic factors although the periodic factors are very clearly shown.

Having thus seen something of the manner in which climates should be studied let us begin now a study of the major climates of the world. We shall begin with the major types of vegetation. They are : i. **Forests,** *Evergreen, Deciduous, Coniferous.* ii. **Grasslands.**

Forests

The growth of trees depend among other things on two factors. One is the quantity of moisture available in the soil. Even if there is a dry season trees will grow if there is sufficient moisture retained in the soil from the rains

that have already fallen. But if the rain has not been heavy and there is a long period of dryness there will not be sufficient moisture in the soil to help trees to grow. In some parts of the world the long period of dryness may be caused by what is known as physiological drought. Plants can absorb moisture in the form of water but if the water is frozen and snow and ice cover the ground then moisture is present in a form that plants cannot use. Such a time will be a time of rest for plants or trees may not grow at all. This is the case in the interiors of continents of cool temperate latitudes where the long winter is a period of drought and the scanty rain of the summer is not sufficient for the growth of trees. From this it will be clear that forest growth is controlled by the amount of moisture available in the soil and more especially by the **length of the dry season.** If the dry season is short, trees will adapt themselves to live through the dry season by devices that will reduce loss of moisture by transpiration. But where the dry season is long then trees will gradually disappear and their place taken by low jungle or scrub lands. We see this principle at work in Ceylon. In the South-West where the rainfall is heavy and there is no dry season, forests are thick and plants grow all the year. But when we leave the forests of the south-west and cross the island and move over to the dry zone the forests assume a different form. Here the rain is not heavy and there is a dry season of over 4 months made worse by a desiccating south-west wind. The trees spread out and there are meadows in the forest. Tree growth is active only during the wet months while during the dry season plant growth is checked and trees adopt ways and means to check transpiration. Finally when we enter the arid region of the north-west or south-east the forest disappear and low jungle and scrub lands are found. The rainfall is inadequate for the growth of trees.

In lands where there are well marked summers and winters the winter cold often sets a limit to the growth of forests. Where supplies of rain are adequate and the winter temperature is never below 43°F trees do not need a resting period because the cold is not great enough to cause physiological drought. Trees do not therefore drop their leaves and we have **evergreen forests.**

Examples of these are found in the forests of Mediterranean lands and in the eastern margins of warm temperate lands such as South China and South-East United States of America. In other latitudes where the winter temperature is below 43°F, trees go through a period of physiological drought in winter and trees drop their leaves. These are **deciduous forests** and these must have at least six months when the temperatures are over 43°F. We have a third type of forest where the period of physiological drought is longer and lasts over six months. If the moisture available during the four months of relative warmth is about 15" then we have **coniferous forests.** These are so named because the principal tree such as the pine, bear cones. Trees in the coniferous forests are very hardy. They can live on little rain because in high latitudes the rate of evaporation is small even in summer. Winter is a harsh season with heavy snow and strong winds. The trees have needle shaped leaves so that there is little resistance to winds which howl through them but do not bring them down. The leaf surface is small and the needle shaped leaves bring loss of moisture by transpiration to a minimum. The snow that gathers thick in the forest keeps the soil warm by checking radiation of the heat. When spring comes the snow melts and provides the much needed supplies of water for the trees.

Grasslands

In low latitudes where the rain is scanty and the loss by evaporation is great, trees do not get adequate supplies of water and forests cannot grow. Further if there is a dry season as well, then only such plants that can complete their life cycle during the months of rain can possibly live. Such plants are called annuals and grasses are the best examples of these. They come to life at the beginning of the rains and when the dry season begins they have completed their growth and the seeds have fallen, to lie in the soil until the next season's rain will cause the seeds to grow. This is what happens in tropical lands where the rain is below 30" and the resultant grasslands are called *Savannahs* in Africa, the *Llanos* in the Orinoco Basin, the *Campos* of Brazil.

In temperate latitudes the length of the cold season determines the type of plant. Where the rain is scanty and the winter is long only annuals like grass will grow. They complete their life cycle in the warm months and when the winter sets in, the seeds lie in the ground covered by a mantle of snow. As soon as the spring sun melts the snow and ends the period of physiological drought the seeds quicken to life. The spring and summer heat encourage the rapid growth of the grasses and by late autumn their life cycle is over.

Plant growth is thus greatly influenced by:

1. *The seasonal distribution of rain and particularly the length of the dry season.* This is the most important factor in low latitudes where there is no seasonal range of temperature.
2. *The seasonal distribution of temperature and particularly the length of the cold season.* This is important in high latitudes where the winter is often the period of physiological drought.

Climatic Types of the World

Hot Climates

Let us begin by studying the **Hot Regions** of the world as we are more or less quite familiar with this type. We live in a hot region and so can best appreciate what type of climate this is. A **Hot Region** has an annual average temperature of 70°F so that air temperatures low enough to check plant growth are never experienced. In such regions the major climatic features will be the **quantity of rain and the length of the dry season.**

Now a hot region may have **rain all the year** so that plants can grow all the year round. Such climates are often called **Hot Wet or Equatorial Climates.** There are hot regions with **heavy seasonal** rain so that plants grow quickly during the rains but the dry season checks their growth for **a season** or a part of the year. We call this type **Tropical Monsoon Climates.** We have a third type of Hot Region where the rain is seasonal and scanty so that the dry season makes it almost

impossible for plants to grow without the aid of irrigation. The natural vegetation in such areas is grass, an annual which completes its life cycle in four or five months. This type is often called the **Sudan Type** of climate, or a **Tropical Grassland Type** or **Savannah Type.**

Distribution of Hot Climates

Equatorial Climate—This climate is in regions bounded by the isotherm of 68°F. Examples are, South-West Ceylon, the East Indies, the Congo Basin and West Africa and the Amazon Basin. All these are regions where certain forms of agriculture can be and are very successful. Owing to the combination of heat and rain all the year, **palms** grow very well and the world's supply of palm oils come from this climatic belt. It is also the home of rubber, tea and cinchona.

One disadvantage of this climate is that owing to the ceaseless growth of vegetation, land clearing is very difficult and there has to be a constant fight against the jungle tide from overwhelming the cultivated lands. This is why, for example, the tea estates need a large force of resident labourers to keep the estates free of weeds, etc. Owing to the heavy rain, the lowlands in this climatic type are often marshy. Mosquitoes breed in them so that malaria and other diseases make these regions unhealthy. The climate though excellent for certain plants is not good for man. The high temperature and high humidity do not encourage physical activity. The human body tires soon and is not capable of sustained physical effort. There are some who believe that this climate is not at all helpful to intellectual work. It is worth remembering that we have no records of ancient civilisation in these hot wet climates.

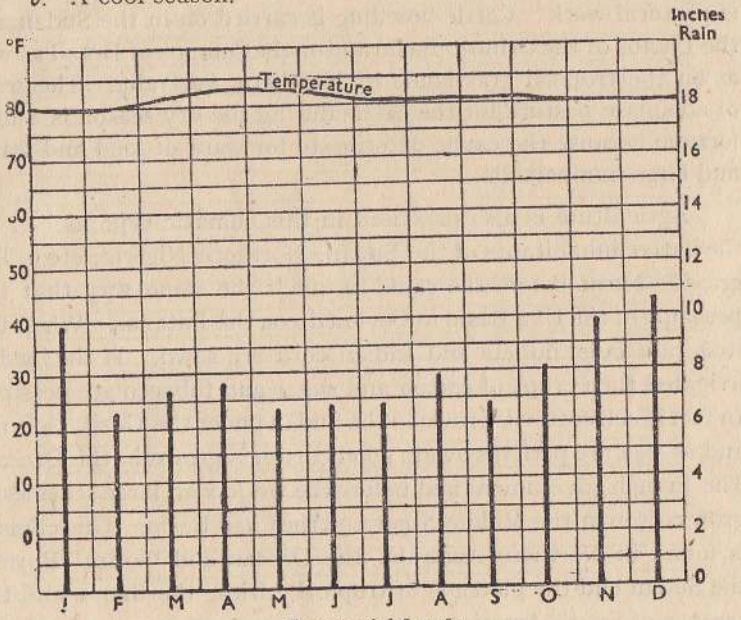
Nevertheless lands with this climate will in the years to come, become **economically** very important. Drought is almost unknown and the **regular and reliable rain** and **steady air temperature** all make for **climatic stability.** This is why certain forms of cultivation are exceedingly successful and tea, rubber and coconut and other palms occupy an important place in the trade and commerce of the world. No frost or any other climatic condition has done any appreciable damage to the plants grown in this

climatic type and this is due to the stability which is the characteristic feature of hot wet climates.

Hot Regions with Scanty Seasonal Rain

To the north and south of the hot wet regions of the world are regions which are hot but the rainfall is scanty and seasonal. It comes in the regions north of the equator with the overhead sun in March-April and in the lands south of the equator in September-October. The rain often comes in evening thunder showers. They are at times very violent and cause great damage by soil erosion. The rainfall is not over 30" for the year and as the rate of evaporation is very great the moisture left in the soil is scanty. The dry season is therefore a time of great difficulty for plants, man and beast. The year in these lands can be divided into three seasons:

a. A hot season.
b. A wet season.
c. A cool season.



Equatorial Lands

The hot season begins with the coming of the overhead sun, i.e. March-April in northern lands. The heat increases from day to day and there is hardly a cloud in the sky. The heat is intolerable and the whole landscape is brown and the air is heavy with dust. May and June bring the rains and almost overnight the landscape which was parched and brown becomes green with plants growing on all sides. The rains end in August and the heat decreases and the cool weather sets in when the sun is over the southern tropic.

The great disadvantage of this type of climate is that the rain is **inadequate** considering the loss by evaporation. It is unfortunately **not reliable,** that is, one cannot always depend on the quantity of rain which may fall each wet season. There are wide fluctuations which do great harm to cultivated lands. This can of course made good by irrigation works.

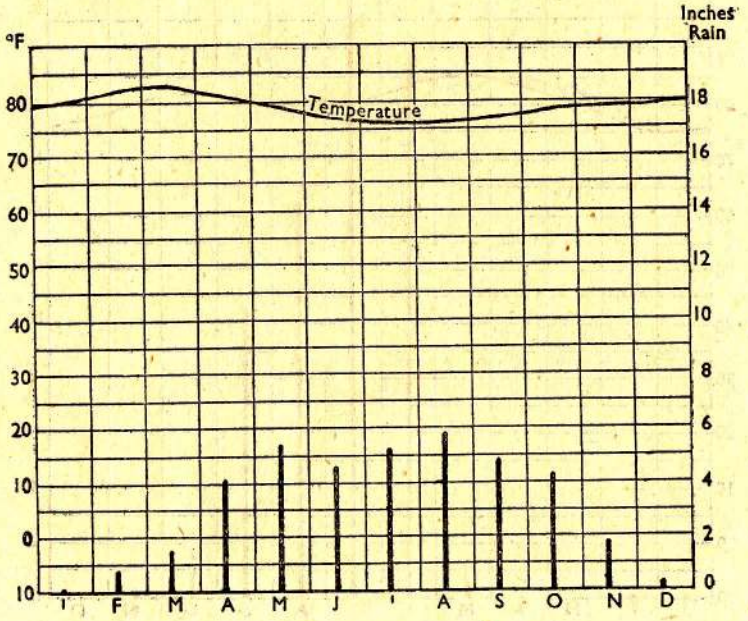
The main occupation of people living in this climatic type is pastoral work. Cattle breeding is carried on in the Sudan and the Llanos of the Orinoco Basin and on the Campos of Brazil as well as on the tropical grasslands of Northern Australia. The want of adequate pasture for the cattle during the dry season is a misfortune because the cattle deteriorate for want of food and water and large numbers die.

Agriculture is also practised in this climatic type as e.g. by the native inhabitants of the Sudan, Northern Nigeria, etc. The grass is burnt before the rains in much the same way that the peasants of the Uva Basin in Ceylon do on the Patanas. When the first rain falls, millets and Indian corn are sown. If the land is irrigated then crops of cotton and sugar and tobacco are possible. In fact much cotton is grown in the Sudan under the Gezira scheme and as you are perhaps aware good cotton is grown in the Deccan. The French government had before the world war, large schemes to grow cotton in the Middle Niger and the Chad Basin. This climate is found in Northern Australia, the Deccan and Central Burma, the Sudan and the plateaus of tropical Africa, the llanos and the campos of South America.

Tropical Monsoon Climate

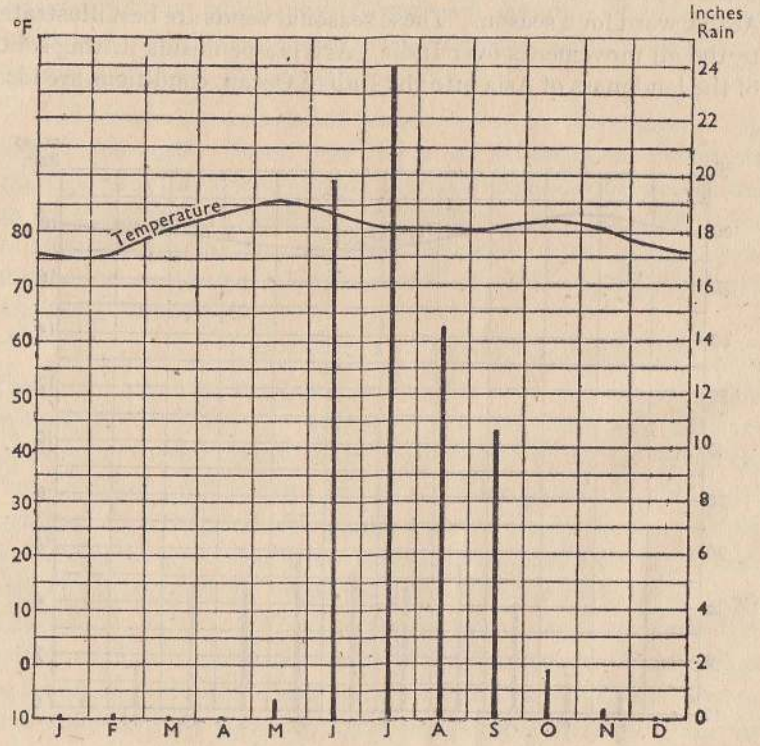
This is not very different from the type just described but as the seasonal rainfall is much heavier, tropical monsoon climates are better suited for agriculture and have supported large numbers from quite early times. Owing to the heavy rain in the wet season there are enough supplies of moisture in the soil to enable plants to live through the dry season and so these lands can grow forests.

As in all tropical regions there is hardly any seasonal range of temperature. But owing to the position of certain lands in the tropics close to large land masses, powerful seasonal winds control the rainfall of these lands. In the summer months there is a great sea wind which is replaced in the winter months by a great land wind. These seasonal winds have been called *monsoon* after the Arabic word for a season. These seasonal winds are best illustrated by the air movements over India. As it is a peninsula jutting south of the land mass of Asia into the Indian Ocean, conditions are ideal



Tropical Monsoon Type (Grasslands)

for the creation of seasonal winds. When the sun is overhead in the northern tropic a low pressure area is created in North-West India, so that slowly and steadily a gigantic sea breeze sets in from the sea towards the land mass. This is the south-west monsoon over Ceylon. This vast stream of air is divided into two branches, the Arabian Sea branch and the Bay of Bengal branch. The former is more or less a westerly wind while the latter enters India as a south-east wind. The air masses that make up these streams of air are very humid and heavy rain falls on the hills. Cyclones often come with the monsoon and these bring rains especially on the lowlands such as the plain of the Ganges. When winter sets in over North-West India, there is a movement of air from the



Tropical Monsoon Type (Forests)

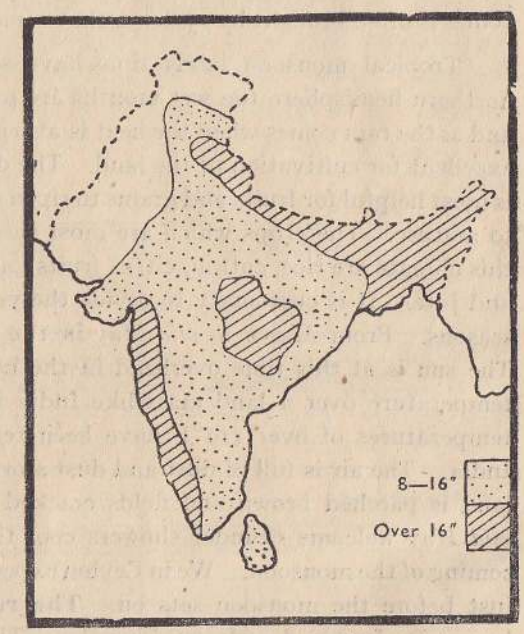
peninsula out to the sea. This is a sort of vast land breeze and is generally dry, save where it passes over seas or expanses of water. Thus on its way to the south the air travels over the Bay of Bengal into warmer latitudes and so become warm. It will then pick up moisture and when it reaches the shores of Ceylon it is a fairly moist wind. This mass movement of air is generally called the North-East Monsoon. This brings fairly heavy rain to the hills on the north-east of the island but on the lowlands the rain that comes is often brought by cyclones that come with the monsoon.

Tropical monsoon lands thus have seasonal rain. In the northern hemisphere the wet months are mid-June to September and as the rain comes when the heat is also great, the wet season is excellent for cultivation of the land. The dry season that follows is most helpful for fruits and grains to ripen and fibres and oil seeds to mature. The crops which are most successfully cultivated in this climate are rice, cotton, citrus fruits, oil-seeds, tea, sugarcane and jute. It is customary to divide the year in India into three seasons. From *March to mid-May* **is the hot weather season.** The sun is at this time overhead in the northern lands and the temperature over a land mass like India is very high. In fact temperatures of over 110°F have been recorded in North-West India. The air is full of dust and dust storms are common. The land is parched brown and fields cracked up by the heat. By *mid-May* welcome thunder showers cool the air and herald the coming of the monsoon. We in Ceylon experience thunder showers just before the monsoon sets on. **The rainy season** in India begins in *June and ends by December.* Then the **cool weather season** sets in and it is over in *February.* This is a most delightful season in India.

The summer monsoon rains amount to about 80 per cent. of the rain of the total rainfall in India. This will show you how much the farmers of India depend on the rains of the summer months for the cultivation of the land. When the rain fails as it has done sometimes, there is famine in India, and food has to be brought from other lands. On pages 32 and 33 are two maps one of which shows

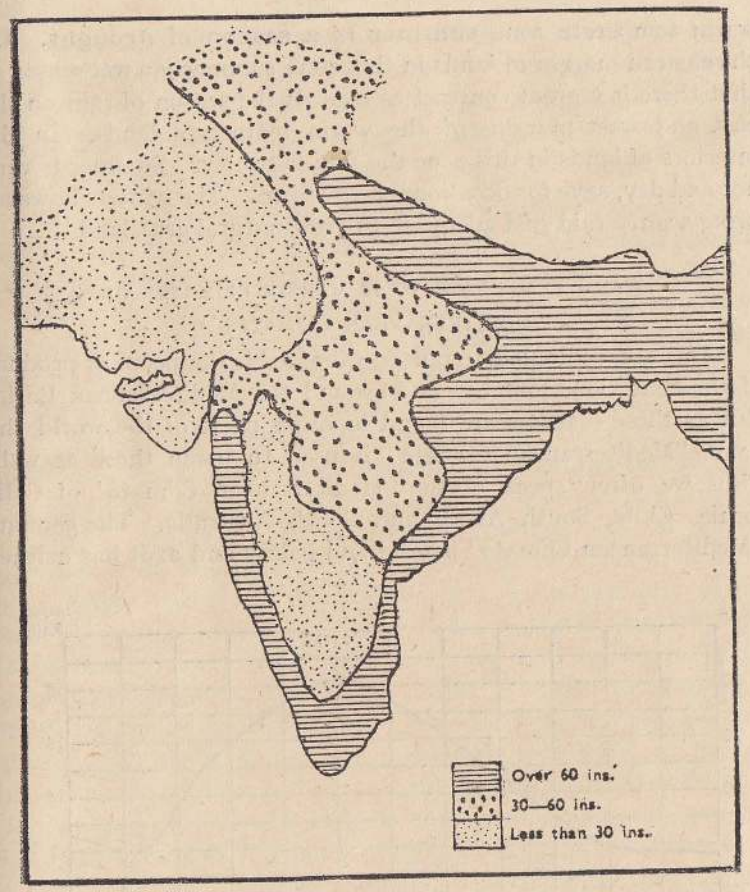
the distribution of rain during the south-west monsoon and the other shows you the rainfall regions.

The heaviest rain falls on the Western Ghats, the Chota Nagpur Hills, Assam and the Himalayan foothills. A very large rain shadow lies in the Deccan and the rain diminishes towards the north-west. Note carefully the area with 40 inches of rain and less. This is the Dry Zone of India and unless the land is irrigated crops cannot be successfully raised. Large extents of land are thus not fully productive and this is at least one reason why the people of India are poor. We too are in a like position with three-fourths of the island needing irrigation for if it is to be made productive. India and Ceylon therefore have one problem in common namely the fuller utilisation of the lands where the rain is inadequate for agriculture.



The other map shows you rainfall regions into which India can be divided. This map too emphasises the large extent of land in India which needs irrigation.

The tropical monsoon type of climate is found in the north and north-east of Ceylon, India, Northern Australia and Abyssinia.



India—Rainfall Regions

Warm Temperate Climates

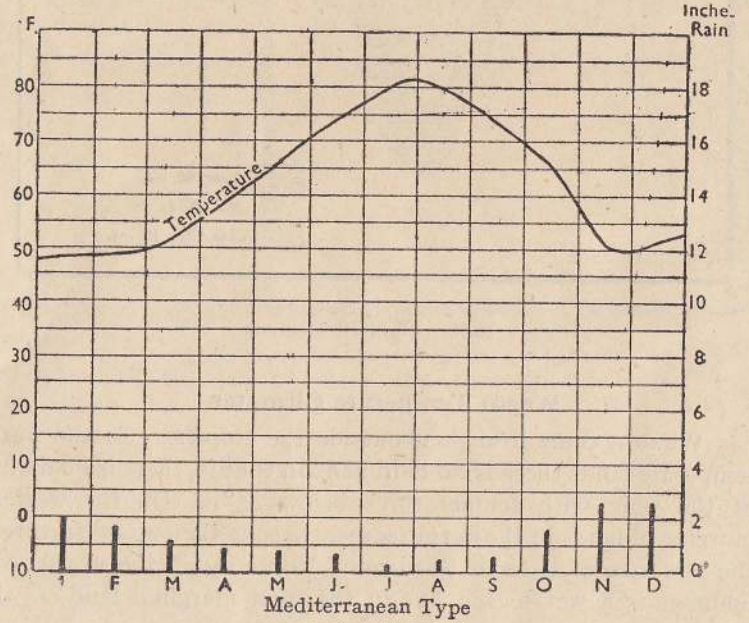
We now come to regions outside the tropics. In the warm temperate lands there is **no cold season** that is, there is no month of the year with temperatures below 43°F. On the western margins of lands in the warm temperate zone the curious feature is the **absence of rain in Summer.** Normally all the world over Summer is a wet season but in the west marginal lands of the

243—C

warm temperate zone **summer is a season of drought.** On the eastern margin of lands in this zone, summer is a wet season so that there is a great contrast as regards the season of rain on the east and west margins of the warm temperate lands. In the interiors of lands in this zone the rain is scanty. Summer is very hot and dry, save for occasional heat storms. The winters however bring scanty rain just adequate to grow natural grasslands.

WARM TEMPERATE WEST MARGIN CLIMATES OR 'MEDITERRANEAN CLIMATES'

In a sense 'the Mediterranean Climate' is the peculiar product of the conditions found in and around the Mediterranean Basin. But as these features are found in other parts of the world the name 'Mediterranean Climate' is used to name these as well. Thus we often speak of the 'Mediterranean Climate' of California, Chile, South Africa and South Australia. The genuine 'Mediterranean Climate' is mild and balmy and as it has neither



Mediterranean Type

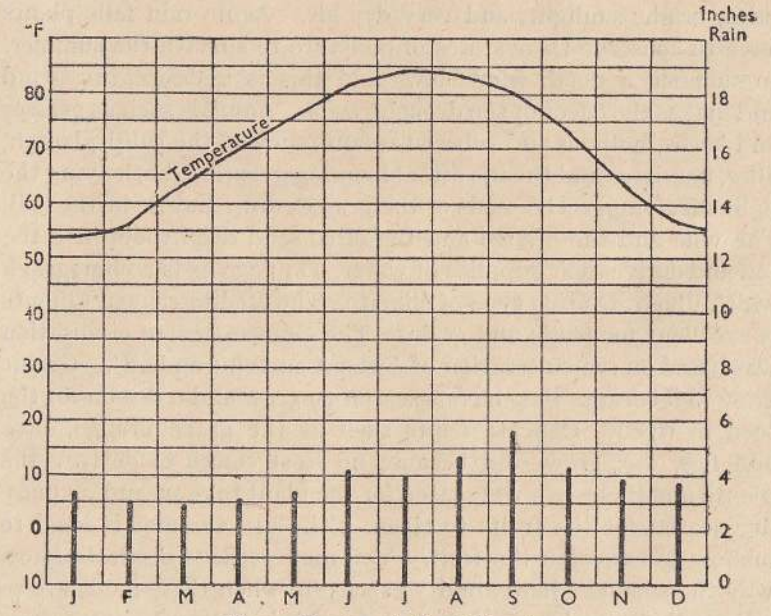
extremes of heat or cold, life in these climates has never been trying to man. Nor is it monotonous as the hot-wet climates are and it is not to be wondered at that in so favourable a climate as in the Mediterranean Basin, some of the most celebrated of ancient civilisations arose and laid the foundations of the modern world.

Winter is a warm season. Snow rarely falls except on the high mountains and frost is also rare. Work out of doors is possible and as the rains come in winter, this is the time when the land is got ready for cultivation. The rain is not heavy, not exceeding 30" except on the mountains. Very little is lost by evaporation and the soil thus has a good supply of moisture for the plants in the dry summer. Limestone rocks, ranges and plateaus are common in the lands round the Mediterranean and these absorb vast stores of water. Wells, springs and fountains are common and some of you may be familiar with references to these in the literature of the Bible. Spring is a lovely season. It is the time for flowers and the sun is mild and pleasant. Summer is a season of clear skies, bright sunlight, and very dry air. As no rain falls plants have to conserve their stores of moisture to survive the summer. In summer a north wind blows and this is a desiccating wind and makes the effect of the drought worse. Annuals such as grasses and herbs, bulbous and tuberous plants such as the tulip, gladioli, lilies, narcissus and the iris after blooming in spring die, leaving the bulb surviving. The seeds of the grasses drop and lie in the soil. The vine and the orange and the olive send deep roots into the soil and derive their supplies of water. On page 34 is a climograph which illustrates this type of climate. The Mediterranean Climate is excellent for fruits and grains. The Graeco-Roman civilisation was based on the cultivation of 'wheat and vine and oil'. Grains grow well because they have a season to grow and a season for the seed to ripen. Delicate fruits such as the grape, orange, olive and figs, etc. grow well because no frost comes to destroy the plants and there is a wet season for the plant to grow and a sunny dry season for the fruits to ripen. The dry summer is ideal to mellow and sweeten the fruit. You may perhaps desire to know why the summers here are dry especially when these lands are so near to the sea. The main reason for this is that in summer there

is a wedge of high pressure over Central Europe and a low pressure over the Sahara. Winds will naturally blow from the north to the south and as these northerly winds move from higher to lower latitudes the air masses get warmer and warmer as they move south. When this happens winds take up rather than give up moisture. And so Mediterranean lands have dry north winds. The skies are cloudless and this adds to the heat and dryness.

WARM TEMPERATE EAST MARGIN CLIMATE

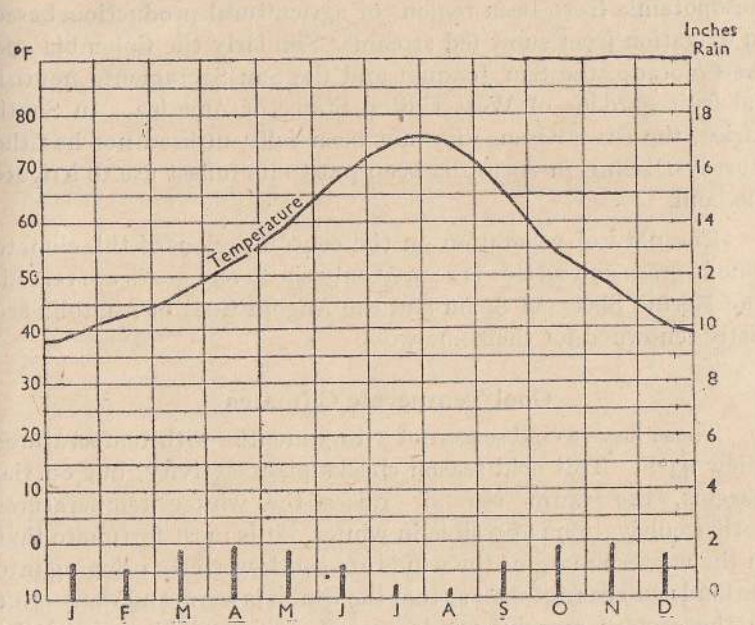
This climate is sometimes described as **Temperate Monsoon Climate** and this seems an excellent name for it. In this type of climate the summers are hot, in fact it is as hot here as in the tropics. For example the summer temperature of South-East United States of America is 80°F. We might truly say that in summer, tropical conditions 'invade' this region, and other east margin lands of this zone. The summers are also wet as in the tropics, and the quantity of rain ranges from 50″ to 80″. This



Warm Temperate East Margin

combination of summer heat and rain enables tropical crops to be grown at this time of the year. Thus in Eastern United States of America rice, sugarcane, cotton and maize are summer crops. In China and Queensland rice, cotton and maize are common summer crops.

Winter is a warm season with an average temperature of 50°F. Rain comes in gentle showers and these are brought by cyclones which are common in winter. Land for winter cultivation is prepared in the autumn and the harvests are gathered in early summer. The absence of a cold season and the presence of rain all the year make this type of climate very valuable for crop production. Winter and summer cultivation makes the land more productive because land does not lie idle by reason of cold or want of rain. Summer crops are rice, maize, cotton, sugarcane and tobacco while winter crops are wheat, beans and peas and vegetables such as cabbages and leeks.



Warm Temperate Central

Regions having this climate are New South Wales and Victoria in Australia, Argentina, Uruguay and South Brazil, South and Central China and Eastern United States of America.

WARM TEMPERATE CENTRAL REGIONS

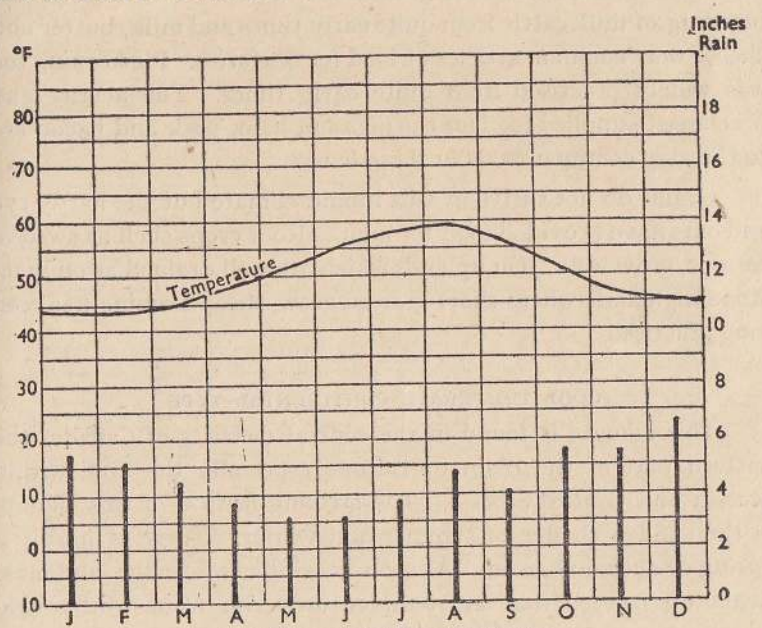
These lie towards the interior of the continents in the warm temperate zone, for example, the plateaus of Western United States of America, Spain, Anatolia, Iran and South Africa. In all these areas the rainfall is scanty. The summers are very hot and the temperature often rises to 90°F. The only rain comes with occasional thunderstorms. Winter is very cold and the snowfall is scanty so that the moisture from the melting snow in spring is also scanty. The natural vegetation is poor grass and on the whole, these open plateaus are regions of privation. But in the sheltered valleys and where irrigation is possible with the aid of streams fed by the heavy snowfall on high mountains, the land can be made very productive. For example the Indus Basin and the Plain of Mesopotamia have been regions of agricultural production based on irrigation from snow fed streams. Similarly the Columbia and the Colorado, the San Joaquin and the San Sacramento nourish the fruit gardens of West United States of America. In South Africa, the River Orange has not been fully utilised nor has the Murray-Darling *in* Australia been put to its fullest use to irrigate the land.

The natural vegetation on the central regions of this climate zone is grass and as this is scanty only sheep and goats are reared. The Merino Sheep of Spain and the Angora Goat of Anatolia are justly renowned for their fine wool.

Cool Temperate Climates

These have a cold season of 1 to 5 months with temperatures below 43°F. This cold season checks plant activity, but on the margins, the warm sea air raises the winter temperatures so that cultivation is possible in winter. It is most fortunate that on the western margins the winds are south-westerly bringing into the lands **warm moist** air so that the winter is warm and wet. But on the eastern margins winds are off shore and blow from the

cold land to the sea so that these regions though near to the sea are nevertheless very cold. We have here a good illustration of the way '*winds import weather*'. The best example of this is North China where the winter winds from the centre of Asia make the land extremely cold for its latitude. The 32nd isotherm reaches its *southernmost limit in winter* over North China. East Canada too has winters very much colder than British Columbia. The summers are cool on the ocean margins but hot in the interiors of the continents. Rain falls in the summer months on the west margins but the central regions have scanty rain, less than 15". Thus the western margins have rain all the year with the maximum in the Autumn-Winter months. Much of this is brought by cyclones which play a very important part in the climate of these latitudes. On the western margins forests of deciduous trees are found while on the colder eastern lands coniferous forest are more common as for instance in Canada and Eastern Manchuria. The central regions are grasslands, where the winter cold provides only four or five months for cultivation.



Cool Temperate Western Margin

COOL TEMPERATE WEST MARGINAL TYPE

This is found in North-Western Europe, British Columbia and New Zealand. The seasons are well marked. The winter is gradually ushered in by the Autumn with its shortening days and longer nights as the sun climbs lower and lower in the midday sky. In the same way the coming of spring is also gradual as the winter days begin to lengthen bringing in warmer and still warmer days until the spring gives place to the summer. The gradual change from the summer heat to the winter cold is a feature of the climates of lands near ocean margins.

The winter is warm with an average temperature of 40° to 50°F and the summers are cool with a temperature of 60°F. Rain falls throughout the year. On the lowlands it is about 50" but on the mountains it is much more. The natural vegetation is deciduous forests of oak and beech, etc. There are also extensive meadows in the forests and in the forest glades as these meadows are sometimes called, rich grasses are found. This lead to the breeding of milk cattle from quite early times and milk, butter and cheese were common articles of food for centuries. Pig keeping too was widely practised from quite early times. The acorns and beechmast supplied food for the pigs and ham, pork and bacon are to this day common foods in these lands.

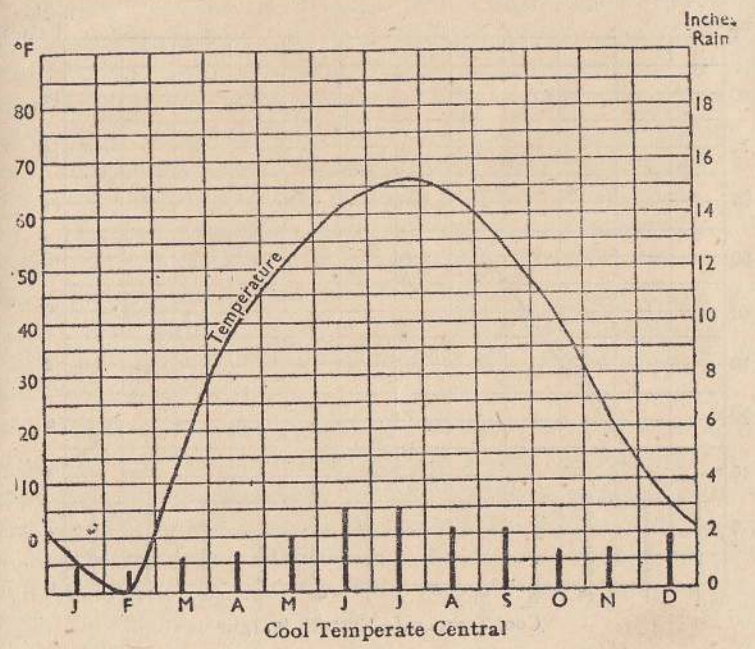
Grains do not thrive in this humid climate but the hardy rye and oats have provided food for man. Root crops such as swedes, turnips, grow well. On uplands which are well drained as on limestone highlands where short grasses grow, sheep-farming has been long practised.

COOL TEMPERATE CONTINENTAL TYPE

This climate is found in the central districts of Canada, the eastern part of the plain of Europe especially the area within Russia and Central Siberia. The striking feature of this climate is the sudden change of summer and winter. There is hardly a spring or autumn season. As soon as winter is over the land mass heats up fast so that air temperatures rise from winter cold

to summer heat in very short time. Your climograph illustrates this clearly. Similarly as soon as summer is over, the land cools so fast that in a few weeks time winter has set in. There are really two seasons namely a short summer and a long winter. Winter temperatures are well below freezing point. All rivers, lakes and ponds are frozen and the snowfall is thick. Violent snowstorms are common. As the winter is dry it is more bracing than the cold damp winters of the ocean margins. The summers are hot for these latitudes and temperatures ranging from 60° to 90°F have been recorded. The days are also long so that plants have longer hours of sunlight and this somewhat compensates for the short summer. Plants grow very fast during these northern summers. The summer is a wet season but the rainfall is about 15" to 20" for the year.

These climatic conditions suit the growth of annuals such as herbs and grasses. In late summer the ripened seed falls to the earth and lies in the earth and the winter snow covers it and keeps

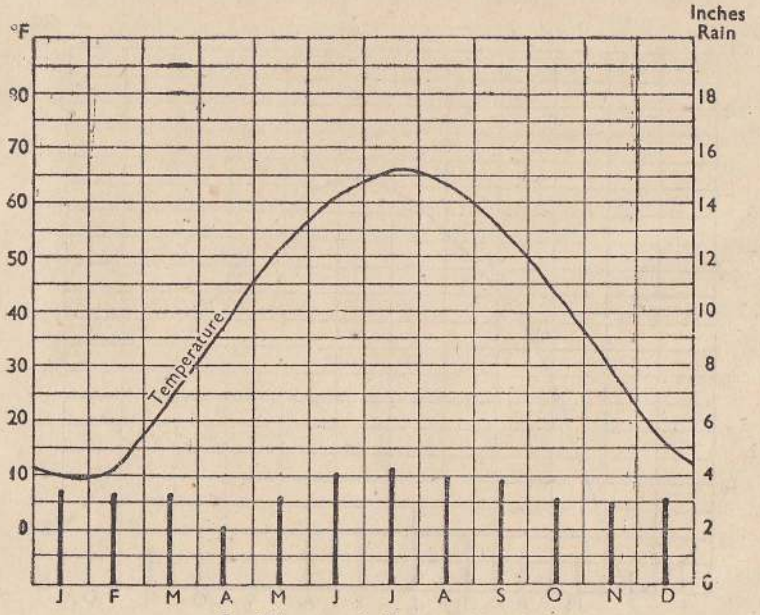


Cool Temperate Central

the soil warm. As soon as the snow melts and the sun warms the earth these seeds leap to life and grow with remarkable rapidity as the summer advances. By late summer they have completed their cycle of growth and when winter is come, the plants are dead. This process has gone on through centuries and a large mass as decayed vegetation collects in the soil. This is what has made the soils of the prairies of North America and the steppes of Euro-Asia so fertile. Today a cultivated grass like the wheat plant finds here an ideal home and the prairies and the steppes as well as the pampas are the great wheatlands of the world. Wheat is sown in spring, i.e. by April and the harvest is gathered in August. Unlike the winter wheat of the lands on the humid ocean margins, spring wheat is hard and mills into excellent flour.

COOL TEMPERATE EAST MARGIN CLIMATE

This type is not very important from the human point of view, but will in the days to come be of increasing importance.



Cool Temperate Eastern Margin

These regions have been settled by man in quite recent times. East Canada and Manchuria are the best examples of this climate. These lands have cool summers and exceeding cold winters. The snowfall is heavy, both summer and winter are wet and these humid conditions have encouraged forests and pasture lands. The exploitation of timber and the keeping of dairy cattle are the occupations best suited to this climate.

Cold Climates of the World

These are of very little human significance. There is a short warm season of 1 to 5 months and so agriculture is severely restricted to the cultivation of plant in hot houses, etc. The winters are very long and extremely cold with temperatures from minus 30° to 60°F. As the winters are dry and the air is still this cold is tolerable. The short summer is warm and temperatures of 65°F are not uncommon. The natural vegetation is coniferous forest which provides a wealth of timber.

Finally there are the **deserts** of the world. They are due to either extreme dryness or great and persistent cold. The hot deserts of the world are found about the Tropics of Cancer and Capricorn. These are regions where throughout the year high air pressure causes winds to blow out of these areas, and as air is constantly settling down in these latitudes, there is hardly any rain. But it should be noted that a desert is not a rainless place. At times very heavy rain falls causing floods and destruction, but this is followed by years of absolute drought. It is this scanty and unreliable rain that makes the desert useless to man. But where water is available in steady quantities as in a well in an oasis, plants thrive and in the words of the prophet the 'desert shall rejoice and blossom as the rose'.

On the borders of the Arctic is a region where there is no warm season in that the air temperature is always below 50°F. The subsoil remains frozen all the year and yet the ingenuity of man has succeeded in growing plants, breeding cattle and so making permanent settlements. In the Tundra the Russians have grown fruits and vegetables, in 'gardens dug into the earth to save them from the icy blasts of winter'.

QUESTIONS

1. What is climate? Illustrate your answer with reference to Ceylon. What do you understand by 'climatic stability?'
2. Compare and contrast the following types of climate:—
   (*a*) Equatorial and Tropical Monsoon Climate.
   (*b*) Mediterranean and Tropical Monsoon Climate.
   (*c*) Warm temperate east margin type with Tropical Monsoon.
   (*d*) Cool temperate continental and Tropical grassland climates.
   (*e*) Equatorial and cool temperate east margin type of climate.
3. Which climatic types are densely populated and why?

PART II

HUMAN ACTIVITIES

CHAPTER III

MAN AS HERDSMAN

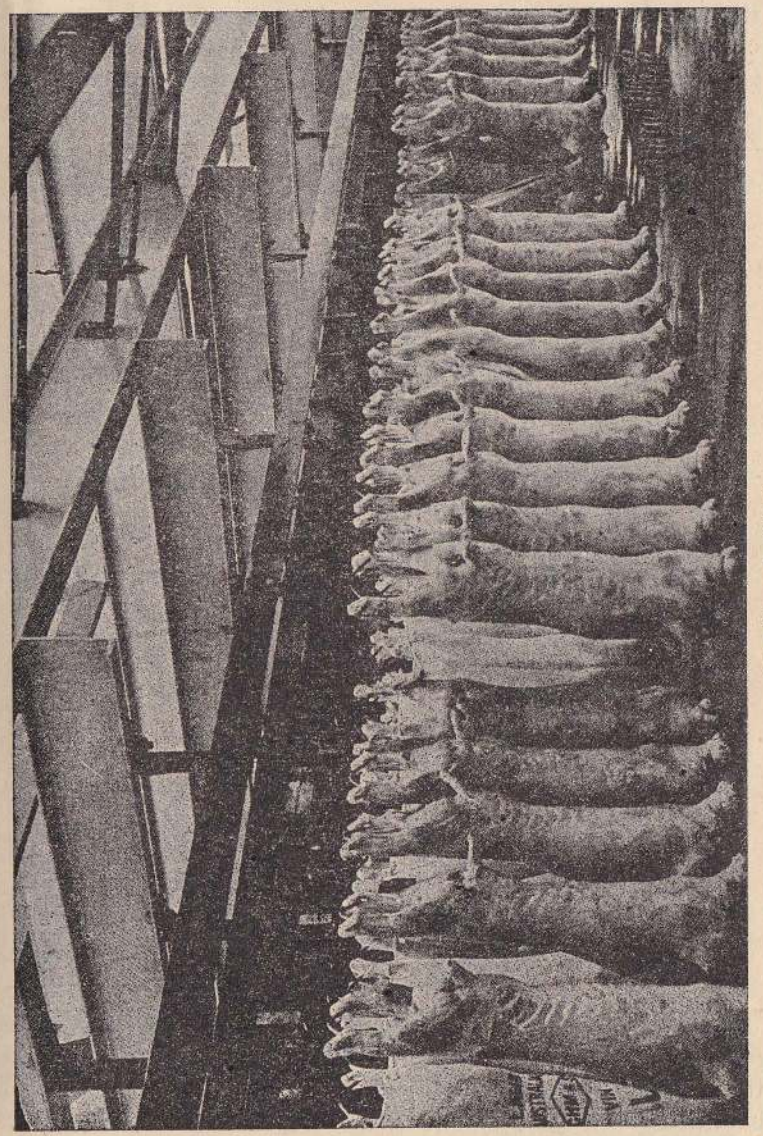
The earth's surface and the climatic conditions on it together with the earth's garment of vegetation are the most important elements of man's physical environment. The earliest of human activities connected with earning a living was **hunting.** At first man used weapons made of stone and later of metal. The life of a hunter is by no means easy or secure and hunger no doubt drove men to find more secure ways of getting his food. This lead to the taming of animals that gave flesh and milk, and in this way man became a **herdsman.** Later still in human history, man learned to ' tame ' plants that grew wild in the jungle and grow them in fields prepared closed to his home. Paddy, millets, maize and wheat were once wild grasses but at some time in the past, these were cultivated by man. Today these grains are among the chief bread grains of the human race. Cultivation of the land helped man to live in settled homes, very often in groups as in villages. It was when this stage was reached that man at last had the conditions essential for civilised life. He had assured supplies of food and he could put by some for the future. Grain such as paddy and maize were excellent for this purpose as these could be kept in good condition for over six months. Agriculture also gave man leisure so that he had time to think and create things of use and beauty. In this way the arts and crafts of mankind arose.

We need not spend time in examining the lives of peoples dependent on hunting for a living. Such peoples are few and are fast disappearing except in the dense forested regions of the tropics. Even in our own land the true Vadda or hunter is rarely found. Most of them have become cultivators and in course of time they will live in villages and cease to be hunters altogether. But there are still human communities which subsist as herdsmen. Such

are the nomadic peoples of Central Asia and the borders of the Sahara. Even these are fast disappearing. The breeding of cattle, sheep and goats, etc. has in the modern world, become a well established industry. We shall attempt to find what geographical factors have helped this industry.

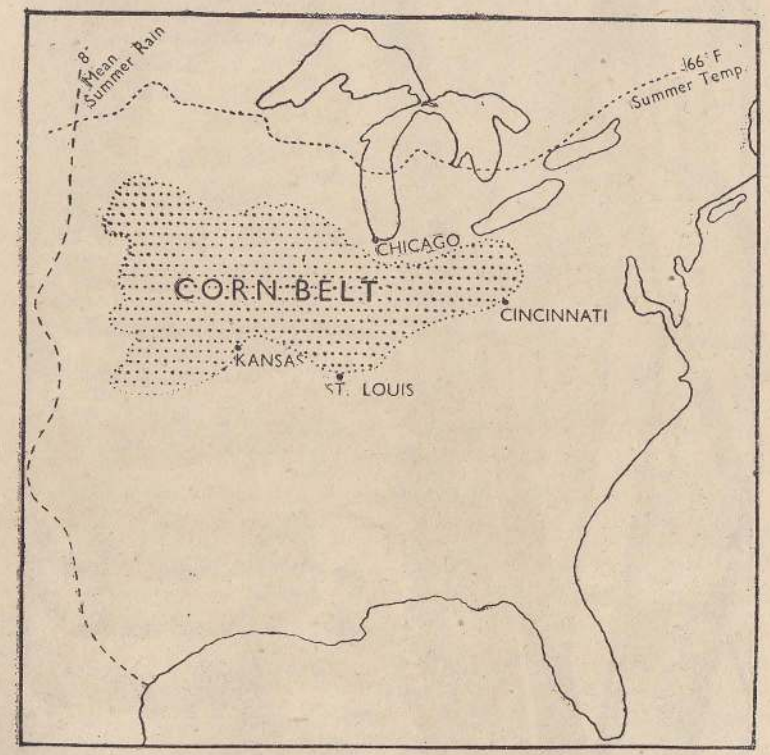
The Breeding of Beef Cattle

Cattle breeding is chiefly for meat and milk. Cattle need rich pastures and for this reason it will succeed only in regions where grass and other fodder crops will grow well. Let us first find out how cattle breeding for meat started. To feed large numbers of cattle **extensive pasture lands** are needed and it is therefore natural that cattle breeding began on a **large scale in lands of scanty population** such as the pampas, the prairies and the tropical grasslands. **The demand for meat** however comes from **lands which are densely** populated, such as Western Europe and the urban areas of East United States of America. The supply of meat comes from unpopulated lands but the demand comes from densely populated regions. The question of **transport** thus becomes very important. At first cattle from Argentina and Uruguay were sent alive to Western Europe but the animals reached the market in very poor condition after a long sea voyage. In 1895 the **refrigerator** and **cold storage** greatly helped the meat industry, for meat could be sent to market in good condition from even distant countries such as Australia, New Zealand and Argentina to Europe. Meat packing factories in Chicago, Kansas, St. Louis, Buenos Aires, Fray Bentos and Paysandu despatched **tinned meat** to all parts of the world. Finally the manufacture of **'meat extracts'** such as 'Bovril and Oxo' etc. have enlarged the range of the products of the meat industry. Let us take one example of the meat industry from the United States of America. West of 100 degrees west longitude are plateaus known to the Americans as the 'high plains'. These are grasslands and are too dry for successful cultivation. On the grasslands large herds of cattle are reared. When the animals are two years old, they are taken to be fattened for the market. This is done in the 'corn belt' where



Cold Storage Plant

maize is extensively grown. The cattle are fed on corn and when they are fattened they are taken to the packing plants. The carcases are sent in cold storage (see picture on page 49) or the meat is packed in tins. Other regions where cattle are reared for meat are Brazil, Uruguay, Paraguay, Eastern Australia and New Zealand.



Meat Packing Centres

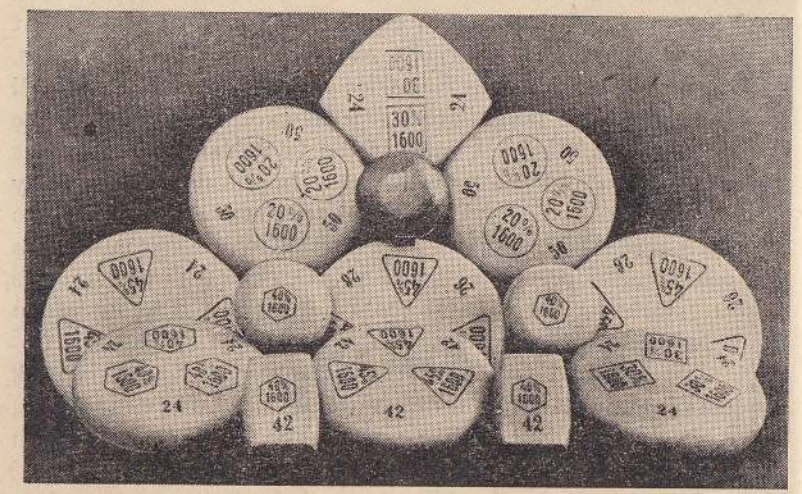
Dairy Farming

Cow's milk is a most nourishing food and from early times people reared cows for their milk. To this day in most parts of the world peasants keep a cow or two to supply milk which is turned into butter, cheese, curd and ghee. When large cities arose the **urban population** created a demand for milk, butter,

cheese, etc. and the peasants in the country found that they could make money by selling milk and milk products in the towns. This in course of time made dairy farming a highly developed industry.

Milk, is a perishable product and it has therefore to be sent quickly to market. In most countries vans, and even the railway, are used to rush the milk from the country to the cities. By converting the milk into butter and cheese, milk can be preserved for a longer period than in its fresh condition and so can be sent to **distant** markets. In forms such as milk food or beverages, milk is sent to very distant countries and the products keep well for many months. Dairy farming needs excellent fodder for the cattle. For this reason it will succeed in **moist lands** such as Eastern Canada and Western Europe. In the next place dairy farming is profitable near **large urban areas.** But owing to modern methods of converting milk into butter, cheese, milk foods and condensed milk, distant lands now can compete with regions close to markets. Purity and quality are essential to success in the industry and this is why countries like Denmark and Switzerland have acquired an international reputation for their milk products. Let us take as our illustration of a dairy farming region, the dairy farming belt of Western Europe. This extends from the west of England (Devon and Somerset) to Brittany, Normandy, Holland, Denmark, Southern Sweden and the Baltic States. You will at once observe that these countries are humid lands swept over by moist Atlantic winds. There were once grasslands here but these have been converted into ploughed land for the cultivation of food crops for milk cattle. Food grains are imported while every piece of available land is used to grow fodder grass, root crops, oats and barley for livestock. The next thing to note is that these dairy farming lands are not far from **industrial regions** where there is a large **urban population.** The west of England supplies the London area of 8 million inhabitants. Normandy and Brittany supply the Paris market of 4 to 5 millions. The dairy farmers of Holland and Belgium supply the urban population of their own lands. Denmark and Southern Sweden have access to the markets of Germany and even the British Isles.

Denmark is however the world's leader in dairy farming. The Danes were the first to understand that by the careful cultivation of the land for food for cattle, they could get a much higher income by selling the milk than by the sale of agricultural produce. They knew that if cultivated products such as oats, barley and root crops are fed to milk cattle they could convert these cheap agricultural products into more remunerative products namely milk, butter and cheese.

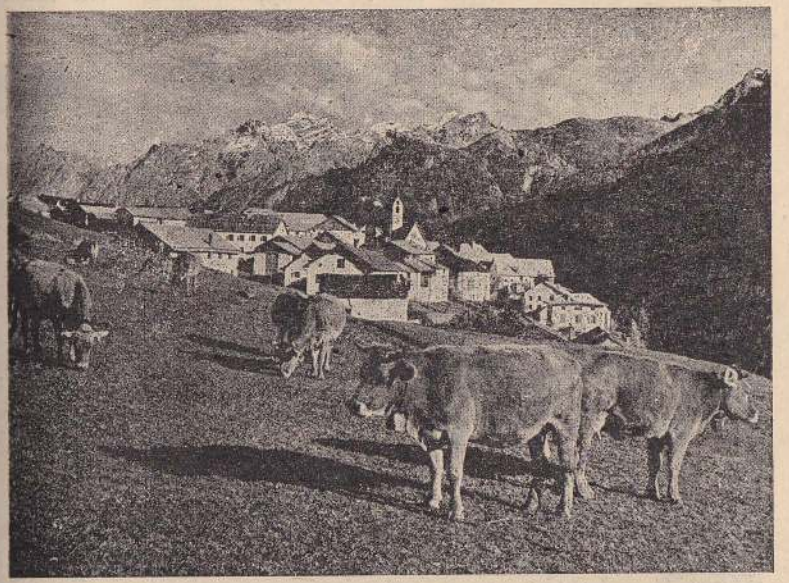


Danish Cheese

To improve methods of breeding and feeding milk cattle as well as to make the best butter and cheese, the Danes employed all the assistance science could give them. They also developed co-operative creameries and butter factories and these helped the individual farmer to benefit by the best methods and machinery so that a product of high quality was assured to all buyers of Danish milk products. Today 88 per cent. of the dairymen of the country are members of the co-operatives, and 92 per cent. of the milk produced is handled by the co-operative societies.

In Central Europe the most important dairy farming country is Switzerland. The Swiss cattle find excellent pastures on the mountains and cattles are fed here all the summer. The hill slopes

are carefully cultivated with fodder grass and much hay is made as winter feed for the cattle. In the autumn the cattle are taken down to the valleys where they are stall fed. Swiss milk and milk products have to travel far to reach the markets so that the milk has to be **converted** into forms suitable for transport as well as to cover the cost of transport. Milk is thus **condensed** into small bulk. Swiss milk products such as malted milk, milk foods and chocolates are world famous.



Swiss Dairy Cattle

In the New World, the St. Lawrence Valley and the Great Lakes Region are the most important dairy farming regions. The humid climate enables fodder grass to be grown on soils not well suited for other forms of agriculture. The great industrial towns in the Lakes Region are the markets for the milk.

The refrigerator and cold storage have helped very distant countries such as Australia and New Zealand to develop dairy farms and the butter is sold in European, especially British markets. The dairy farms are found here too in the humid parts of the

countries such as the south-east coast of Australia and the western side of New Zealand.

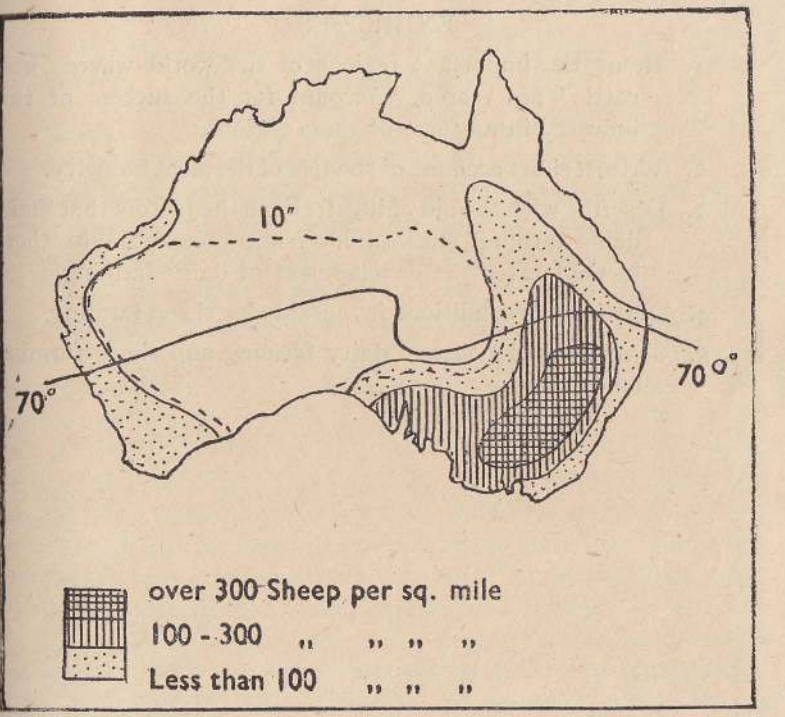
Sheep Farming

The sheep is a native of dry lands. It was domesticated long ago in Ancient Egypt and the Bible makes constant reference to sheep in those books which date as far back as 800 B.C. Sheep have been a source of support to man in the Mediterranean lands and the plateaus of West Asia. It supplied man with much needed meat, wool and skins.

Sheep on the Downs of Australia

Sheep farming requires wide pastures and for this reason it is confined to regions not suited to agriculture, as for example the Highlands of Wales and Scotland, the limestone uplands of England or to distant lands which are sparsely populated. In fact, sheep farming is one of the ways of making use of land where the annual rainfall is less than 15″. For this reason the arid west of the United States of America, Western Argentina and the Downs of Australia are given over to sheep farms.

Sheep are primarily reared for their wool and as this does not deteriorate with time the distance from the markets is not at all a great disadvantage. England was once the premier wool producing country. The names of famous breeds of sheep come from districts in England noted for sheep, e.g. Dorset, Hampshire, South Downs and Lincoln. In the Middle Ages wool was the chief export of



England and the Lord Chancellor's 'woolsack' is a reminder of the days when England's chief source of wealth was wool.

Australia is today the world's chief producer of wool. West of the great Dividing Range is a wide expanse of open undulating land. The rainfall here is less than 20″ and grass grows on these 'downs'. The above map shows you the distribution of sheep in Australia. It also shows the close dependence of

sheep farming on rain. Australia exported most of her wool to Japan (pre-war), the United Kingdom and the United States of America.

Other sheep lands of the world are North-West India, Russia (Turkestan), Argentina, United States of America, South Africa, New Zealand and the British Isles.

EXERCISES

1. Name the important regions of the world where 'beef cattle' are reared. Account for the success of this industry in any one of these regions.
2. Write a short account of the rise of the meat industry.
3. Describe with the aid of illustrations the factors that make dairy farming successful. What prospects are there in Ceylon for the development of dairy farming.
4. Describe the conditions favourable for sheep farming.
5. Compare and contrast dairy farming and sheep farming lands.

CHAPTER IV

MAN AS CULTIVATOR

Food Grains

When man became a cultivator he was able to secure better and surer supplies of food than before. In various regions he grew various food crops and these became the bases of several types of civilisations. In the **south and east of Asia** where heavy summer rain was followed by a dry season, one of the world's most important **wet grains** came to be cultivated. **Paddy** was originally a marsh plant and it grew wild in the marshy alluvial plains which abound in South-East Asia. This plant was 'domesticated' and grown in flat muddy land prepared by human hands. In this way some of the early peoples of Asia taught the world the use of paddy as a food grain. Its cultivation spread to India, Ceylon, Burma, Siam, Cambodia, South and Central China and Japan. The paddy plant is a great blessing to man. It gives a greater yield per acre than any other food grain so that large numbers could subsist on paddy cultivation. It is a nourishing grain and is easily digested. Its waterproof husk enables the grain to be stored in damp climates for many months. Thus one season's harvest can feed people until the next is ready. The paddy cultivator is spared the fear of hunger and privation which always threatens the hunter. Once food is assured people can devote their time to higher things and become more and more civilised. You must not forget that the civilisations of India, Java, Ceylon, Further India, China and Japan developed among rice eating peoples.

In the **Mediterranean Basin** there arose other centres of civilised life. The climate was in many ways favourable to man.

The winters were mild and caused no hardship. The dry summer that followed was useful to the farmer. It helped to ripen grain and sweeten the fruits he grew. Winter was wet and at this time of the year the seed was sown and the fruit trees pruned. Wheat and barley grew to perfection. The wheat plant once grew wild on the Plain of Mesopotamia, and we are sure that much wheat was grown in Ancient Babylonia, as well as in the valley of the Nile. The Greeks were cultivators of wheat, the grape-vine and the olive. It was on the basis of wheat, vine and olive that the Graeco-Roman civilisation flourished.

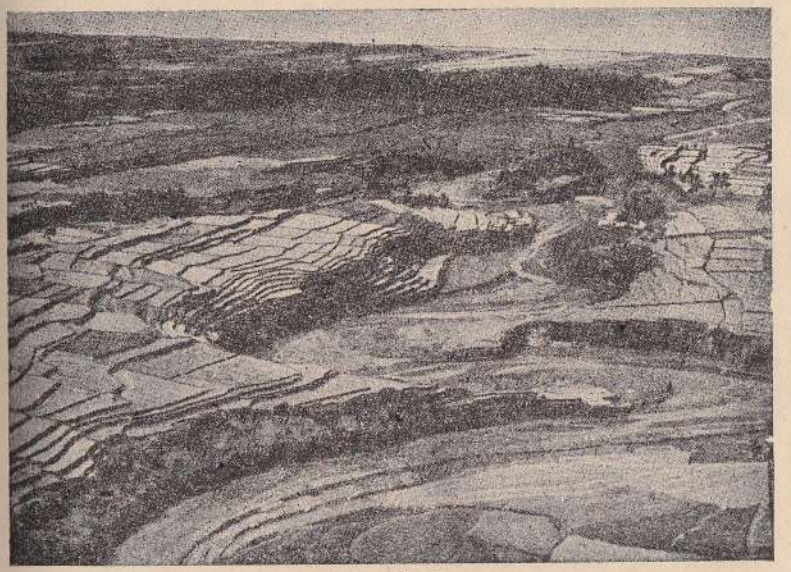
North-West Europe is another region where Western Civilisation as we call it, flourished. The countries connected with it are France, the Low Countries, Germany and Britain. These countries belong to one climatic unit. Owing to the influence of the winds of the Atlantic it has cool summers and mild winters. Rain comes all the year round. In such a climate only hardy grains such as rye and oats grow, and root crops such as the swede and the turnip. As the climate is moist all the year, grasses grow exceedingly well and cattle can be easily reared. Milk and meat became common foods of people of this region. In the forests oak and beech trees were plentiful and large herds of pigs were fed on acorns and beech-mast. These animals supplied the ham and bacon so widely used by peoples of Western Europe. The characteristic foods of the people of Western Europe thus came to be oats porridge, oaten, or rye bread, milk, butter and cheese, ham and bacon. It was in later times that wheat and other foods entered into the diet on West European people.

In the **New World** another plant called by man the ' gift of God ' fed and sustained the American Indians. This was the **maize** plant which provided the food of the ancient peoples of Peru, the Aztecs of Mexico and the Maya Indians of Yucatan.

From these four centres where grains fed and nurtured man, human civilisation took its birth and in course of time spread over the whole earth.

Paddy Cultivation

Rice is the food of one-third the human race. It grows best on level land which can be flooded with water. The soil has to be worked into a muddy paste before the seed can be sown. Water has to be let in from time to time and to retain this water in the field, small ridges have to be built so that a paddy field really consists of a number of shallow basins. As it is a native of hot lands the paddy plant will not grow where the temperature falls below 75° F during the growing season. Rain is best when the plant is growing but warm dry weather is essential for the ripening of the seed. The plant requires about 50" of water annually.



Rice Fields

Though the paddy plant is very sensitive to cold it can stand very high air temperature provided it has adequate supplies of water. For this reason it can grow in arid hot regions such as the Nile Valley, Lower Mesopotamia, Russian Turkestan and South-East Spain.

Paddy can be grown outside the tropics as a summer crop. It is grown in Queensland, Australia, California and Louisiana in

the United States of America, the plain of the Po in Italy, the south-east of Spain, Egypt and Russian Turkestan. The chief producers are given in the table below. You will notice that the first three do not export rice as there is a great demand for it in the home lands which are densely populated.

China	52	million tons.
India ..	42	,, ,,
Japan and Korea ..	14	,, ,,
East Indies ..	5½	,, ,,
Indo-China ..	5	,, ,,
Siam	4¾	,, ,,

Maize Cultivation

The maize plant was originally grown by the American Indians. The English settlers of the New World called it 'Indian corn' and the Spaniards called it 'Maiz'. The word **maize** is thus derived from the Spanish. It is a dry grain and so grows well on land which unlike paddy, need not be soaked in water. It is thus **easier** to cultivate and all that is needed is to dig the ground lightly for the seed to be sown. This ease of cultivation makes it an ideal crop for pioneers in a new land. In fact the English settlers of North America grew it in very much the same way that the chena peasants of Ceylon do today. The forest was burned and after the ash had settled down, holes were dug in the earth and the seed planted. There was no attempt to dig the land and lay out beds for the seed to be sown.

Maize is a plant sensitive to cold air and so must have at least 150 days frost free. The best conditions are given if the day temperatures are between 70° and 80° F and the night temperatures do not go below 55°F. Like all grains it must have rain during growing season and as the plant grows fast it needs plenty of moisture in the early stages of growth. A supply ranging from 25" to 50" a year is best, provided it comes when the plant is putting forth leaves and stalk. But once the 'cobs' appear it needs warm weather. The best conditions are a warm sunny day followed by

rain in the evening. These conditions are found in late summer in the interiors of continents in mid-latitudes.

Like paddy, maize can be grown in lands outside the tropics as a summer crop. It is grown very successfully in the United States of America, North Italy, Roumania and other Danubian States, North India, Central China, Argentina and South Africa. The most important producers within the tropics are Central America where it is the staple food, and Brazil and West Africa where it is a very common food.

In the regions outside the tropics it is primarily grown as a food crop by the poor, as in Italy, or as cattle food. Thus in the 'corn belt' of the United States of America which is the largest producer of corn, the greater part of the crop is used to fatten cattle for the meat market.

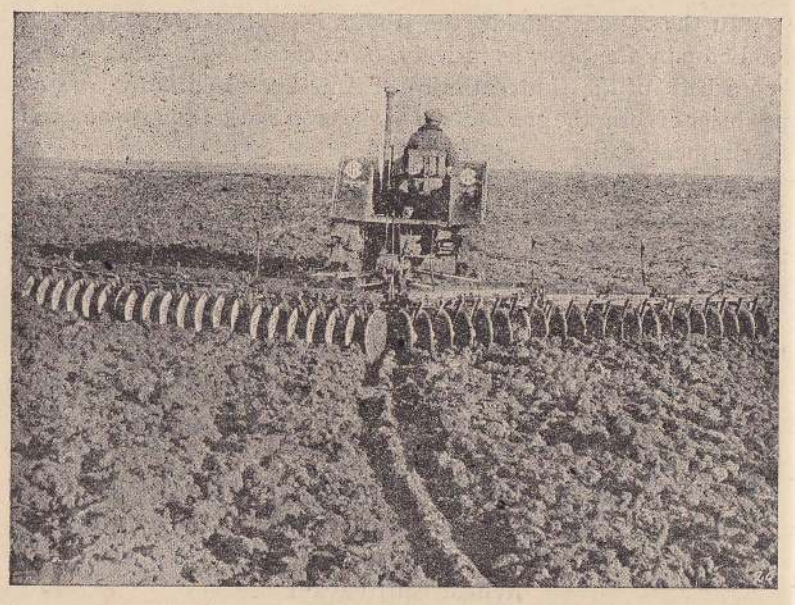
As a human food corn can be ground into flour or made into several forms of 'breakfast foods' such as cornflakes. It is also roasted and eaten as 'popped' corn. The tender cob is also boiled and eaten. Corn can also be used to make oil, starch and glucose. The oil is an excellent substitute for olive oil. The following are the most important producers of Indian corn.

United States of America	257	million	quarters	of 480 lbs.
Argentina	53	,,	,,	,,
Brazil	26	,,	,,	,,
Roumania	24	,,	,,	,,
Russia	17	,,	,,	,,

Wheat Cultivation

Wheat was first grown in the Mediterranean Basin where it was sown in autumn and the harvest was gathered in summer. The wheat plant needs a cool growing season and on this depends the number of stalks and the size of the heads of grain. If there is a long, cool, moist season the heads of grain are many and naturally the harvest will be plentiful. In maritime regions of the temperate zone, winter is the growing season, but in the interiors of continents the winter cold is too great for any plant to grow so that wheat is sown in spring. This wheat is often called 'spring wheat'.

Wheat is a dry grain and is easy to grow. The land has to be ploughed but there is no need to level the land and control the water as the paddy farmer has to do. Wheat will thrive with a rainfall of 15″ to 20″. High temperatures do not harm the plant provided it has the necessary minimum of water. A large amount of heat is necessary to ripen the grain. In areas of cloudy skies as in Western Europe, wheat requires 250 to 270 days to ripen but in Central Asia it ripens in 135 days. Winter wheat is grown in Western Europe, the middle states of United States of America,

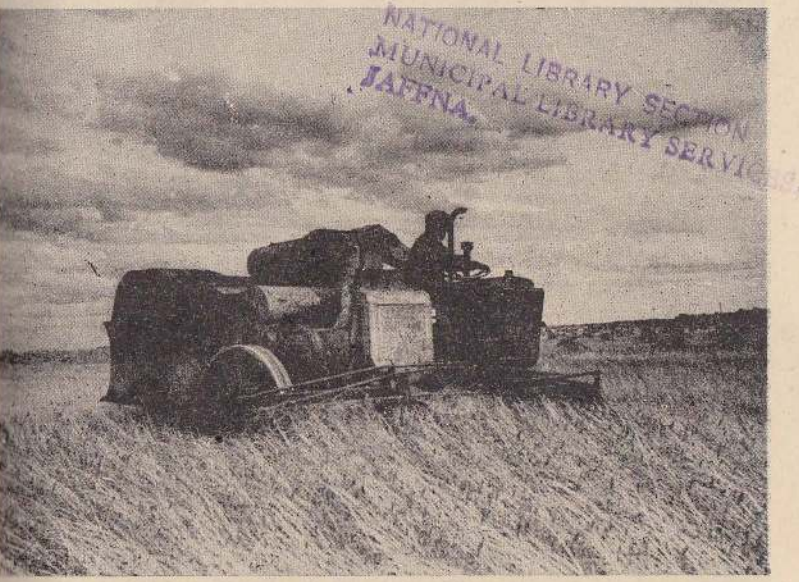


Ploughing Wheat Land

North India, North China, Australia and Argentina, while Spring wheat is cultivated in the prairies of Canada and the United States of America, the Danubian States, and the steppes of Russia.

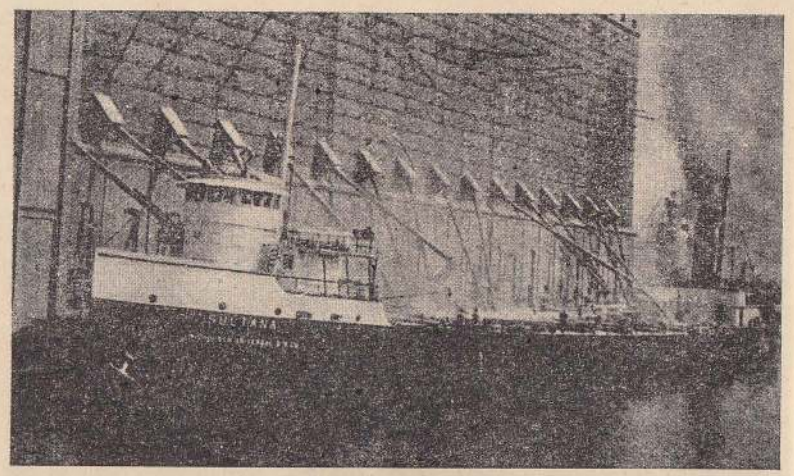
In Canada, the United States of America, and Russia, the wheat fields are extensive. Machines are therefore used to plough the land, sow the seeds and gather the harvest. Machines are very necessary as the fields have to be got ready for the spring sowing very quickly, because if the sowing is late, then Autumn frosts will

damage the harvest. Moreover in these lands wheat is grown as a **cash crop**, and the farmers sow as large an area as possible to secure the largest amount of grain they can. Large areas of land cannot be got ready without the aid of machines. Finally, the spring wheat lands are not densely populated and machines have therefore to do the work of human hands.



Machine reaping Wheat

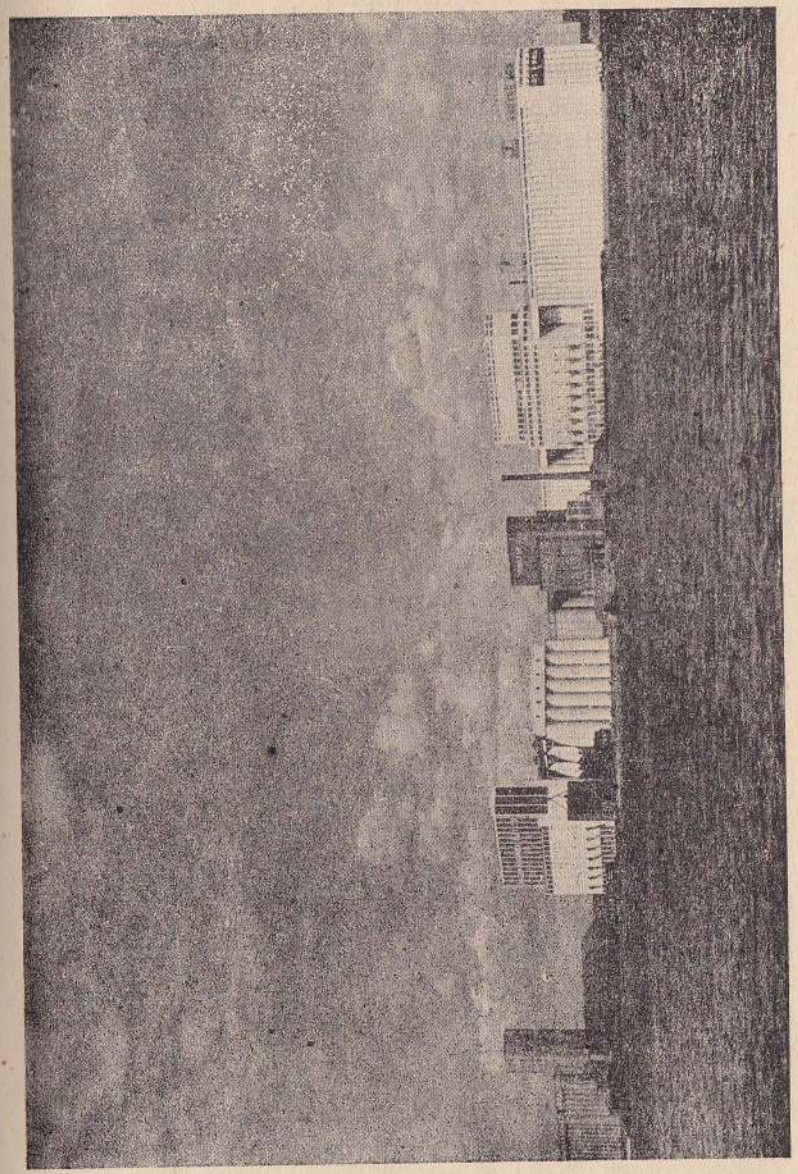
As the wheat is grown for foreign markets the grain has to be transported. The practice in Canada may be taken as an illustration of the methods of transporting grain on a large scale. The farmers bring the grain in carts to the railway stations where there are storage bins called Elevators. The grain is not put into sacks but is treated like a 'liquid', in that it is sucked through pipes from the carts to the elevator. From these the grain is pumped into rail waggons and sent to the ocean ports. Here there are very large elevators which pump the grain into the cargo vessels. On pages 64 and 65 are two pictures which illustrate the way the grain is handled by elevators.



Grain being loaded into Grain Boat

In Russia, there are very large tracts of land either worked by the state or village co-operatives. The former are called state farms where wheat is cultivated by ' factory methods'. This means that all the farm operations are carried out by means of machinery. In the large co-operative farms, the peasants supply the labour and the state supplies the machinery for which a certain part of the harvest is deducted. The most important wheat districts of Russia are near to seaports. Odessa on the Black Sea is the largest wheat port of Russia. The wheat of the Danubian lands are shipped at ports such as Braila and Galata. Canadian wheat ports are Quebec and Montreal while the United States of America ports are New York, New Orleans and Galveston. The following table gives you the position of the largest producers of wheat.

Russia	..	..	130 million	quarters of 480 lbs.
China	..	..	99 ,,	,, ,,
United States of America			78 ,,	,, ,,
India	..	..	44 ,,	,, ,,
France	..	..	31 ,,	,, ,,
Canada	..	..	29 ,,	,, ,,
Argentina	..	..	28 ,,	,, ,,



Grain Elevators

243—D

EXERCISES

1. Describe the geographical conditions necessary for the cultivation of **Paddy, Maize and Wheat.**
2. Why is it not possible to grow wheat in tropical lands and paddy in cool temperate lands ?
3. Why is paddy the most difficult grain to grow ?
4. Describe the importance of grains in human history.
5. Illustrate by means of block or line diagrams the statistics given in this chapter.

CHAPTER V

CASH CROPS

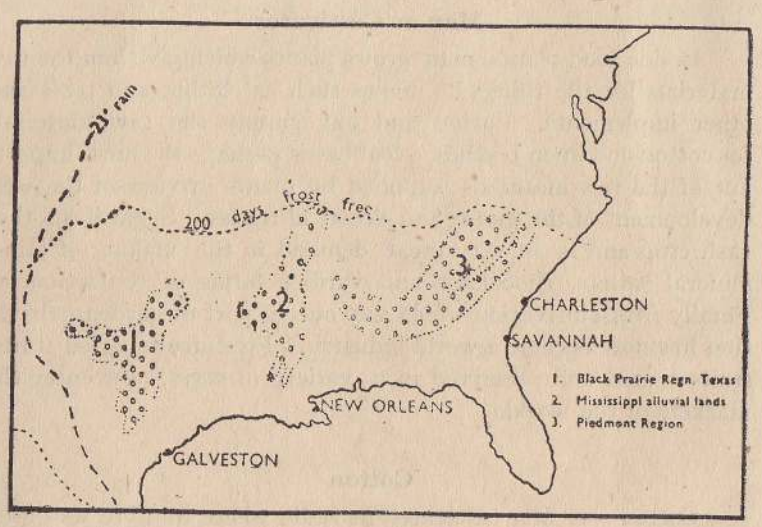
Man as Cultivator

Beside food plants, man grows plants which give him the raw materials for the things he makes such as clothes and tools and other implements. Cotton and flax supply the raw materials for cotton and linen textiles. Rubber is perhaps the most important of the raw materials supplied by plants in view of the vast development of the motor and electrical trades. Sugar is another cash crop and is in very great demand in the making of jams, mineral waters, chocolates and various forms of confectionery. Finally fruit cultivation which was once a part of garden cultivation has now become a world industry. Fresh fruits, dried fruits, fruits tinned and preserved in a variety of ways, now enter the markets of the world.

Cotton

Cotton was first cultivated in India where its fibre was used to make cotton cloth. Megasthenes the Greek ambassador who lived at Pataliputra when Chandragupta Maurya ruled in India, has recorded the statement that the Indians made garments from **wool bearing trees.** These were no doubt cotton plants and it is interesting to note that we to this day, speak of ' cotton wool ' thus perpetuating the phrase of Megasthenes. It appears that the Moslems introduced cotton cultivation into Spain. The English word ' cotton ' comes from the Spanish word ' coton ' which is in turn derived from the Arabic word ' Qutun '. It is also very interesting to note that the American Indians of Peru, Mexico and Central America, e.g., Yucatan, were also quite familiar with the use of cotton.

The cotton plant is a native of the tropics and for this reason is easily damaged by frost. Like other tropical plants it will grow outside the tropics only if it can be assured at least 200 days frost free. It needs a wet season to grow and a dry season for the cotton 'bolls' to ripen. Too heavy rain encourages the growth of leaf and twigs and the result is the cotton pods are poor. In all tropical regions the rainfall should be less than 60" and above 23" for the year.



Cotton Belt—United States of America

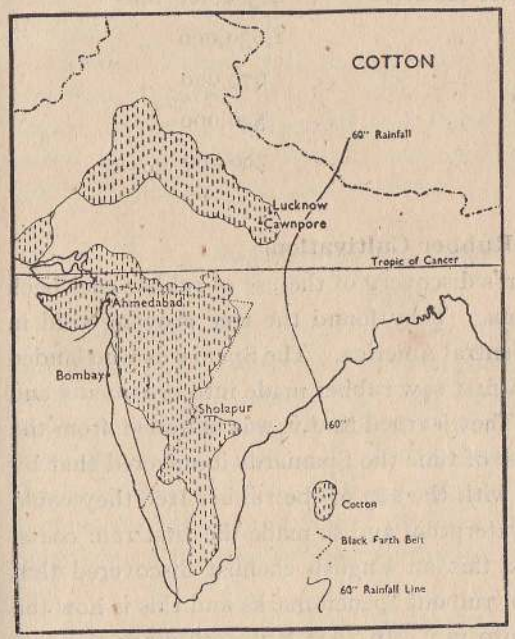
Cotton is grown in many countries lying between 40° North and 30° South Latitude. Within the tropics cotton is grown in Cambodia, the Deccan, Nigeria, Brazil, Peru and Queensland. Outside the tropics it is grown as a **summer** crop in Central and Northern China, Northern India, Russian Turkestan, the Nile Valley and the United States of America.

The United States of America is the world's greatest producer of cotton. It is grown in a region measuring 1,500 by 150 miles. Within this vast region there are three centres where it is

grown more intensively than in any other area. On the opposite page is a map which shows the cotton belt of the United States of America.

The three regions are: 1. **Texas.** 2. The **Mississippi alluvial lands.** 3. **Georgia** and **Carolina.** In all these regions cotton is a summer crop. Sowing begins in March and it is over by April. May, June and July are wet months and this is the time of the most rapid growth of the plants. After July the rain diminishes. August is a dry month and the cotton is gathered then.

Cotton is picked by hand, but machines have been invented in the United States of America which not only picks the cotton, but also 'gins' it, separating the seed from the lint and compresses the cotton into bales ready for transport. The cotton grown in the United States of America is used in the factories of New England States and the 'Fall Line' towns close to the cotton belt. American cotton is exported to Europe from the ports of Galveston, New Orleans, Charleston, Savannah and Wilmington.



India is second to the United States of America as a producer of raw cotton. Cotton is grown in two regions, one within the tropics and the other outside the tropics. The former is found in the famous 'Black Soil Belt' of the Deccan and the latter in the Indo-Gangetic Valley. The above map shows you these areas.

Bombay is the largest cotton spinning centre in India. Others are Sholapur, Ahmedabad, Lucknow and Cawnpore.

Very large crops of cotton are harvested in the middle and lower basins of the Yangtse-kiang. Much of this used to go to Japan. Cotton has been introduced to Russian Turkestan where it is grown on irrigated land. Large factories have been put up in the towns of Stalinabad, Askabad and Tashkent. The Nile Valley produces the finest long staple cotton. The dry air and bright sunshine of Egypt is valuable for the ripening of the cotton bolls while the waters of the Nile and its fertile silt feeds and enriches the plant. Very fertile soils are needed for the production of good cotton as the plants very quickly impoverish the soil. The following are figures for the production of cotton :—

United States of America	..	2,300,000 tons
India	.. ..	1,030,000 ,,
China	.. ..	670,000 ,,
Russia	.. ..	540,000 ,,
Egypt	.. ..	380,000 ,,

Rubber Cultivation

The history of man's discovery of the use of rubber goes back to the American Indians. They found the tree growing wild in the hot-wet forests of Central America. The Spaniards who landed in this part of America first saw rubber made into ornaments and balls by the Indians. They learned that it was obtained from the sap of a tree. In course of time the Spaniards discovered that by smearing their clothes with the sap of the rubber tree they could make their garments waterproof and so made the first rain coats. Very many years after this an English chemist discovered that rubber could be used to 'rub out' pencil marks and this is how the word 'rubber' came into use. In 1823 McIntosh made the first rubber-lined waterproof cloth and his name is remembered to this day.

But the great demand for rubber came only when the motor car was invented and widely used. At first soft rubber was used to make tyres but these naturally wore away very fast and experiments were made to harden rubber. In 1842 Goodyear succeeded in manufacturing solid tyres and very soon pneumatic tyres came into the market. The rapid growth of the use of motor cars, vans and lorries created a great demand for rubber. The growth of the electrical trades also added to the demand for rubber which is used for insulating wires, etc.

The rubber tree is a native of hot-wet climates. It needs a rainfall of 80" to 120" and a short period for the tree to rest if it is not to be bled to exhaustion. In Ceylon this period is in February and August. The average annual temperature should be above 70° F and there should be little or no annual or diurnal range of temperature. This is why the rubber tree does not thrive in uplands over 3,000 feet.

British Malaya was in pre-war days the world's largest producer of natural rubber, with the Dutch East Indies and Ceylon occupying the second and third places. Rubber is now grown in the Congo, and Liberia in West Africa, and in the provinces of Para and Ceara in Brazil.

Sugar-Cane and Sugar-Beet

Sugar

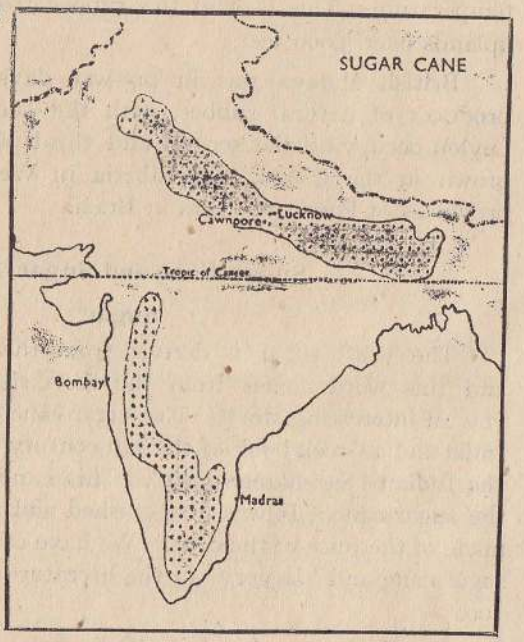
The word sugar is derived from the Arabic word *Sukkur* and this word comes from the Sanskrit *Sakkara*. This tells you an interesting story. The sugar-cane was first cultivated in India and a Greek book of the 5th century A.D. makes mention of the Indian 'Saccharene reed'. This is no doubt a reference to the sugar-cane. It was first crushed and a kind of brown sugar made of the juice of the cane. We have constant reference to the sugar-cane and 'jaggery' in the literature of the Sinhalese people too.

The Moslems took over to Mediterranean lands the cultivation of the sugar-cane. From here it spread to the New World where it is now widely cultivated.

Sugar-Cane

The sugar-cane like cotton and many other useful plants, is a native of the tropics. It cannot therefore be grown in lands where it does not have complete protection from frost. As it is now cultivated as an annual, the sugar-cane can be grown as a summer crop in the warm temperate zone, provided of course it has at least a six month period when the temperature is 75°F and over. It needs a seasonal rainfall of about 60". Dry weather and bright sunshine are essential for the canes to mature well and increase their sugar content. The sugar-cane is cultivated by planting mature stalks or cuttings of it. The best yields come from annual or biennial planting. Bright sunshine and heavy rain starts the rapid growth of the plants. Cool, dry weather on the other hand stunts the growth and produces short joints and a high fibre content with the result the quantity of sugar is also low.

India is the largest producer of sugar. Although the yield is low there is a vast extent of land under cane cultivation. The acreage increased from 2½ million acres in 1930 to 4 million acres in 1936. This is equal to the total extent of land under cultivation in Ceylon. Here is a map showing you the distribution of sugar-cane in India. The concentration is highest in the Middle Ganges where it is a valuable summer crop.



Other countries growing sugar-cane are Java, Cuba, the Hawaiian Islands, Queensland in Australia, Mauritius, Natal, Brazil and the State of Tucuman in West Argentina.

Sugar-Beet

The beet is a root crop and its sugar content though known, was first made use of on a large scale by the Emperor Napoleon. The British blockade of the Continent deprived France and other countries of Europe of sugar and rum which came from the West Indies. So in 1811 Napoleon ordered the cultivation of 80,000 acres under beet for the making of sugar. For many years afterwards, the cultivation declined until scientific investigation showed that it was possible to raise the production of sugar from **one pound** of sugar from 18 lbs. of beet to **one pound** of sugar from 7 lbs. of beet. This discovery made it profitable to grow beet for sugar.

The success of sugar-beet cultivation depends on a number of factors. It requires soils which are well tilled so that roots can develop freely. Much labour is also needed because the young plants have to be protected from weeds. The young beet plant is so small that only human fingers can remove the weeds growing around it. The young plants have to be thinned out with the hoe. In fact the labour required for an acre of sugar-beet is **six** times that for an acre of corn, and **twelve** times that for an acre of hay.

The beetroot grows in a variety of climates but where the sugar content is high the temperature for the three summer months ranges from 63° to 73° F. Planting takes place in spring and the crop is harvested in autumn. It is taken to the factories where the beets are sliced and the sugar soaked out in warm water. It is then crystallized and later refined. The by-products of the beet are also useful. The leaves and 'tops' are good fodder. The pulp is also used as food for cattle. For this reason the sugar-beet is grown in the neighbourhood of industrial towns. The beet is sold to the factories and the peasants can also keep milk cattle by feeding them on the leaves, 'tops' and beet pulp. In this way the farmers who own small farms supplement their income by the sale of milk in the towns. Moreover the sugar factories are busy in the winter and the farmers who find no work in the fields in the winter find work in the sugar factories.

Germany was the world's largest producer of beet sugar. The chief districts are Madgeburg and Breslau. Russia too has exten-

sive fields near Kiev and in Podolia. North-East France grows sugar-beet and much sugar-beet is also grown in Belgium, Poland and Czecho-Slovakia especially round Praha.

Here is a table which gives the position of the chief producers of cane and beet sugar.

Cane Sugar

India	3,600,000 tons
Cuba	2,400,000 ,,
Formosa	1,100,000 ,,
Philippines ..	1,090,000 ,,
Hawaii	800,000 ,,
Brazil	790,000 ,,

Beet Sugar

Russia	2,100,000 tons
Germany ..	1,480,000 ,,
United States of America	1,070,000 ,,
France	870,000 ,,
Czecho-Slovakia ..	510,000 ,,
United Kingdom ..	500,000 ,,

Fruit Cultivation

From time immemorial fruit trees were grown close to the homes of the farmers. In Ancient Ceylon, fruit trees such as the jak, orange, plantains were grown in the gardens attached to each village. It was so in Ancient China where fruit trees were grown close to the homes of the peasants as well as along the paddy fields. But in Mediterranean lands owing to the scarcity of flat land for grain, fruit trees became very important sources of food. The *olive* was regarded as the gift of the 'goddess of wisdom'. The olive oil took the place of butter in these lands. Then there was the *grape-vine* which supplied the precious juice from which wine was made. Here is a passage from Homer's Odyssey which describes one of these fruit gardens. 'Outside the courtyard with a hedge running down on either side, lies an orchard where trees hang their greenery on high, the pear and the pomegranate, the apple with its glossy burden, the sweet fig and the luxuriant olive.

Their fruit never fails or runs short. It comes at all seasons of the year and there is never a time when the West Wind's breath is not assisting here the bud and here the ripening fruit, so that pear after pear, apple after apple, cluster on cluster of grapes and fig upon fig are always coming to perfection. In the same enclosure is a fruitful vineyard. Vegetable beds of various kinds are neatly laid out and make a smiling path of never failing green'. The lands round the Mediterranean Basin are rugged and only fruit trees will grow on the hill slope so that fruit cultivation was the only way in which the land could be made useful to man. Above all the climate was ideal for certain kinds of fruits.

Fruit cultivation on a commercial scale arose only when there was a demand for it. This demand came from two sources. One was from the cities of Northern Europe and the other was the demand from factories which manufactured jams, jellies, fruit conserves and preserves, fruit juices, fruit drinks, etc. These factories used up many millions of tons of fruit.

Citrus Fruit

The citrus fruits are perhaps the most important fruits entering into world trade. Chief among these is the **orange.** It stands transport well and there is a steady demand for it owing to its high food value. The orange is a native of Asia. It was grown in India and later introduced into Mediterranean lands by the Moslems. From here it reached the New World with the Spanish conquests. In recent times the cultivation of the orange has been extended into Australia and South Africa.

The **lemon** is also of Asiatic origin. The name is derived from the Arabic *Laimon* which is in turn derived from the Persian *Limun.* All citrus fruits cannot be grown in lands liable to frost. The northern limit is reached about 45° North Latitude in France and Italy. In North America citrus fruits are grown in Florida, but many years ago a cold wave destroyed almost all the plantations. California is world famous for oranges. In the Southern Hemisphere the orange is grown in Paraguay, Uruguay, Chile, the oases towns of West Argentina, South Africa and Australia.

Seasonal rainfall is essential for the cultivation of citrus fruits. When the fruits appear bright sunshine is necessary to ripen them well. Too much rain does not destroy the trees but the fruits become small and sour. The best conditions are given if in the tropics the rainfall is about 50". In Mediterranean lands the rainfall is between 20" and 30". Citrus trees can live through a dry season as their long roots enable them to tap supplies of water underground. Thus tropical monsoon lands and Mediterranean climates are the best for the cultivation of citrus fruits.

As the Mediterranean lands are close to the industrial regions of Europe, fruits grown in the former find a good market in the latter. The orange is grown in Palestine, Tunis and Algeria, Malta and Sicily, Southern and Eastern Spain. The fruits are sent to Britain, France and Germany. The oranges of California supply the United States of America markets while those of Chile, Argentina, Australia and South Africa come into the markets of Europe when other supplies are over.

The following figures give the position of the chief producers :—

United States of America	2,200,000	fruits
Spain	870,000	,,
Italy	327,000	,,
Palestine	167,000	,,

Grape-Vine

The grape too is a native of Asia, its original home being Ancient Media on the western margin of Iran. It was widely cultivated in Ancient Persia and throughout the Mediterranean Basin. The grape-vine is a lover of warm climates. It will grow in humid lands where it runs into a wild vine and produces none, or bitter fruit. But it likes best a climate with a cool frost-free growing season followed by a warm sunny dry season when the fruits can ripen and grow mellow in the warm sun. The Mediterranean is the ideal climate for the grape. The vine is pruned in autumn and in the warm wet winter it puts forth new tendrils and grows vigorously. Springtime is the season of flowers and the young clusters of grape appear in late spring. The dry summers with their clear

skies ripen the grape to perfection. Apart from climatic conditions, vine cultivation (viticulture) requires very skilled gardeners. It needs the skilful and tender fingers of the horticulturist to prune the vine and also to pick the grape without damage to the vine. A grape vine will bear fruit for over 15 years.

In France the vine is grown in the basin of the Garonne which produces the Bordeaux wines and the brandies of Cognac. Another district is Burgundy which makes the famous 'champagne'. The grape is grown in most parts of Italy. The 'Asti' and the 'Chianti' wines are produced in Piedmont. Grapes are grown in Tuscany and the Campagna as well as in Sicily. Spain grows table grapes of the highest quality in Malaga. The grapes of Jerez close to Cadiz go to make the wine called 'sherry' while in Portugal the Duoro Valley produces 'port' wine shipped from Oporto. In Central Germany the grape-vine is grown on the hill slopes of the Moselle and Neckar. Near Bingen are vineyards that produce the famous 'Johannesburger Wine'. In California the grape is sent either fresh or dried to market. Fresno has over 500,000 acres under vine. In South America the grape vine is grown in Chile, and the oases towns of San Juan and Mendoza. In Australia, Victoria and South Australia are the chief vine-growing states, the most important vineyards being near Mildura.

EXERCISES

1. Describe the conditions necessary for the successful cultivation of cotton. Are these found in Ceylon ?
2. Why is rubber an important article of world trade ? Why can it not be grown in the lands where there is the most demand for it ?
3. Compare the conditions necessary for the cultivation of cane and beet sugar.
4. Why do certain lands cultivate fruit on a large scale ?
5. Write a short essay on : (*a*) Citrus fruit cultivation. (*b*) Viticulture.
6. Draw block or line diagrams to represent the statistics of production found in this chapter.

CHAPTER VI

MAN AND DESTRUCTIVE EXPLOITATION

We have seen how man had from early times 'mastered by his devices the tenants of the fields'. This is how the Greek poet Sophocles described the taming of animals. Mankind later learned to 'tame' wild plants and grow them in fields and gardens prepared by human toil. In this way grasses and trees that once grew wild and the 'gadding' vine and many other plants were all pressed into the service of man. But man has also been a destroyer. He breaks and converts to his use what nature provides. Thus the trees in the forests are felled for wood to light his fires, to make his home and furniture and various things to satisfy his wants. He digs into the earth and converts the clay, sand and rocks for his use. He delves into the earth for metals and these too he puts to his use. In all these ways man exploits the resources given by nature and in most cases what he removes from the earth is lost for ever. Forests once felled may grow again but the coal, iron and mineral oil once removed are lost for all time. Nature's resources are thus slowly and steadily exhausted. We shall now study a few of these forms of destructive exploitation.

I. Forest Industries

There is a great demand for timber in the modern world. Millions of logs are yearly used in making bridges or for railway tracks. Boards are used to make packing cases for the despatch of all manner of manufactured goods. Timber is also in great demand for house building and the making of furniture. Paper is today made of wood pulp. Finally, rayon silk is made of wood cellulose. Forestry is thus an important industry and today forests are carefully conserved and useful timber trees are cultivated to replace the tree felled. All forests are not of equal importance

as sources of timber. In the **hot-wet forests** there are valuable hardwoods such as mahogany, ebony and other cabinet woods. But their exploitation is very difficult. The forests are marshy and fever ridden and human labour is scarce. Besides for one useful timber tree there are hundreds of useless trees and creepers so that a square mile of forest may only yield a few useful timber trees.

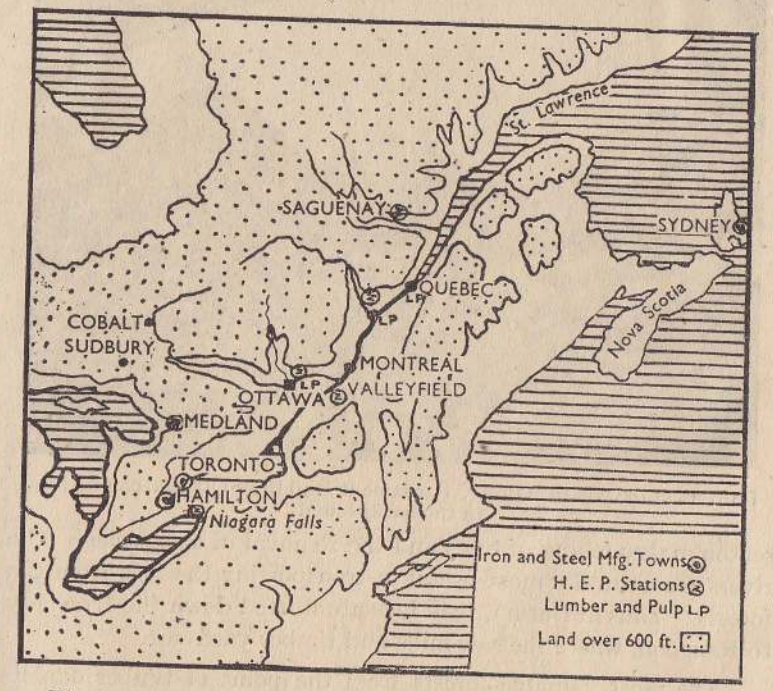
The forests of the **Tropical Monsoon lands** are better. They are not so thick as the hot-wet forests and the existence of a dry

Pulp wood for paper-making. Parliament Buildings Ottawa, can be seen in the background

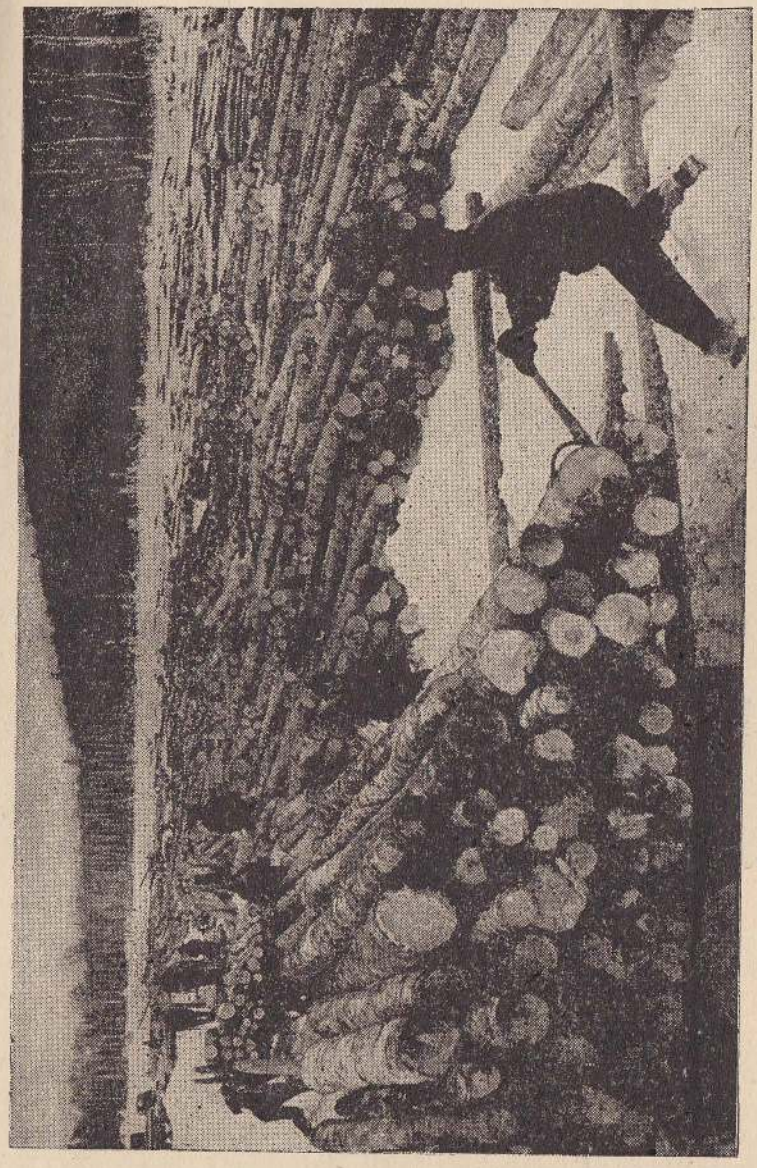
season makes felling of trees and the removal of logs easier. The rivers are naturally most useful in transporting the logs from the forests. Thus in Burma, teak logs are floated down the Irrawady to Rangoon, where the saw mills and timber yards are.

The most valuable forests from the point of timber exploitation are the coniferous forests of the north, stretching from Alaska to East Canada and from Scandinavia to Eastern Siberia. In these forests one can find millions of useful trees with straight trunks,

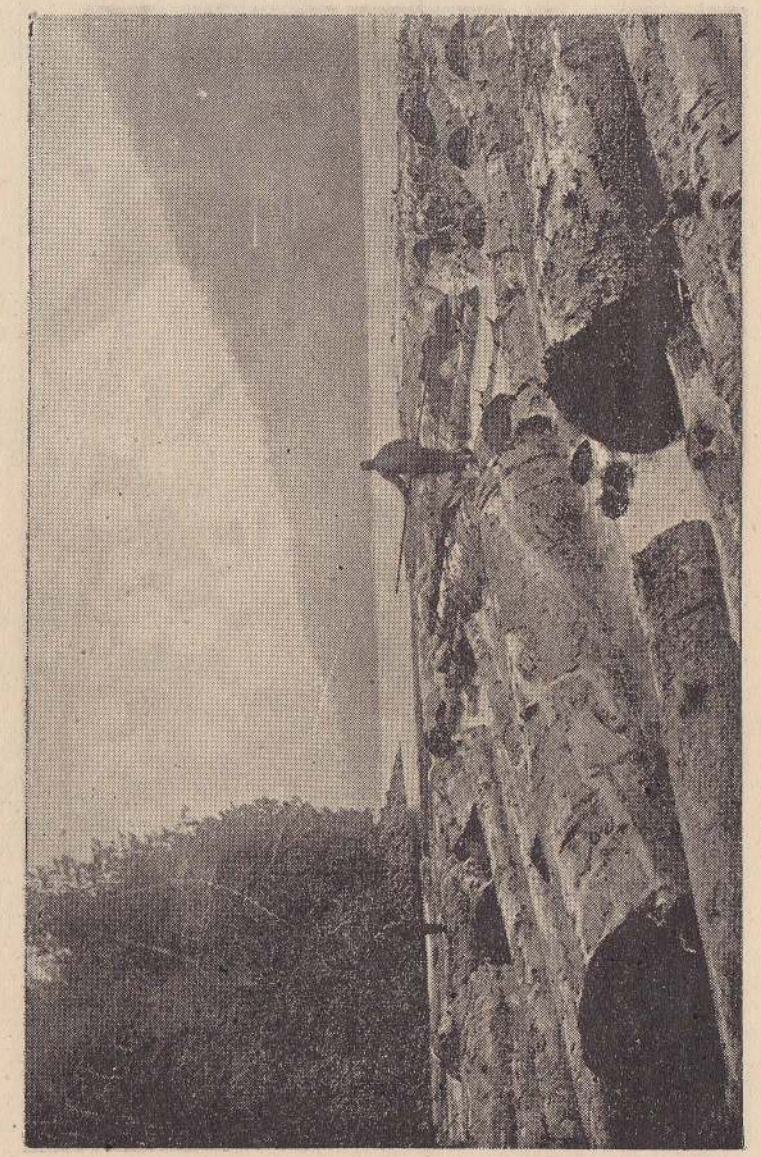
few branches, and what is more, large areas where trees of one kind grow are quite common. In such forests millions of logs of the same kind can be felled. There is also no dense undergrowth in these forests and the transport of the logs is made easy by the heavy snow and ice cover in winter. The ice and snow fill up the hollows in the forests and smoothe out the ruggedness of the surface so that logs can be easily drawn over it. The trees are felled in winter and logs are dragged to the sides of the frozen rivers and piled up. In spring the ice and snow melt and rivers are full of water. The logs are tossed into them and floated to the river mouths where the mills are. Eastern Canada gives us a good illustration of the timber industry. Here is a map of the area where timber exploitation goes on.



The land over 600 feet is covered with pine, spruce and larch trees. The winters are severe so that the rivers are all frozen in winter and the snow-fall is very heavy. Lumbermen make a winter

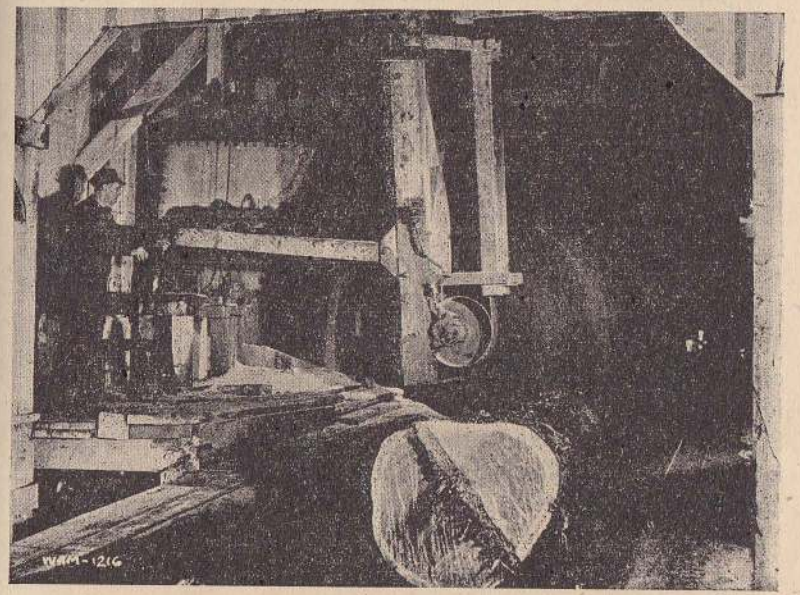


Loading logs on a frozen lake to await the spring thaw



Gathering spruce logs in the water to be towed to the mill

home in the forest and day after day, trees are felled, branches lopped off and the logs are piled high on the banks of the rivers. In spring the logs are floated down the Ottawa, Maurice and Saguenay rivers to the mills. The chief centres are Saguenay, Quebec, Ottawa and Montreal. In all these there are huge power stations and the machines that saw the logs or grind them into pulp are worked by electricity. This is a great advantage because electric power derived from rivers and falls is cheaper than that derived from coal or gas. You will realise how important this



Sawing Timber

is to the timber industry when you know that it requires 100 horse-power to make one ton of pulp. The paper mills in the states of Quebec use 312,000 units of horse-power every year.

Norway, Sweden and Suomi (Finland), are three other countries where forest industries are highly developed. Forests cover over 50 per cent. of the total area, and as the surface has been deeply glaciated much of the soil has been removed so that agriculture is not possible over the greater part of the lands. The hardy coniferous forests however grow, and timber is thus the one source of

the prosperity in these lands. The rivers, lakes, waterfalls and streams are used either for the generating of hydro-electric power or to float timber. The important mills and pulp and paper factories are Umea, Hernosand and Gefle in Sweden, and Viborg, Abo and Hammersfors in Suomi.

Russia too has vast timber resources. The logs are floated down the Dvina, Petchora, Ob, Yenisi and the Len. About 8½ million square feet of timber is exported each year.

Japan is one of the few eastern countries where forests are a source of wealth. In North Japan are forests of pine and these are used to make boards and paper pulp. Japan has vast supplies of hydro-electric power and electricity is used to work the timber saw mills and pulp factories. In Central Japan are forests of cedar, chestnut and oak, while in the sub-tropical south are camphor, lacquer and bamboo. Woodwork and wood carvings, cabinet and curio work have been well developed in Japan centuries ago and it is difficult to find better wood carvers and workers in wood than the Japanese anywhere in the world. The skill of the Japanese worker is put into articles of exquisite taste and skill. Works of art such as Japanese boxes, screens and cabinet work are highly prized in countries such as the United States of America. Japan has developed a modern timber industry in addition to her traditional crafts. She makes boards and other forms of fashioned timber. She manufactures the finest paper in the world in the towns of Shizuoka and Shimada. She is also a leading manufacturer of artificial silk. The annual value of her timber exports is about £11 millions.

II. Fishing

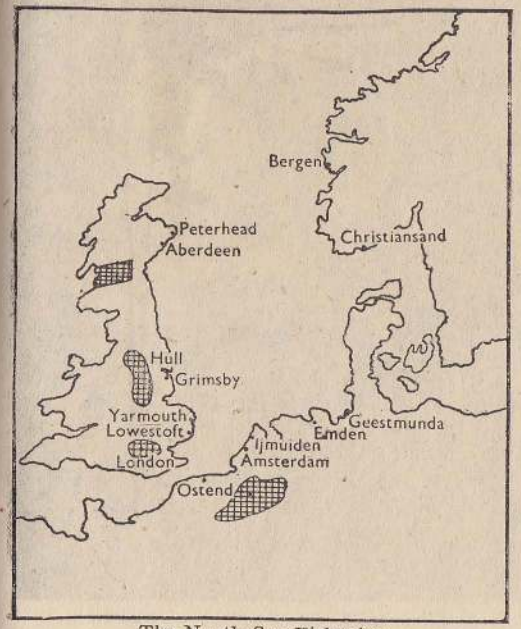
Fishing has been one of the earliest methods of getting food especially where the land was unfertile and gave little or no return for man's toil. Where 'the land repels and the sea attracts' with the harvests of the sea, men began as fishermen. Thus the people of the Deccan, unlike the ancient Sinhalese who were essentially farmers, became fishermen and seafarers. Similarly many people who lived in the lands round the Mediterranean became famous seamen such as the Phoenicians, the Cretans, the Greeks and the Carthaginians. Along the North and Baltic Seas too there were

famous seafarers such as the Vikings, the Danes, the Dutch, the Bretons and the English. In the New World too many Indian tribes such as those who inhabited the coasts of Alaska, British Columbia, the islands of the Carribean (the Caribs) were all fishermen and sailors. The Arabs were so famous that they have given a name to 'their sea' the Arabian Sea. Finally the people off the rugged coasts of South-East China, the Melanesians and Polynesians are to this day excellent fishermen and sailors.

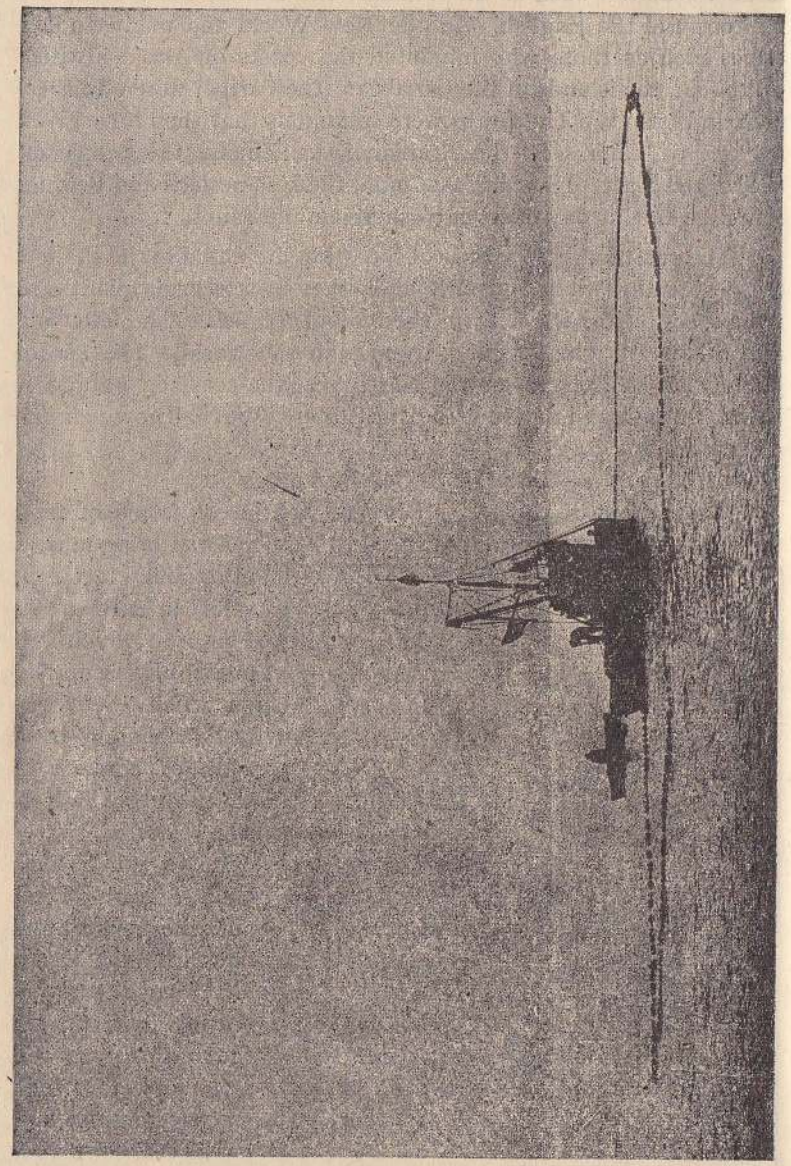
The great fishing grounds of the world are found in the shallow seas especially where currents and other agents bring plant and animal organisms which form the food of the fish. The following are among the chief fishing grounds in the world. The Sea of Japan, the Mediterranean, the North Sea, the coast off Labrador, Newfoundland and the New England States. We shall now examine a few of these.

The North Sea Fisheries

The waters of the North Sea are rich in all forms of food for fish. The warm waters of the Gulf Stream Drift bring masses of organic matter on which fish feed. Plankton which is a mass of living matter on which fish love to feed, abounds in a zone of contact of warm and cold water. The warm water comes with the Gulf Stream Drift and the cold waters pour into the North Sea from the rivers flowing into it from the continent, as well as Polar water which creeps along the floor of the sea. Further the sunlight

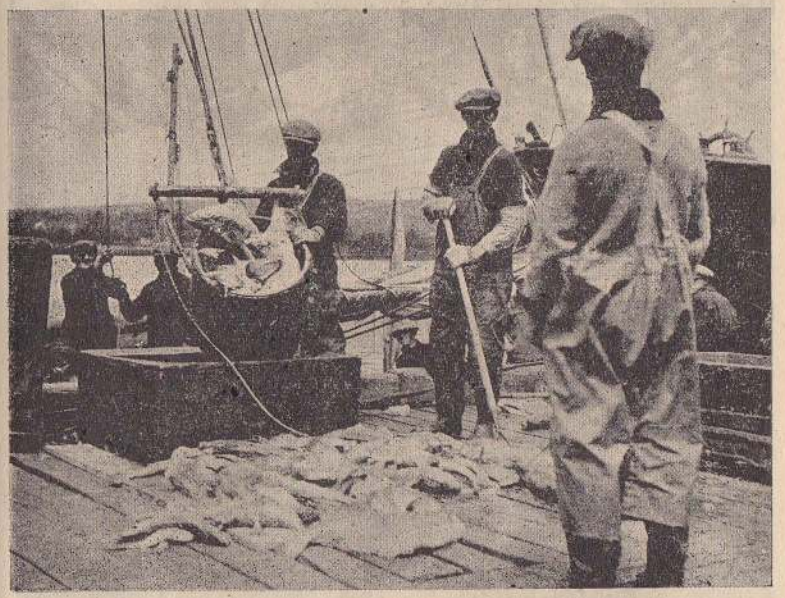


The North Sea Fisheries



Trawling Fish

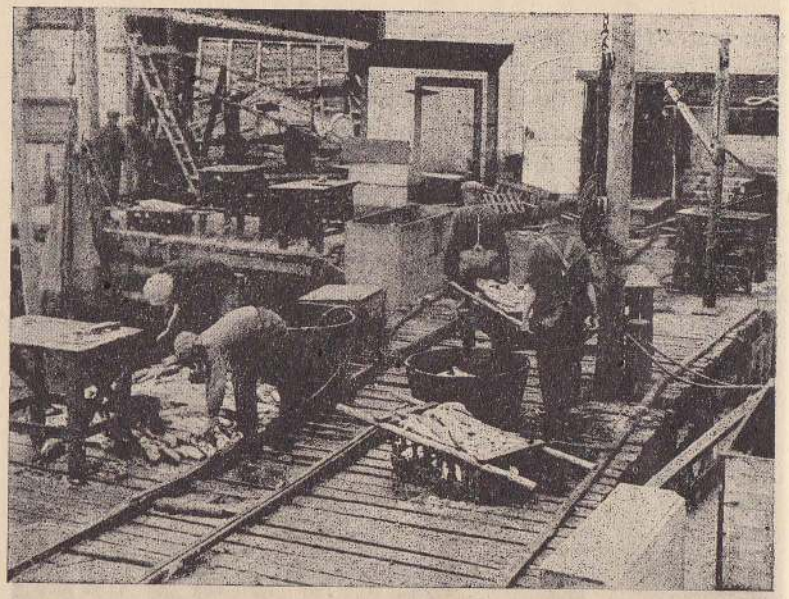
penetrates the shallow sea and encourages the growth of marine vegetation and tiny organisms. All these provide food for fish. For these reasons the North Sea is richer in fish than any other sea. Some kinds of fish are found not far from the surface. Herring and mackeral are the commonest of these. Other kinds of fish such as the cod, plaice, sole and turbot live in the bottom of the sea. The people engaged in the North Sea fisheries are the Swedes, Norwegians, Danes, Dutch, Frenchmen, Scots and English. In Britain alone 250,000 people are engaged in fishing and about 30,000 vessels are employed in catching the fish.



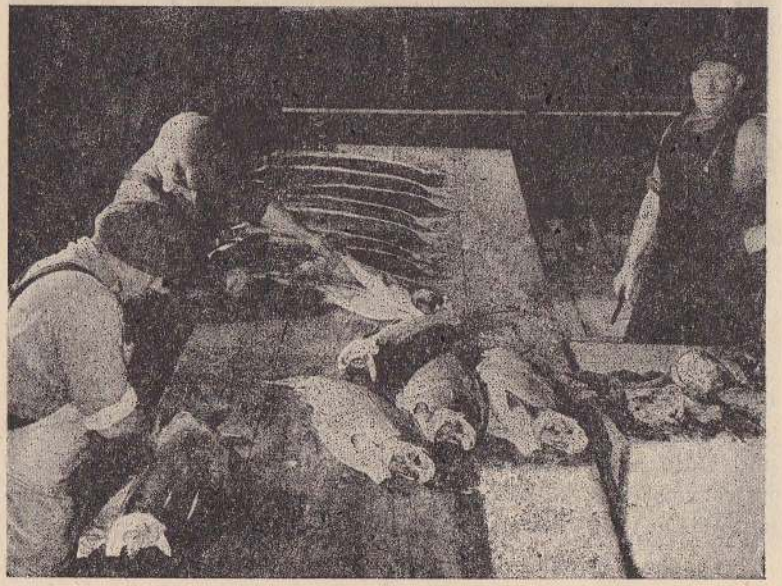
Landing Fish

The method of catching the fish varies from the trawler to herring smacks and line fishing boats. On the western side of the sea, the important fishing ports are Aberdeen, Peterhead, Grimsby and Hull, Yarmouth and Lowestoft. The first two supply the industrial region of the Midlands of Scotland, while the others supply the Yorkshire and London areas respectively.

On the south and east coasts are the continental fishing ports of Geestmunda, Ijmuiden, Ostend, Rotterdam and Amsterdam,



Sorting the Fish



Cleaning the Fish

with the Scandinavian fishing ports of Bergen, Christiansand and Stavenger. The fish caught here is salted or smoked and sent to South European countries.

The Japanese are the greatest fish eaters of the world. The land is very rugged and only 12 per cent. is arable. The Inland Sea and the Sea of Japan are very rich in fish. Off the island of Sakhalin are very valuable salmon fisheries, while cod and herring are caught off the Kuriles.

EXERCISES

1. Why are the coniferous forests more valuable for the lumbering industry than the forests of hot-wet lands ?
2. What geographical factors have helped the development of lumbering and forest industries in Canada and Sweden ?
3. Why are forests so valuable to the people of Japan ?
4. Write a geographical account of *either* the North Sea fisheries *or* the Sea of Japan.
5. Why are lumbering regions not densely populated. Contrast these with areas close to fishing banks.

CHAPTER VII

MAN'S DESTRUCTIVE EXPLOITATION

Minerals

From the dawn of history man had been using metals. We know that copper, bronze, and later iron weapons and implements were made which gave man increasing power to do his work by supplying him with better weapons and tools. But the fullest use of metals had to wait till such time man discovered a **fuel** which would give enough heat to cast the metals into any mould he desired. Wood was the chief fuel known, but in the 19th century coal, and later, mineral oil came to be used as fuels. In our own day electricity or white coal has become very important as a source of light and heat as well as mechanical power.

When coal came to be mined on a large scale, it helped the making of iron and steel on a large scale too. Machines made of iron and steel largely replaced timber and wooden wheels, etc. When coal helped to make steam on a large scale and the steam was used to drive machinery we got our factories with power driven machines and we also got the locomotive and the steamship. Factories, steam driven machinery, railways and steamships are some of the features of the modern machine age.

Then came the discovery and use of mineral oil which supplied the fuel for the internal combustion engine. The motor engine has now been fitted to road vehicles and we have the automobile. Motor cars, vans and lorries are gradually replacing waggons and carts drawn by animals. Finally the aeroplane has opened for man a path across the sky and such is the speed of the aeroplane that the world has been made smaller than ever before. Journeys that once took days to cover now take only a few hours. This has made men realise that the world is a small place and isolation

is no longer possible. We think today in terms of the world as one unit. We now speak of ' global ' trade, transport and, unhappily of ' global war ' too. Today the possession of supplies of coal, iron and mineral oil gives the owners great power in peace and war. This accounts for the massive strength of the United States of America and Russia.

Coal Mining

Coal was perhaps first known to the Chinese. The Greeks also knew of its existence and they called it 'lithanthrax'. Mining for coal on a fairly large scale began in Europe especially in France and Great Britain. But it was only in the 18th and 19th centuries that coal came to be used on a large scale. ' Coal owes its arrival as an economic factor to **steam** and **iron**'. It was used as a fuel to produce steam and also to smelt iron ore. The union of steam and iron created the age of machines and railways and brought about the era of Industries. Here are five dates which mark the stages in the rise of the Industrial era.

1779—First iron bridge over the Severn. The beginning of metal structures replacing timber.

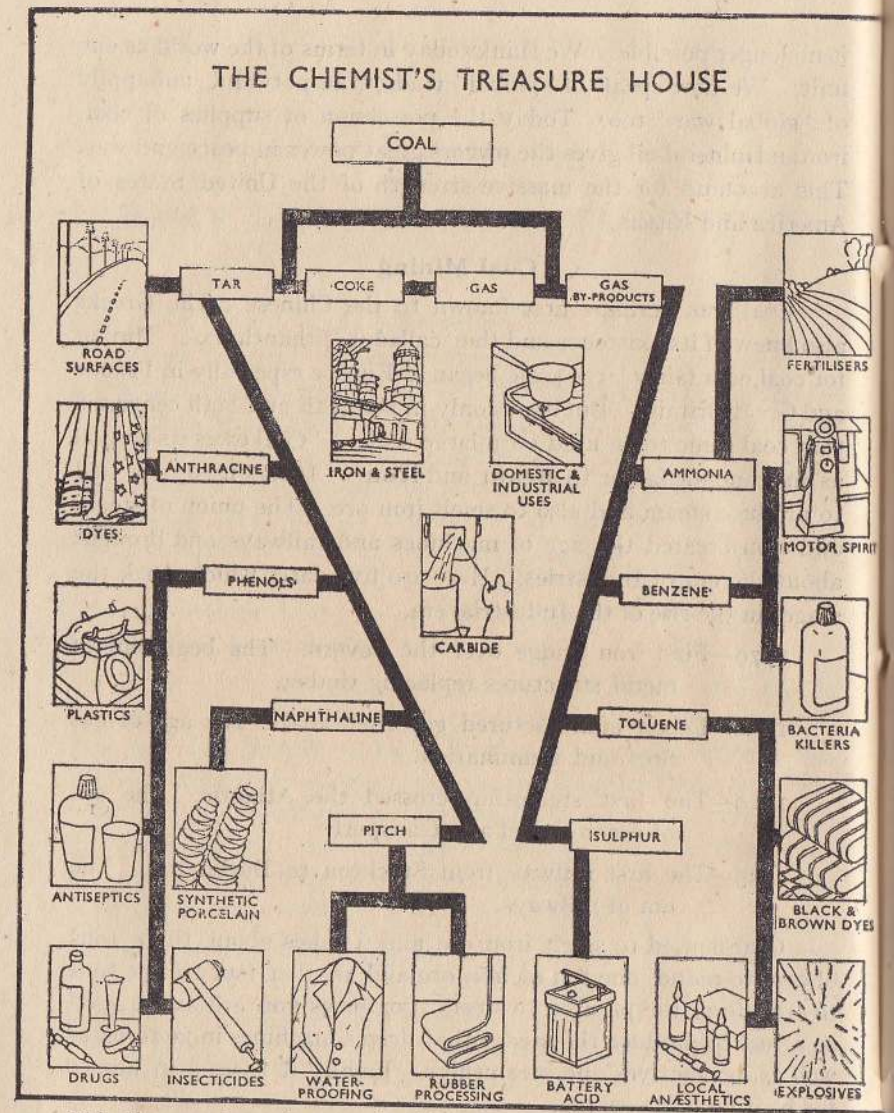
1801—Lebon manufactured gas from coal. The age of gas fires and illumination.

1819—The first steamship crossed the Atlantic. The era of ocean travel and transport.

1825—The first railway from Stockton to Darlington. The era of railways.

Coal is used to smelt iron ore and it takes about three tons of coal to reduce one ton of iron ore and another four to five tons to transform the pig iron to steel. Coal is as you are aware used as a fuel to produce the steam that drives machines in factories as well as locomotives and steamships. Finally it is used in homes for heating and cooking.

But coal is not merely a fuel. It is the raw material for a number of industries. On page 92 is a diagram which illustrates some of the products of coal.



This diagram shows in very simplified form the way in which the primary by-products of tar, coke and gas are utilised as the chemical bases of a wide range of products. Many of the symbols in this diagram themselves represent hundreds of different chemical combinations.

Coal seams occur in the earth in a number of ways. In some places the seam is on the surface and you dig it out of open pits, just as you blast rocks out of a quarry.

But sometimes the coal lies many thousand feet below the earth surface and then a shaft has to be sunk to reach the coal seam. The coal has to be lifted to the surface. The mine has to be ventilated and in many other ways made safe for the miners. All this will naturally raise the cost of mining. Finally coal is a bulky product and cheap transport is very desirable. If the mine is situated near a river, canal or a seaport, then it greatly helps the transport of coal.

Let us now examine the distribution of coal in the more important countries of the world. In India the largest fields are found in the valley of the Damodar. Mining is relatively easy as the coal seam is exposed on the sides of the river where in places the seam is many feet thick. The coal is sent east to Calcutta and south to the steel towns of Tatanagar and Jamshedpur.

China has vast coal reserves in the provinces of Shansi and Shensi in the Middle Hoang-ho Basin. There are also large deposits in Manchuria and Szechuan. Asiatic Russia too has very important coalfields in the Kusbaz district on the upper Ob. Many new towns such as Stalinsk have come into existence in recent years under the Five Year plans of the Soviet. The largest European coalfields are in Westphalia in Western Germany, Saxony, Silesia, Czechoslovakia near Praha, and the Franco-Belgian field. Britain is very rich in coal and the foundation of the economic prosperity of the country depends on her coal exports. The major fields are :

1. The Glasgow field, drained by the Clyde.
2. The Durham and Northumberland field, drained by the Tyne, Wear and the Tees.
3. The Lancashire field, drained by the Mersey and the Ribble.

4. The Yorkshire field, drained by the Humber.
5. The South Wales field, drained by the Rhondda.

You should note one point of significance about these fields and that is that all are located on the sides of rivers and close to the sea. This fact accounts for the development of an export trade in coal from quite early times.

In the New World there are extensive fields in the province of Alberta in Canada, but those which have been developed are in the United States of America. They are :

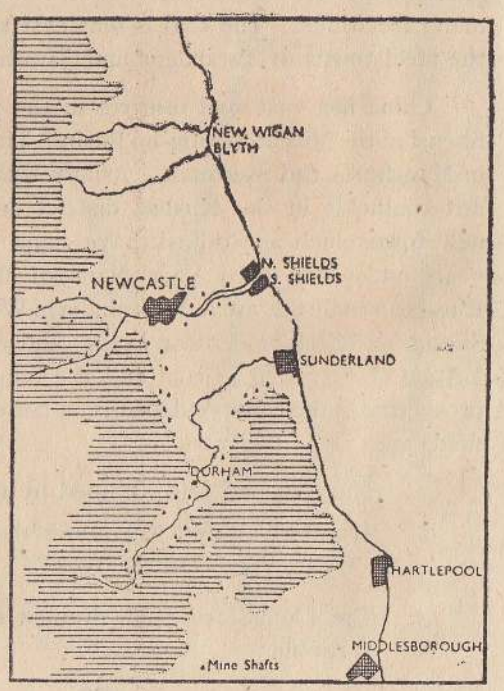
1. The Appalachian field, drained by the Ohio and its tributaries, such as the Monangahela, Big Sandy, etc.
2. The Central fields in Michigan and Illinois.
3. The West-Central in the states of Iowa, Kansas, Missouri.
4. The Southern Interior in the states of Oaklahoma, Texas, and Arkansas.

Coal is found in Africa in Nigeria, Rhodesia and Natal and in Australia in New South Wales.

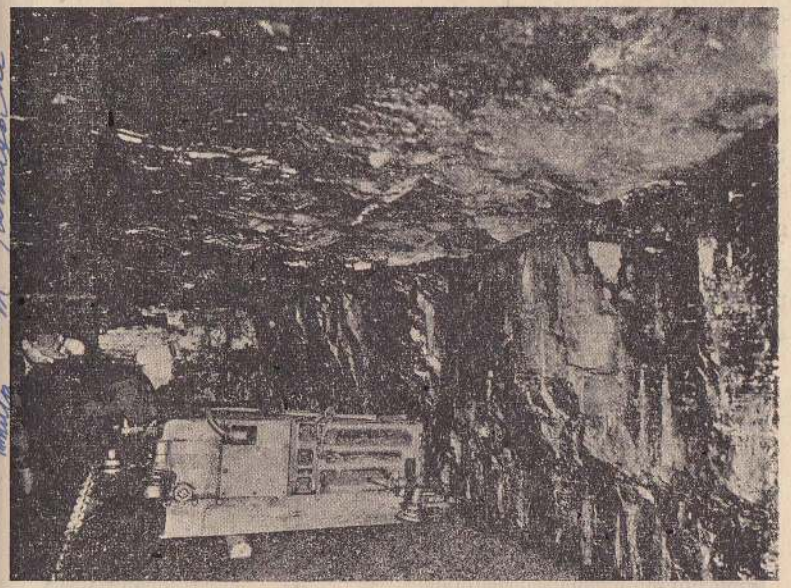
Let us now examine two regions which illustrate coal mining. The first example is from Britain and the second is from the United States of America.

The Durham-Northumberland Coalfield.

The map shows you the extent of the coalfield and it also shows you some of the mine shafts. Note that



these are close to and above the river Tyne. It is thus possible to send the coal to the river sides by mere force of gravity. The coal is loaded into trucks and sent along large wooden frames called 'staithes' and emptied direct into the ships moored in the river. Today coal represents about 55 per cent. of the value of the exports of Newcastle and about 95 per cent. of the weight of the goods shipped out. Coal is sent to Norway, Sweden, Denmark the

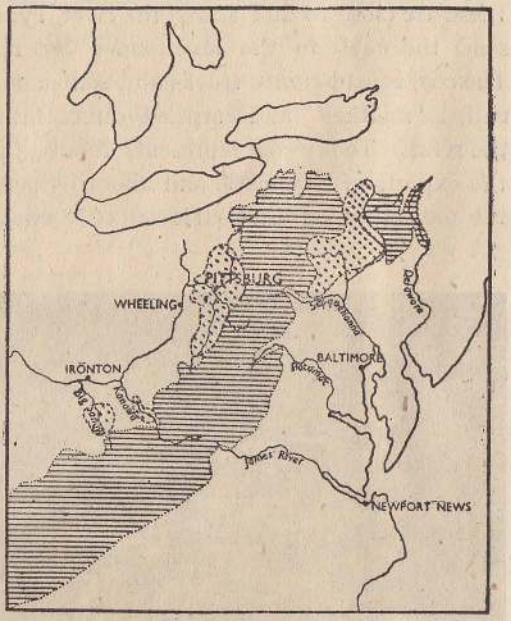


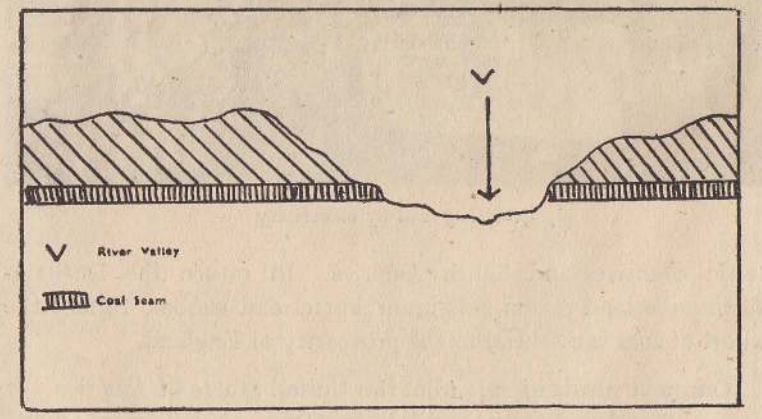
Cutting coal by electricity

Baltic countries and South America. In return the Durham-Northumberland region gets grain, butter and timber. In fact the export of coal is essential to the prosperity of England.

Our next illustration is from the United States of America. It is the **Pittsburg-Appalachian region.** Your map shows the location of the field. The coal occurs in horizontal seams, (vide diagram) so that where the rivers have cut their valleys the

coal seams appear on the valley sides. Mining and the transport of the coal is thus easy and cheap. Pittsburg is the centre. On the eastern side of the Appalachians, the coalfield is drained by the Sasquehanna and other streams so that the coal can be sent by water down grade to Baltimore and Newport News the largest coal port of the United States

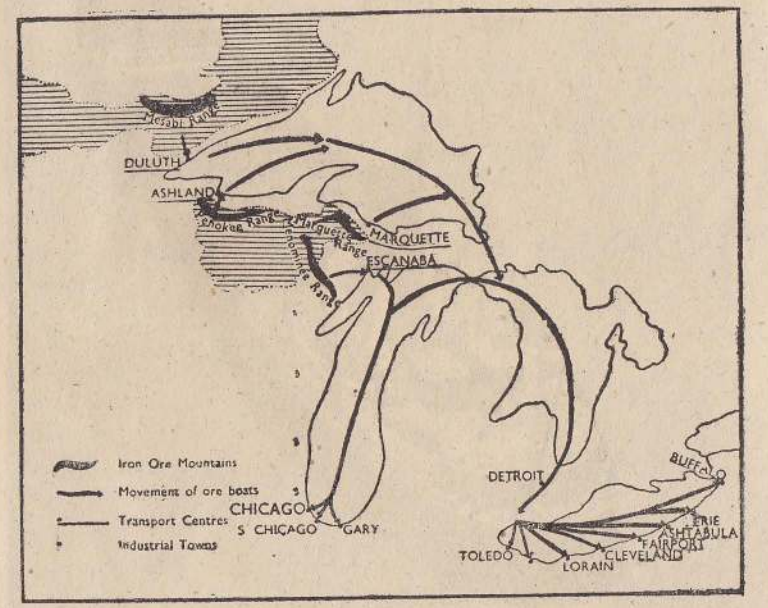




of America. Coal is exported to the Mediterranean countries and to South America.

Iron Ore Mining.

Iron ore is found in a variety of forms. Sometimes the deposits are on the surface of the earth, and it is only necessary to remove the top layer of clay and sand to reveal the ore. In other places the ores are deep underground and then the cost of mining is great. In some places the ore is found in low ranges of hills and here the ore can be removed by means of steam shovels. The world's most important iron deposits are found in (1) the United States of America, Brazil and Chile, (2) Sweden, Lorraine in France, Spain, and the Urals in Russia, (3) in South Australia at Iron Knob and (4) the south of Damodar Valley in India.



The above map shows you, the distribution of the ore fields of the United States of America. It is found in a number of ranges to the west and south of Lake Superior. The ore is easily

243—E

dug out by machines that remove 10 tons of ore at a time. The ore is then loaded into flat bottomed boats (vide picture) and

An Ore Boat

sent to the blast furnaces at Chicago and Gary on Lake Michigan and the lake ports of Erie and the lake peninsula of Canada.

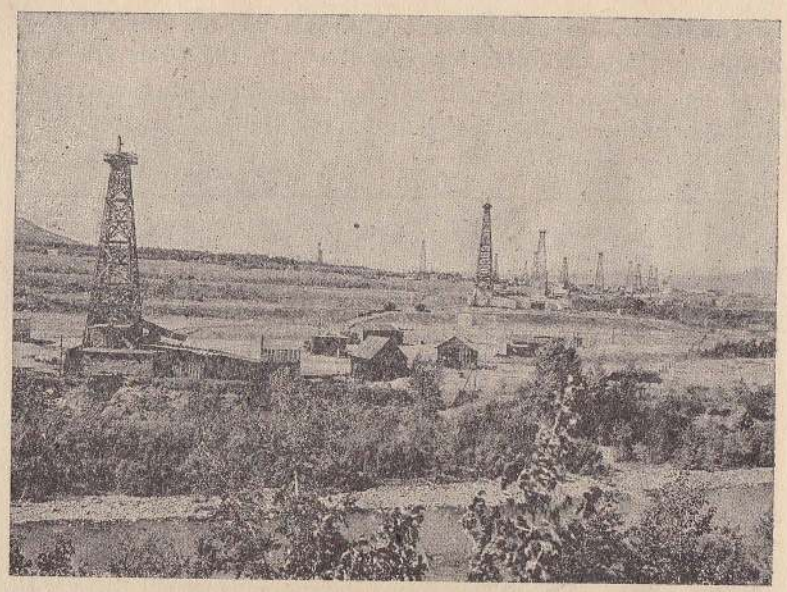
The ore fields of Russia are shown in the map below. In the west are deposits of Krivoi Rog. In the Urals are very great fields near towns such as Magnitogosk. Other ore fields are found in the Kusbaz district and in the Sikhota Alin Mountains

to the north-east of the town of Khabarovsk. The world production of ore is shown in the following figures:—

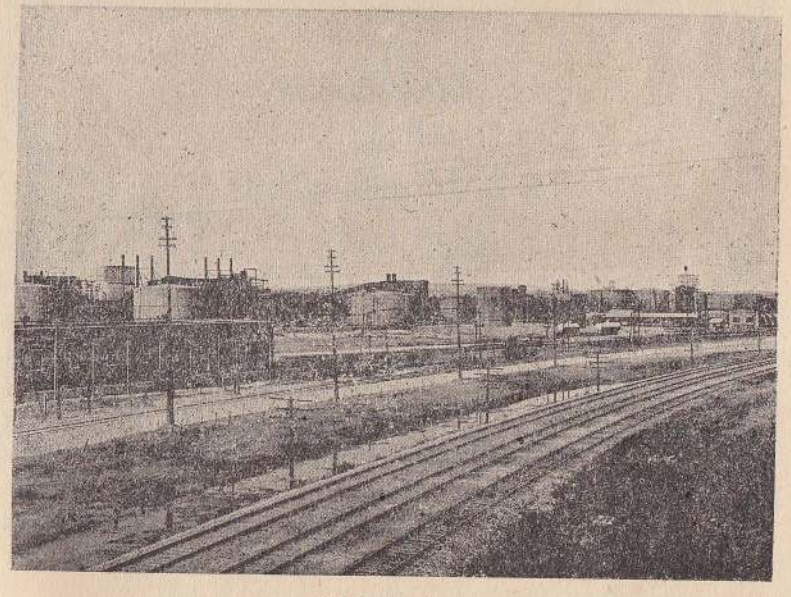
United States of America	..	21,500,000 tons
Russia	..	12,450,000 ,,
Germany	..	12,300,000 ,,

Mineral Oil.

The importance of mineral oil was hardly realised twenty years ago. But the increasing use of motor transport, the use of diesel engines and, above all, air transport, have made mineral oil one of the most important sources of power in the world. In fact the nation that has a sure and abundant supply of mineral oil becomes not only great in peace but invincible in war. This explains why modern powers are for instance keenly interested in Iran and Saudi Arabia. Both regions are rich in mineral oil.



An Oil Field



Oil Refineries

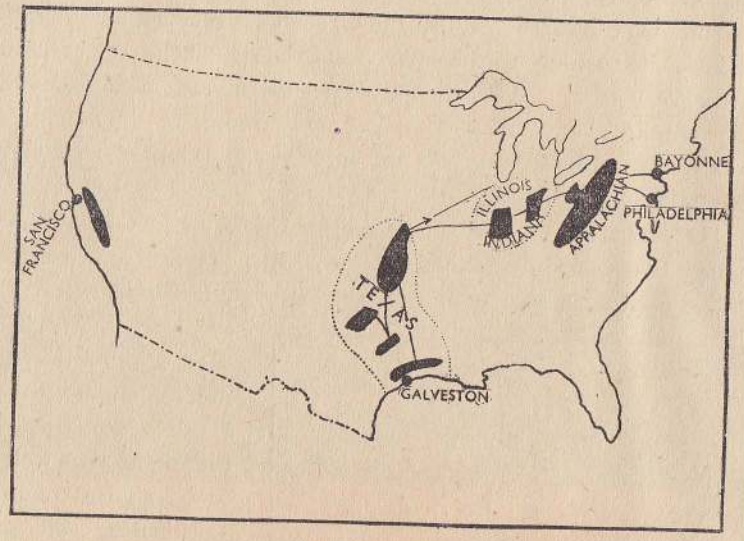
Mineral oil is found in places gushing out of the earth like water from a spring. But more often it has to be won from the earth. A well is sunk by means of a drill which enables a pipe to be run into the earth. When the oil strata is reached inflammable gases come rushing up the surface and the risk of the well catching fire is very great. With the gas comes the oil and various devices are employed to trap the gas and store it in huge gas containers while the crude oil is lead along pipes to distant refineries.

An oil well does not last very long, and when the oil is exhausted the well is abandoned. Mineral oil, or 'petroleum', or rock oil, is used as a source of **power, light** and **lubricants.** The gasolines (petrol) are used as fuel for the motor engine. The kerosene are used for illumination as well as fuel for farm tractors. Lubricating oil and greases are essential to the smoothe running of all types of machinery. Fuel oils are now in increasing use for generating power by industrial plants, railroads and ocean steamers. Road oils are also made of mineral oil, and waxes made from its by-products are used as surgical dressings.

Mineral Oil

Mineral oil is widely distributed. In Asia, there are important fields in Burma, Borneo and Sumatra, Iran, Iraq and Saudi Arabia. The above map shows you the Iran-Iraq fields. The oil is sent along pipe lines south to Abadan and west to Haifa and Tripoli.

The United States of America is the world's largest producer of mineral oil. Here is a map which shows you the more important



fields. In the west are the Californian fields with refineries at Monterey and San Francisco. The oil from the Texas field is sent to Galveston and Gulf ports as well as to Chicago. The important Appalachian field sends oil to New York and Philadelphia. The major oil fields of Europe are in Roumania and the Caucasus region, Maikof Grozny, and Baku are some of the centres. Large stores of oil have been found at Emba east of the Caspian. In South America there are valuable fields in Venezuela and in Central America there are useful deposits in Mexico. The world production of oil is as follows :

United States of America	..	122 million tons	
Russia	..	23	,, ,,
Venezuela	..	20	,, ,,
Roumania	..	7½	,, ,,
Iran	..	7	,, ,,
Dutch East Indies	..	5½	,, ,,

EXERCISES

1. What are the important uses of coal ?
2. Write a geographical account of the coal mining industry.
3. Describe the distribution of iron ore, and the mining and transport of the ores in any one region.
4. Describe the distribution of mineral oil. What are its important uses.
5. Express by means of diagrams the statistics given in this chapter.

CHAPTER VIII

INDUSTRIAL REGIONS

When coal became the fuel for steam driven machines, the factories were built close to coalfields so that supplies were easy to get. Towns near the coalfields soon became crowded with workers and as the industries grew, more and more people came in search of work so that large areas soon became crowded with factories and working class people. For example in Yorkshire new towns came into existence near the coalfield, all of them making either woollen or steel goods. Thus a part of Yorkshire which was once a rural area became an urban industrial region. In place of villages and cottages there were towns crowded with people living in small back-to-back houses. A similar industrial region making cotton goods arose on the Lancashire coalfield. In the Tyne Valley an industrial region specialising in iron and steel drew to it many thousands of workers so that today it is the most important iron and steel centre in England. Other regions making iron and steel goods are the Clyde Valley, famous all the world over for ship-building, and the Birmingham and the South Wales regions. All these had local supplies of iron ore which enabled these areas to start making steel goods, but today they are compelled to import ore. This can be done fairly cheaply as these areas are not far from seaports.

These types of industrial regions are dependent on coal and are on, or near the coalfields. Other areas which had neither iron nor coal were nevertheless able to develop iron and steel industries because they were able to import both coal and iron cheaply. These regions are therefore unlike the former and constitute a second type of industrial region. Finally a new power has been harnessed to industry. This is electricity. It is a power that can be transferred from the power station to the places where it is needed so

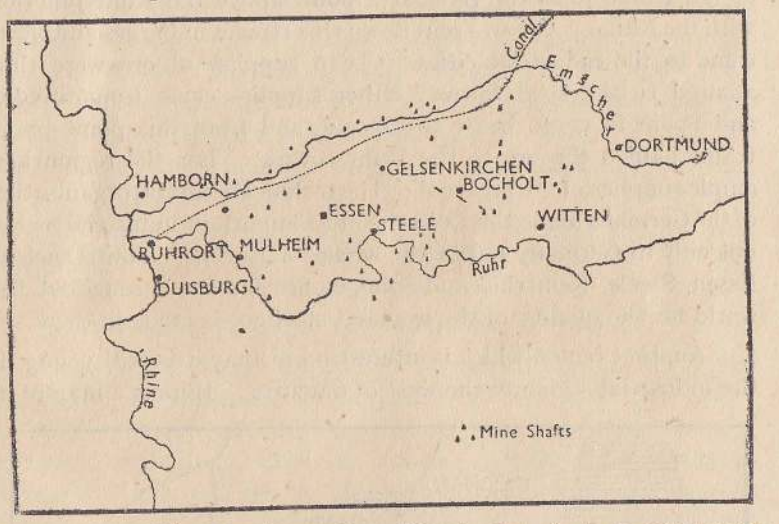
that industrial towns using electricity are unlike those in the first type of region because they are spread or dispersed over a wide area. Let us examine a few of these types of industrial regions.

Type I Regions that are on or near coalfields.
Type II Regions that import coal and iron ore.
Type III Regions using electricity.

Industrial Regions on or near Coalfields.

THE RUHR REGION

In this region there are ten million inhabitants and the density of population is over 1,000 to the square mile. A certain writer has described this area as 'a sea of houses'. On every side one can see against the skyline, the stacks of chimneys and blast

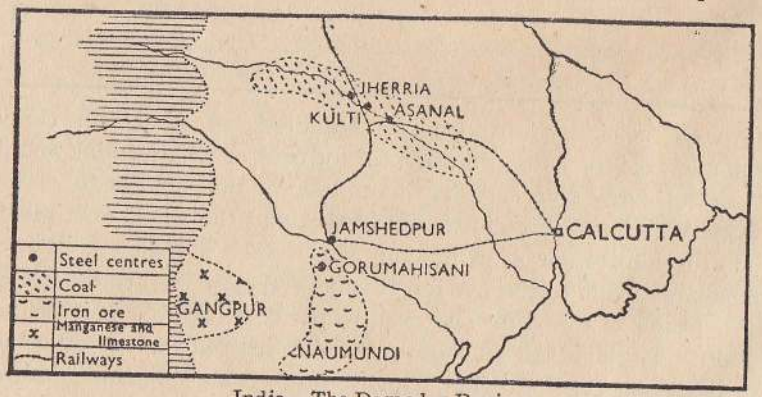


furnaces belching forth smoke. Hundreds of steel rails carry innumerable trucks loaded with coal and ores, or freight trains would rush out every hour carrying many tons of finished goods. The workmen's homes are clustered together and the whole area gives one the impression of a human hive. Such a region is by no means pleasant to the eye but it is nevertheless vital to the life of the people of Germany and even to the countries the west of the Ruhr. To the north and south of the industrial region you come to a different type of region, namely, a green and pleasant land of

farms and farmhouses, green fields and meadows dotted with cattle. This is an agricultural region. On page 105 is a map of the Ruhr region.

The **Ruhr** and the **Emscher** are two tributaries of the Rhine and these two flow across the Westphalian coalfield. The small dots on your map indicate where the mine shafts are. They are close to the river which means that the coal is mined close to the river and so can be easily transported down stream. In the early days of the steel industry, the blast furnaces made use of the local supplies of ore which was mined to the south of the Ruhr. When these were exhausted supplies were obtained from the ore fields of Lorraine in France. The Moselle, a west bank tributary of the Rhine joins the river at a point above the Ruhr junction with the Rhine. Ore was sent down this stream in barges and these came to the industrial cities. Cheap supplies of ore were thus assured to the steel towns. Other supplies came from Sweden and Spain in cargo boats to Cologne and from this point barge trains hauled the ore to the Ruhr towns. Thus the region had ample supplies of ore and coal. The technical skill and organisation of the Germans made the Ruhr the most important industrial region not only in Germany but in the whole of Europe. Towns such as Essen, Steele, Remschid and Solingen are famous throughout the world for the quality of the iron and steel goods made in them.

Another region which is interesting in that it is still young, is the industrial region to the west of Calcutta. Here is a map of it.



India—The Damodar Region

The river that flows across the coalfield is the Damodar. The mining centres are Asanal, Jherria and Kulti. The coal is sent to Calcutta to the mills and factories there. But in recent years Indian coal was made into coke in the mining towns. Coke is the carbon left when the oils and gas have been removed from the coal. Coke is used in the blast furnaces to smelt the iron ore. To the south of the Damodar is another stream, the Subharnarekha. It flows through a district known as Singhbum which is very rich in iron ore. The mining centres are Naumundi and Gorumahisani. Not far away is the district of Gangpur, rich in manganese ore, so very essential for the making of steel.

The coke made in the towns of Asanal, Jherria and Kulti are sent by rail to Jamshedpur and Tatanagar. The blast furnaces are here and these towns are engaged in making a variety of iron and steel goods. A great impetus was given to the steel trade during the second world war when war material for the Allies was made here for the armies in Burma and the East. Today this region is the largest producer of iron and steel goods in the British Commonwealth.

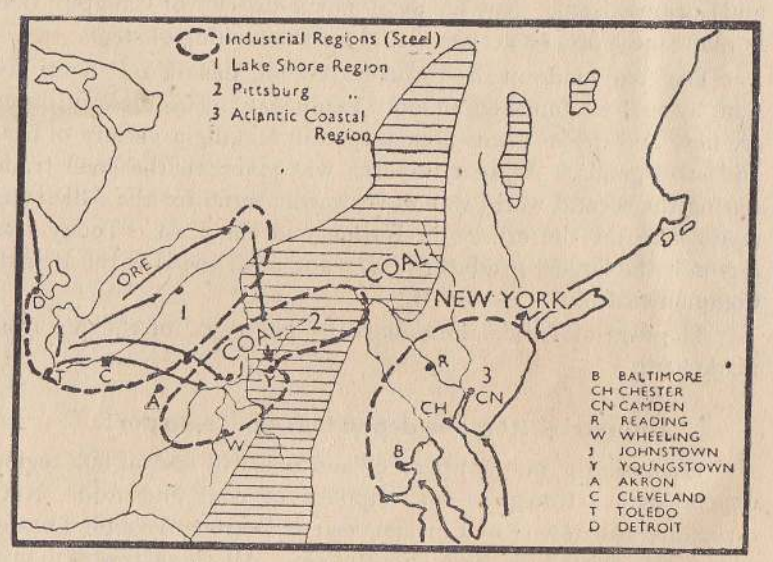
The firm of Tata's alone make 65 per cent. of the pig iron made here.

Industrial Regions dependent on Transport.

Examine the map on page 97 and you will find in it a region dependent on transport for supplies of coal and iron. Note especially the towns of Chicago, Gary, Detroit, Toledo, Lorain, Cleveland, Ashtabula, Erie and Buffalo. All these towns manufacture iron and steel goods. Chicago for example is world famous for locomotives, steel rails and agricultural machinery. Detroit is the centre of the famous Ford Motor Works.

There was a time when the great industrial region of Pittsburg sent freight trains to the ports on Lake Erie to bring back iron ore that came to these ports from the west of Lake Superior. These trains used to take coal as ballast and unload them at the lake ports and bring back iron ore on the return journey to Pittsburg. The people in the cities on the shores of Lake Erie were familiar with the sight of lake boats unloading ore and the freight trains

unloading coal in their towns. Business men quickly realised that here was the place where blast furnaces and factories should be set up to take advantage of the cheap supplies of both coal and ore. This is how the industrial towns on Lake Erie came to be. Similarly the manufacturers of Canada also realised that they too could get cheap coal and ore at points on the 'lake peninsula'. Today two of Canada's leading steel towns, Hamilton and Midland, are in this region. Similar industrial towns have come into being on the east coast of United States of America. Here is a map of this



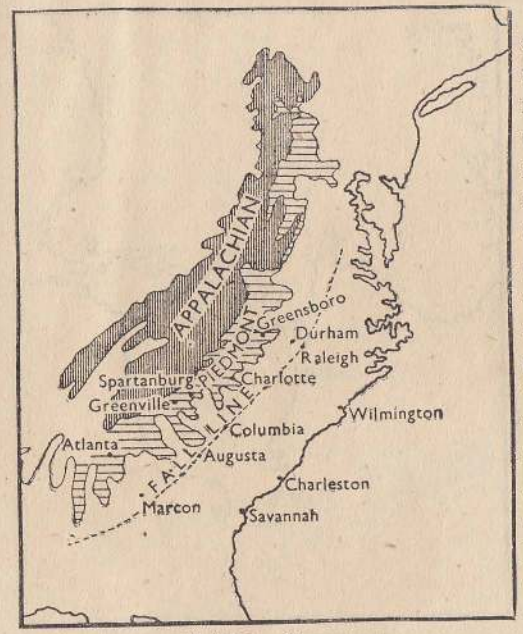
Industrial Regions—Eastern United States of America

region. Coal comes down grade from the Appalachian field while from overseas come Spanish and Chilean iron ores. Towns such as Bethlehem, Chester and Baltimore are some of the chief centres.

Industrial Regions based on Electric Power

In certain favoured regions where streams descend from the hills rapidly and in constant volume throughout the year, the force of running water can be used to turn dynamos which in turn generate electricity. Take for example the 'fall line towns', of

Eastern United States of America. Here is a map to show you these towns. They have become important spinning and weaving centres of cotton goods. One reason for this is the presence close by of ample supplies of cotton. The other is that cheap power was available to work the factories. You will notice on your map two sets of towns. One is at the foot of the Piedmont Plateau and the other is more to the east along what is known as the 'fall line'. As the streams crossing the plateau will naturally toss down the edge of the plateau there would be power stations at the edge. Such towns are Greensboro, Charlotte and Spartanburg.



Fall Line Towns

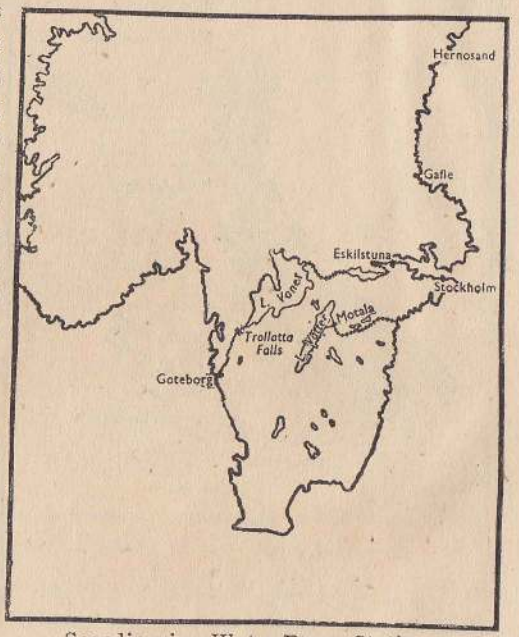
The 'fall line' is an outcrop of hard rock across which the rivers flow on their way to the sea. There are rapids at this point and power stations have been built to make use of the rush of water over the rock down to the lower level of the softer rock. The St. Lawrence Valley is another region rich in power resources. The tributaries of the St. Lawrence such as the Ottawa, Maurice and the Saguenay descend from the plateau to join the main river. On page 80 is a map which shows you the power stations.

The raw material available in abundance here is timber and electric power is used in the saw mills and pulp and paper factories.

Hydro-electric power is widely used in Norway and Sweden. All the saw mills and pulp and paper factories in these countries

are worked by electricity. Cheap electric power has enabled Sweden to manufacture nitrates, ammonia and explosives for which the name of the Swedish firm of Nobel is so famous. Sweden also makes high grade steel goods and electric furnaces and steel rolling mills are employed in all the factories. The power is derived at a number of stations but the most famous is at the **Trollatta Falls** called the 'Niagara of Sweden'. The accompanying map shows the leading power stations and industrial towns. Note that these, unlike the towns in the region under type I, are scattered and spread out on a wide area.

Hydro-electric power is used in the United States of America along a string of towns from Buffalo to Schenectady and Albany. The town of Buffalo has large flour mills. Schenectady is the headquarters of the world famous General Electric Company, the 'G.E.C.' as it is more commonly called.

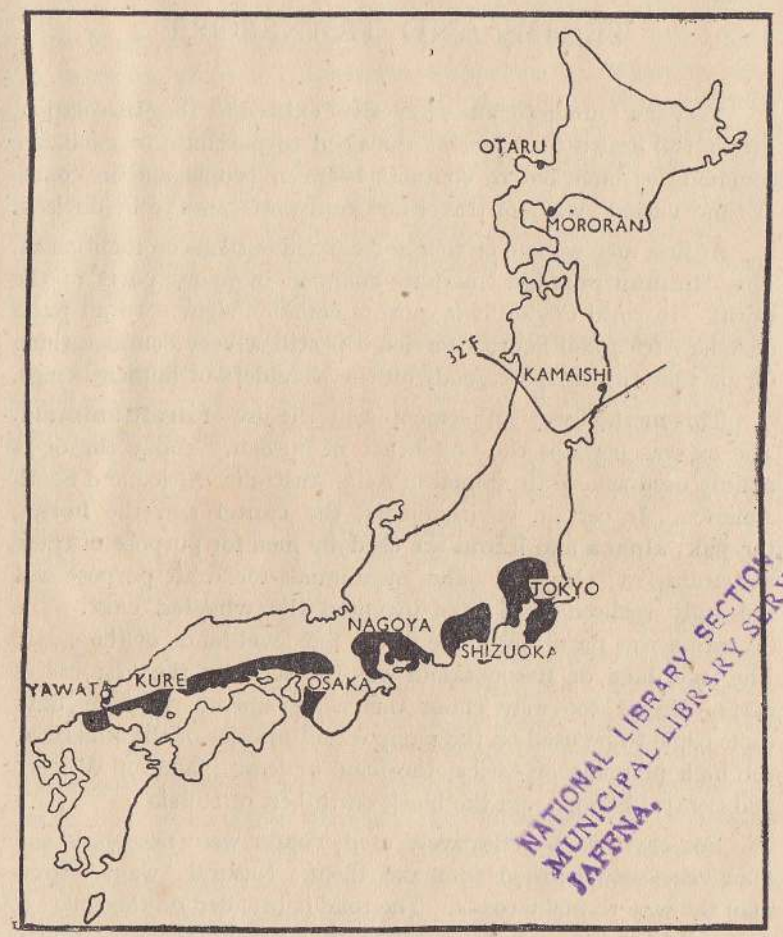


Scandinavia—Water Power Stations

Other countries where electric power is widely used are Russia and Japan. The largest power station in Russia was at Dnepripetrovsk and this supplied power to a large network of industrial towns in the Donbas.

The Japanese too have made excellent use of their hydro-electric resources. The swift flowing streams on the south have been harnessed to produce electricity and as Japan is poor in coal all her textile factories are driven by electric power. Such machines

are ideally suited for her staple industries, namely cotton and silk. The industrial towns extend from Tokyo to Shizuoka, Nagoya, Kobe, Kyoto, Osaka to Kure and Yawata.



Japan—Industrial Zone

CHAPTER IX

TRADE AND TRANSPORT

Very few human societies have ever existed for long in isolation. Either the desire to travel or the need to purchase or exchange commodities have led to contacts between people and in course of time various ways of travel and transport came to be devised.

At first men walked on foot and carried burdens on their backs. This '**human portage**' is quite common in many parts of the world. In rural Ceylon it is quite a common sight. In all parts of Asia, Africa and South America it is still a very common thing for persons to transport goods on the shoulders of human beings.

This method was supplemented by the use of **draft animals.** The ox was perhaps the first beast of burden. Today the ox is mainly used as a draft animal in Asia, Australia, Africa and South America. In certain environments, the **camel** and the **horse,** the **yak, alpaca** and **llama** are used by men for purpose of trade and transport. But the value of animals for draft purpose was not fully realised until man invented the **wheeled cart.** The invention was naturally made in the flat level lands of the earth. The level land of Mesopotamia was the scene of the first use of carts. Egypt too may claim this achievement. In later days carts came to be used on the pampas and prairies of the Americas, the high plateaus of Africa, the loam or loess plains of Western and Central Europe and the black earth belt of Russia.

For carts to be effectively used, **roads** were necessary and man very soon learned to make them. Natural 'ways' show man the way to make roads. The road is branded on the soil. It sows seeds of life—houses, hamlets, villages and towns. Human footsteps first mark the soil. It begins with the random tracks of hunters and shepherds. These 'ways' follow the lines nature

has marked. They stop at marshes, lakes and rivers. They take their course along easy slopes and through 'gaps' in mountain lands. Such gaps become 'gateways' through which the human horde seeks to travel. Gateways acquire great importance and achieve historic significance. Nalanda, Galagedera, Balane, Haputale, Passara and Alutnuwara have been significant in the history of the Kandyan Kingdom. The ançient kingdom of Cilicia held the gateways to Syria. In India, Purushapura (Peshawar) and Indraprastha (Delhi) kept watch over gateways to Western India and the Ganges Valley. The gateways of Central Asia, in the Pamirs, Dzungaria and Manchuria have been famous in Asiatic history. The Danube and Rhone-Rhine 'ways' are studded with historic towns. In the New World too gateways are still of great importance and have given birth to celebrated cities such as New York and Chicago.

In ancient India and Persia we find certain proof of man-made 'ways'—the **artificial road.** Royal roads existed in the Maurya Empire and one great road went from Tamralipti at the mouth of the Ganges through the great Ganges valley to the north-west of India. Another Royal road went right through the great Persian Empire of Darius. The Romans, however, were the famous road builders of history. The Roman roads, like the road built in the Kandyan Kingdom in the first years of British rule, were an 'imperialistic achievement'. The roads were intended to be an instrument of power to keep the outlying dependencies firmly held at the centre. Later the 93,000 miles of metal road in the empire became a life-giving system. Trade and commerce developed and flowed along these roads and the uncultivated wastes became ploughed land. It was through her road system that Rome brought the elements of civilized life to the greater part of her empire, especially to what was then known as Gaul, Germania and Britannia. We have seen a similar transformation in our land. In the Kandyan hills as well as over other parts of the island, there were villages cut off one from another save for footpaths through the forest. In fact a forest was a means of defence and by royal decree the forests of the Kandyan Kingdom were kept intact. It was a very wise thing because there is no doubt that

the Portuguese, Dutch and British invaders were often beaten back by the forests and guerilla fighters.

But after the fall of the Kandyan kingdom **military** roads were constructed and in the years of peace that followed the rising of 1818, the road helped to develop the land. First came coffee, then tea and later, rubber and coconuts and there is not the least doubt that roads have sown the seeds of life in Central and South-West Ceylon. Today all the more important towns and three-fourths the total population, are to be found in the region where tea, rubber and coconut estates flourish.

Roads did not come to their own as long as they were used by wheeled carts drawn by oxen and horses. The hard, smooth metal surface is intended to carry weight with speed and it was only when the **automobile** was invented that modern roads began to render full service. The motor lorry is now a widely used means of transport. Network of roads now leads from seaports inland distributing goods as well as bringing goods for shipment abroad.

The **railway** is a product of the era of industrialisation. It was first used to haul coal and the waggons placed on steel rails were drawn by horses. But when the steam engine was adapted to **locomotion** the railway system came into operation, at first in the industrial areas where iron and steel goods were made. Later, railways spread widely over vast spaces and today they thread their way across continents.

Roads and railways have now come to hold a very dominating position over trade and transport on land. Apart from their commercial value, roads and railways have also acquired **political** and **military** significance. Mass movements of men are now possible on a scale hitherto unknown. The first two world wars have shown how battles are fought to **secure** communications and enemies can be beaten by **destroying** roads and railways.

Vast oceans separate the continents and these are spanned by **ocean ways.** There was a time when the ocean was thought to be the end of the world—a barrier which could not be surmounted. Horace speaks of the first navigator as a man whose heart was ' oak and triple bronze '. Man naturally dreaded the seas, but

under certain conditions he learned to trust himself to the sea. In the small island studded seas such as the Mediterranean and in the oceans in which, like the South Pacific, are innumerable islands, or off the fjord coasts of Norway, man became a sea-farer. Where the land repels and the sea attracts, man becomes a sailor. He goes forth to the sea to find his food and the first sea-farers were **fishermen.** With his increasing knowledge of the sea and navigation, man travelled beyond the sea to other lands. It was at first hunger, then perhaps the spirit of adventure and love of plunder, that launched him across the sea. Contacts with other people lead to trade so that the merchant followed in the footsteps of the pirate. Very often both enterprises were combined. In this way the Japanese, the Chinese of the south-east coast, the inhabitants of the East Indian isles and the South Pacific seas became regular sea-farers. The people of **South Indian coasts,** and the **Arabs** traversed the Indian Ocean. The **Greeks** and later the **Romans** made the Mediterranean ' their ' sea. The people on the coasts of the **Baltic and the North Sea** also became sea-farers and the **Vikings** made history when they reached the North American continent centuries before Columbus by making their way along the ' stepping stones ' of Iceland and Greenland. In the New World the **Caribs** gave their name to the **Caribbean Sea.**

All these people discovered that the ocean was **not** a barrier but a **pathway,** the ' Swan's Way ' as the Viking so picturesquely described it. Oceans have become the links between the land masses. The moment this happened **coast lines** acquired a very great significance and peoples of **coast lands** leapt into historic importance. The empires of the landways ended and those of the seaways began. We begin to hear of the **empires** of Spain, Portugal, France, Britain and Holland. This phenomenon is even older because prior to man's conquest of the oceans, he had conquered the ' seas ' and then we had the ' thalassic empires ' such as those of Greece, Rome, the city republics of Venice and Genoa and the trade empire of the Hanseatic League over the Baltic Sea.

When ocean travel and trade began, **harbours** became the **foci of land and ocean routes** and round many of the better situated harbours, seaports arose. These were really the **points** of **transference** of traffic from land to sea. The first requirement was a **deep, secure, navigable** harbour so that even the largest vessel could anchor in safety. The transfer of goods from land to ocean vessels required machinery and installations so that where **flat** land was available round the harbour, it was put to use for **docks, wharves** and **other installations.** Examine any of the world's largest seaports and you will notice that some of these features gave them a start in developing the ports. Thus in Ceylon, Colombo scored over Trincomalee which has the better harbour because the **former** is a focus where land and sea routes converge, while the latter is not.

Another important factor that plays a great part in the development of an ocean port is the presence of a **productive and easily accessible hinterland.** A hinterland is the ' trade area ' of a port, or the region which supplies the port with commodities to be shipped. A **productive hinterland** supplies exports while a **consuming hinterland** supplies imports. A port which has any **one** type of hinterland will not be as large a focus of trade routes as one which has both types. In a small way Colombo is a good example of a port with both types of hinterland. Tea, rubber and coconut products come to it for shipment abroad while the presence within 50 miles of it of about three-fourths the total population supplies a ' consuming hinterland ' for food, textiles and all types of manufactured goods.

In recent years man has begun to make the air a swift **pathway** of travel. He has thus blazed a trail on land and sea and air. The speed of his aeroplane has changed people's conception of the world. In the days of the land ways the earth was believed to be flat. The ocean ways changed this point of view but still the maps most useful to the navigator perpetuated wrong ideas of the world. Take the map of the world on Mercator's projection. This was the world map in popular use until airways drew pointed attention to its fallacies.

Mercator's map was used as a navigation chart and it was most useful in indicating correct direction only for **regions** of the world. It was an ideal **regional chart** for ship navigators. But this is not true of the **world** map and it must be remembered that **world maps are not used as nautical charts in practical navigation at sea.**

Turn to your Mercator's map and note for example a few of the distortions on it. For this purpose have a **globe** too before you.

Your map shows you that Greenland is larger than South America, whereas it is only one-ninth as large. Your eye will detect other distortions.

Now take an example of **world relations.** The shortest route from Rio de Janeiro to Darwin appears to be westward, but actually the shortest route passes near the south. Verify this on your globe by means of a piece of string stretched tight from Rio to Darwin. Try the same for **distance.** What is the shortest route from Colombo to London, Moscow, Tokyo and New York ? Your map will not help you to find them, but your globe will.

Thus the era of airways has made us ' **globe conscious** ' and we now think in terms of ' global problems ' not regional problems. We spoke of the last war as a ' **global war** ' not as a ' **world war** '.

Airways have thus brought people very close to each other. It has brought into strategic importance some of the nooks and corners of the world. For example, Alaska, Greenland and Iceland became centres of military planning for these are on some of the shortest airways to North America.

Let us now examine some of the more important land and sea routes of the world and conclude by a study of some of the principal air routes of the earth.

Before we examine the trade routes of the world we should have a general idea of the kinds of vessels used in ocean transport. You have no doubt heard of the **ocean liners.** These vessels are primarily built to carry passengers and mails. They have

scheduled times of starting, arrival and departure from various ports and they have routes definitely marked out. They work according to a time table.

In contrast to this we have the **ocean tramp.** This is a steamer that has no fixed route or ports of call. It goes where its owners want it to go to collect cargoes. It may start from Liverpool with a cargo for Buenos Aires and it is informed by radio that it must touch at Santos for a cargo of coffee and later reach Jamaica for a cargo of sugar. In this way it 'tramps' across the ocean taking and discharging cargoes as its owners order. Then we have ships built to carry special cargoes. The **'tanker'** for instance carries oil. Ships specially built for timber and ores carry only such cargoes. Then we have today ships built to carry **fruit, meat, dairy produce** such as butter and cheese. They have very extensive storage space **insulated** and air-conditioned. The holds of the ship are really vast **refrigerators** so that the cargoes may come to market in fresh condition. These ships have been well called by the people of Britain **'Empire food ships'.**

Cargoes too belong to different types. First there is what is called a **general cargo.** It consists of various commodities for several ports. Then there is a **special cargo.** This consists of **one** commodity destined for a special port. Thus ships leaving ports like Savannah or Galveston may take a cargo of **cotton** for Hamburg. Such a ship will be taking a special cargo. Finally there are **'bulk cargoes'.** Such a cargo can only be handled *en masse.* The principal bulk cargoes are grain, coal, iron ores, fuel oil, lubricating oil and gasoline.

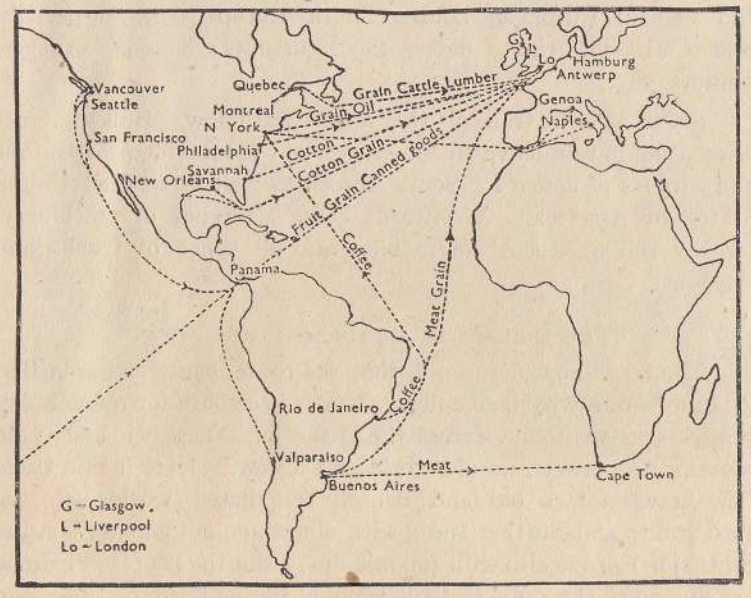
The flow of trade and cargoes must be inevitably from the regions of **constant supply** to those of **constant demand.** Let us examine this flow of trade across the oceans of the world.

The Atlantic Ocean.

On the opposite page is a map which shows you the flow of trade across the Atlantic. The ports of origin and discharge of cargoes are also shown to you. The first thing that you will perhaps note is that the flow of trade is **one** way—from the **new** to the **old.** There was

a time when the old world sent manufactured goods to the new and received food from the new. But the New World, especially the United States of America, has had a great development of manufactures that it has very considerably reduced the westward flow of manufactured goods.

Let us examine the eastward flow. From Vancouver, Seattle and San Francisco come cargoes of oil, lumber, wheat, canned fish and fruits canned, fresh or dried. It is nothing to be surprised at if we hear that 4,015 tons of apples, 410 tons of canned fish



Trade Routes Across the Atlantic

and 276 tons of dried fruit pass through the Panama Canal as a special cargo! From New Zealand, which finds the Panama route the shortest to England, come cargoes of meat and dairy produce. From Chile comes nitrates, iron ore and fruits.

From the **cotton** ports of Savannah, Galveston and New Orleans come cargoes of cotton. These are supplemented by mineral oil, and grain especially in winter. The North Atlantic ports of Quebec, Montreal, New York and Philadelphia have bulky

cargoes of timber as well as grain and meat to feed the hungry millions in Europe. We must not forget that there is a very steady flow of passenger traffic bound eastwards to Europe. The world's greatest passenger boats work on the North Atlantic route.

Traffic westwards does not consist of bulky cargoes, for the New World has need of none from the old. But articles of high value and workmanship come west—such as leather goods from Vienna, fancy goods, cigarette cases, soaps, perfumes, jewellery, optical instruments, wines and silks come from North European and Central European lands. South Europe sends, especially near Christmas time, dates, figs, currants, lemons, oranges, walnuts, etc.

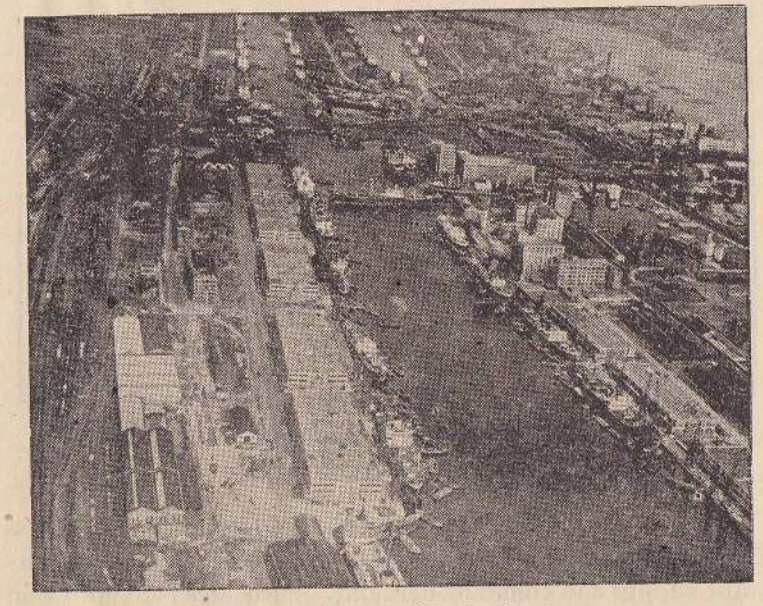
South Atlantic trade also has an eastward flow. Bulky cargoes of meat and grain leave Buenos Aires and Montevideo for Europe and cargoes of coffee for South Europe as well as to East United States of America. Westwards come all types of machinery, railway rolling stock, automobiles and all types of trucks and waggons.

The Indo-Mediterranean Trade Flow.

The trade flow across this long sea route is interesting in that it is **not** a **one way** traffic flow. Nor is it a route for a few bulky products as we found across the Atlantic. There we had trade movements between an old world and a new. Here it is a trade flow between **two** old and densely populated worlds—in the East Indies and Further India with about 400 millions and on the other side Europe also with 400 millions. But the people of Europe are not quite the same in their ways of life as those of India and Indonesia. The former have highly developed industries and have much of these products to sell abroad, while the latter—the Indians and Indonesians are poor and have only raw material to offer for sale. Westward moving traffic is thus primarily of **raw** material. Wool from Australia is joined by Sumatran oil, Malayan copra, rubber, Java sugar and tea, spices and pepper. Burma sends her teak, India her jute and manganese ores, Ceylon her tea, copra and rubber. Iraq sends her dates and oil and Saudi Arabia will also be soon a supplier of oil. The Mediterranean

lands add fruits, fresh and dried, wines and tobacco to this stream of traffic.

Marseilles to some extent and London principally is the *entrepot* for goods from the East. The Port of London has special docks to handle these cargoes.

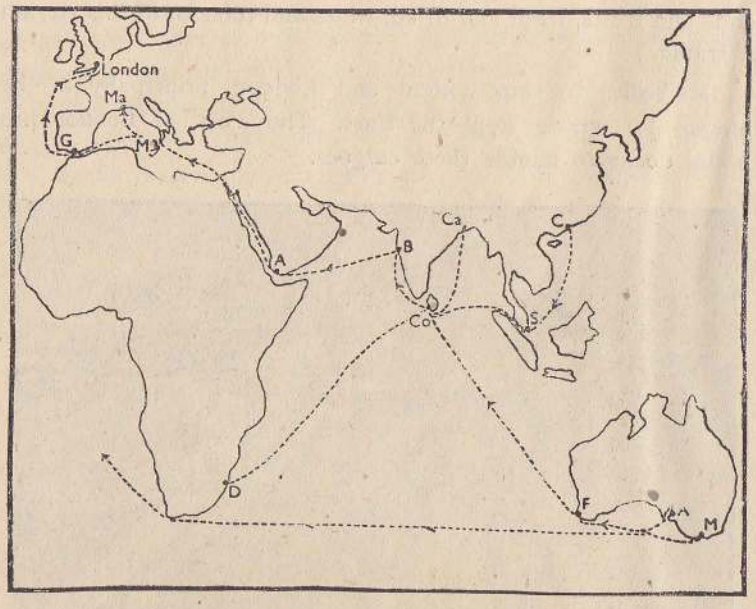


Aerial view of Royal Docks, London

The Pacific Trade Flow.

On the Western Pacific are the crowded lands of China and Japan and the islands such as Taiwan and the Philippines and New Zealand. On the eastern side is the Pacific seaboard of Canada, United States of America, Central and South America.

Traffic from San Francisco, Victoria and Seattle westward consists of timber, grain, canned goods and oil. These flow across the Pacific to Yokohama and Shanghai and return cargoes are for the most part raw silk and Japanese curio work. From the Philippines comes sugar and copra. The Hawaiian Islands are the



Mid-Pacific focus of these North Pacific routes. Sugar and pine-apples are cargoes from Hawaii to the United States of America.

The Pacific is thus not one of the world's great trade ways. The reason for it is that there will be trade between areas of **constant supply** and **constant demand.** Such areas are not found yet on either side of the Pacific. Geographically the western areas of the American continents are the **least** developed. They consist of high mountain chains backed by arid plateaus. The only productive regions are the Valleys of California and Chile and their products are **not** in demand by the millions of poor people in China and Japan. On the other hand, the demands of the people of the western districts of the Americas are met by the eastern areas of the continents. It is therefore not likely that the Pacific can develop into a great trans-ocean trade way. On the other hand the North Atlantic and the Indo-Mediterranean routes link up populous and productive areas and where there is a **constant demand** and **constant supply** there will be trade.

EXERCISES

1. Examine a map of the distribution of population in either South America or Australia and show the relation it bears to the roads and railways.
2. Write a **geographical** account of—
   (*a*) The North Atlantic trade ways.
   (*b*) The Indo-Mediterranean trade ways.
3. Why are there no important trade ways in the South Atlantic and South Pacific Oceans?
4. Describe with the aid of examples, consuming and producing hinterlands.

CHAPTER X

RAILWAYS

The main forms of travel and transport over land were for many centuries by roads or waterways. You have read something of roads. These became **efficient** only when macadamised roads gave a hard smooth surface to roads and the invention of the motor engine enabled motor traffic to make free use of the hard surfaced roads for **fast** and **heavy** traffic. Today from every port a network of roads spread landwards and along these imported goods are taken for distribution. Similarly, networks of roads gather goods from all parts of the land for shipment at the ports. Centres of production such as industrial regions are also served by roads bringing in and taking away traffic.

The railway is somewhat different. It is not quite so **flexible** as the road which travels into every nook and corner where it is wanted. The railways are specially valuable for **long distance transport of heavy goods.** The motor vehicle has displaced the railways in handling traffic over short distances. You will find this true of Ceylon. There was a time when shopkeepers and boutique-keepers used to get their supplies from Colombo by train. They had to load up at a Colombo railway goods shed and the goods were taken say to places like Panadura, Kalutara, etc. There the goods were unloaded into goods sheds and once again loaded into carts to be taken to the shops. This caused (1) delays at the goods sheds and (2) additional labour charges for loading and unloading at the goods sheds. But if the shopkeeper employed a lorry he loaded up at the wholesale stores in the Pettah and the goods were taken right up to his shop and unloaded. This was quicker and cheaper. This is why in towns like Colombo, many firms deliver goods in vans at the doors of the customer. Roads

and motor vehicles are more **flexible** in that unlike the railway it can distribute a **variety** of goods **over** wider areas.

But when it comes to long distance transport over many hundreds of miles of **heavy** goods, then the freight train holds its own. For example, heavy cargoes of **coal, ores, oil, wheat and other grain, timber** are especially adapted to rail traffic. You have, say, **one** freight train loaded up with many thousand tons of **coal** and this can be sent cheaper over long distances by rail than by road. You have read how Pittsburg coal travels to the lakes by train and brings back ores. If you examine maps of the continents you will find the **transcontinental** railways still most valuable. Let us examine a few of these.

Asia.

The best example of transcontinental routes is the Trans-Siberian railway. The European branches join up at Omsk. The Trans-Siberian railway then proceeds east to **Novosibirsk.** Up to this point it crosses the fertile Baraba steppe where in recent years much **wheat** and **flax** cultivation as well as **dairy** farming has been developed. Novosibirsk is the focus of a number of lines leading to the iron and coal district of Kusbaz. Here there are a number of industrial towns such as **Stalinsk, Minusinsk, Kusnetz** and **Kemorovo.** The railway is used to bring **ores** from the Urals to this district and send Kusbaz **coal** and **coke** to the Ural industrial zone.

At Novosibirsk the Turkestan railway begins. It skirts the loess soil belt in which are situated such towns as Semipalatensk, Alma-Ata, Kokhand, Samarkand, Bokhara, Merv and Askaband. These "oases towns' are great centres of **fruit** cultivation and in recent years much **cotton** too is being grown. Cotton spinning goes on at places like **Stalinabad.** Two other lines traverse the wastes of Russian Turkestan. One links up the famous 'steel' towns of the Urals, **Magnitogorsk** with the **coal** and **copper** of **Karaganda** and **Kounrad** and the other joins Kokand and Taskhent (cotton) to the Moscow textile zone.

From **Novosibirsk** the 'Transib' line as the Trans-Siberian line is called travels eastwards to Irkutsk, Khabarousk to Vladivostock on the Pacific. It traverses a region of forests with pockets of cultivated land until it reaches the Pacific Province where much mineral wealth is found in the Sikhota Alin ranges. Railways have often been the means of extending political control over large areas because they enable the rapid movement of armies and equipment to centres where they are needed. This is true of the 'Trans-Sib' and 'Turk-Sib' railways. But as 'trade follows the flag' economic development followed political power. Another illustration of this is the Manchurian railways. The Russians ran a railway from China through Harbin to Vladivostock across North Manchuria and followed it up by a line south to Port Arthur. This gave them an ice free port as well as control over the fertile Manchurian plain. Rivalry with Japan over territory that really belonged to China lead to the Russo-Japanese war. Japan's victory gave her a foothold in Manchuria and the land was developed under soya beans, sheep farming, etc. in her interests. The second world war eliminated Japan and today the Chinese Communists hold the greater part of the fertile plains of Manchuria.

Another transcontinental line extends from Manchuria to **Peping** and southwards through **Hankow** to **Canton**. This is more a political than a commercial line.

The other long distance railways of Asia are found in India. **Bombay** the gateway to India is one focus and **Calcutta** is the other.

From Bombay railways radiate south-east to Madras and Ceylon, northwards to **Delhi** and the **Punjab,** north-eastwards to **Nagpur** and **Calcutta. Bombay** is the great port for **cotton** and **oil seeds. Calcutta,** from where the railways to the populous Ganges Plain radiate, is the port for tea and jute.

Europe.

London may for convenience be regarded as the great focus of European railways. Eastward railways link up Central Europe (Berlin) with Leningrad, Moscow and Odessa. South-east from

Berlin runs what was considered by the Germans as the famous Berlin-Bagdad railway. It enters **Vienna** through the passes in Sudetes and Erz mountains and crosses the Plain of Hungary to **Belgrade.** From this town the railway runs south-east to Istanbul the 'doorway' to Asia.

Another transcontinental line travels south along the Rhine Valley to Switzerland and through the Alpine passes to Italy and the town of Brindisi. From Marseilles a famous French railway crosses France to Calais. This is greatly used by passengers from the East to London and *vice versa*.

The Transcontinental lines are widely used for the transport of passengers. Bulky freights such as **grain, timber** and **ores** move into the industrial regions of Central Europe such as Silesia, Saxony, Westphalia and the Franco-Belgian coalfield.

North America.

North America provides some very good illustrations of Transcontinental railways. From the St. Lawrence Valley foci of **Quebec, Ottawa** and **Montreal** the Canadian-Pacific crosses the continent. Westwards of the St. Lawrence Valley it traverses vast areas of **timber production** and then **grain** until it touches the Pacific ports with their supplies of **timber. Grain** and **timber** are the freights for this railway and in the towns of Quebec, Ottawa and Montreal, thanks to cheap electric power, etc. saw mills, pulp and paper factories and flour mills.

New York is the west end terminus of the United States of America. Transcontinental lines. The Mohawk-Hudson 'gateway' which New York commands gave her access to the corn, grain, cattle, oil and coal regions of the centre. **Chicago** is the 'heart' of the 'American middle-west'. Railways radiate from this city to the 'wheat lands' of the Red River and the 'cattle' district of Omaha. Continuations of these lines link up the Pacific ports of Seattle, Tacoma and Portland (timber and grain) and San Francisco.

From New York many lines traverse the Atlantic plain. They connect New York with the 'Fall line towns' and the great 'cotton belt' of the United States of America.

Transcontinental traffic consists chiefly of grain and timber, but in the neighbourhood of industrial regions the railways handle traffic in coke, ores and heavy finished goods like railway rolling stock, etc.

South America and Australia.

Both continents illustrate the use of railways in opening up land. In South America the railway foci are the ports in the west. Thus the Rio de La Plata ports of Montevideo and Buenos Aires are the gateways to the pampas very much in the same way that Chicago is the gate to the prairies. The gradual development of the pampas under cattle, sheep and later of wheat, maize and flax—all for export—created a demand for transport. Today thousands of miles of railways bring in meat, grain and oil seeds for export to Europe. Similarly, networks of railways connect the **coffee districts** with Santos and Rio de Janeiro.

Australia has a transcontinental line from Freemantle to Melbourne, but her important railways link up ports with productive hinterlands. Thus **Freemantle** is linked up with the grain and fruit districts of West Australia. **Adelaide, Melbourne** and **Sydney** have networks of railways bringing wheat and fruits, meat and wool and dairy products for export.

Africa.

Africa has not much railway development. One reason is that much of the continent is not yet developed. As in Australia, railways are built to link up ports with hinterlands. Thus in the south, Cape Town, Durban, Beira, Lorenzo-Marques, are gateways to the continent. In the east, Mombasa and Dares-Salam bring Kenya and Tanganika in touch with ocean ports and in course of time these will become economically very useful. In West Africa, ports such as Port Harcourt, Lagoa, are connected by trunk lines leading inland. These are used to export cotton, oil seeds, palm oil, etc. The era of railways has only begun in three southern continents.

EXERCISES

1. Draw a map of Asia and mark the transcontinental lines. Indicate the areas of production these lines traverse.
2. Draw a map of Europe. Mark the transcontinental lines. Show the relation between these lines and relief.
3. Draw a map of North America and mark the transcontinental lines. Indicate the areas of production traversed by these lines.
4. Write an essay on 'Railways and land development' with special reference to *either* Ceylon *or* the three southern continents.
5. Write an essay on 'Railways in war and peace'.

CHAPTER XI

THE DISTRIBUTION OF MAN

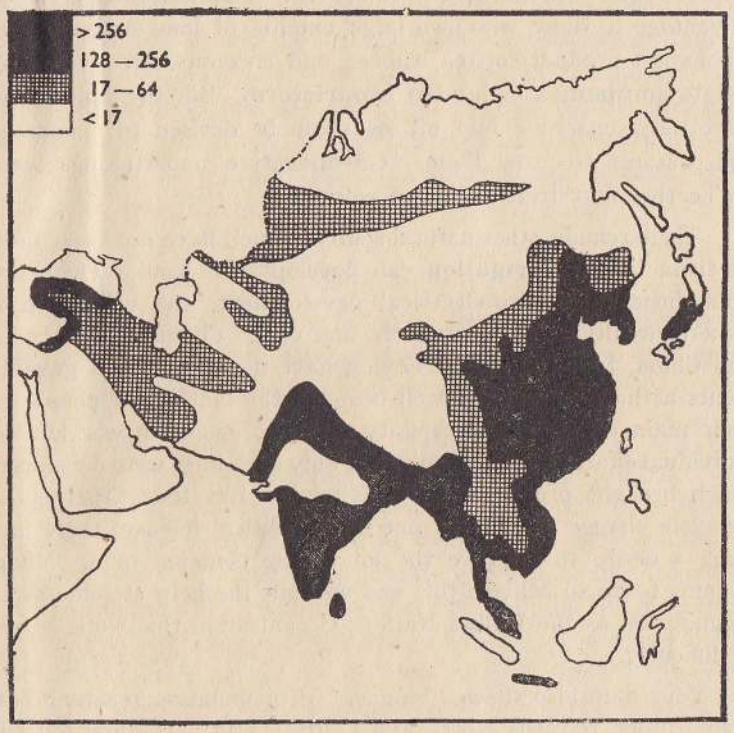
All the human activities we have examined are for the purpose of studying and understanding the distribution of man on the earth. The distribution of population is closely connected with ways and means of living. Thus where people are nomadic herdsmen we do not find large numbers. Similarly, where we find lumbering or the breeding of beef cattle, the number of human beings is not great. Likewise, over the great wheat lands too there are not many people.

But if you take for example the coasts where fishing is the main occupation we find a fairly high density of population. The 'human swarm' will be found thick in regions like the Mediterranean where **intensive** fruit cultivation is found or in the **tropical and temperate monsoon** regions where rice is the main food crop, or, finally, where industries are well established. Thus there is some undoubted connection between the distribution of man and his various forms of work to gain his livelihood. Let us examine this **relation** in each of the continents.

Asia.

On page 131 is a map showing you the distribution of people in Asia. You will notice at a glance that there are two areas where the distribution of man is over 128 to the square mile. They are in those areas where there is a **reliable supply of rain.** Along the coasts of Western Asia where winter rain is followed by summer dryness, fruit cultivation has been the work of man for centuries. Today fruit is cultivated in these areas as a **cash** crop, and with the money

so gained food and other requirements are purchased. Fruit gardening is very paying and as climatic conditions are excellent the **quality** of the fruit is high and so a sure market is assured. Thus the oranges, grapes, figs, etc. constitute a **regular** source of money income so that many people can live in these areas. You must not assume that the people here are rich. They are not



because there are more people here than the land can support but the struggle for life goes on.

In the areas of regular **summer rain** and **winter dryness** live practically three-fourths of the people of Asia. Paddy is the food grain of these people and as it is a prolific grain many people can find a livelihood here. But, as in the lands of winter rain,

there are far too many people here as well. Paddy cultivation alone will not support them on anything like a suitable standard of living. The people are miserably poor and other ways have to be found to give them a better chance of living. This has been found in the development of **cash** crops such as cotton, sugar, tea, rubber, coconut, oil seeds; but here again cultivation for export requires **large scale** production. This naturally gives an advantage to those who own large extents of land and most of the export products of tea, rubber and coconuts, are owned by **estate companies** or **landed proprietors.** But the cultivation of cotton, sugarcane and oil seeds can be devised to encourage the peasants to grow them. **Co-operative** undertakings seem to be the most fruitful line of work.

There remain other natural sources which have not been used in these lands. **Irrigation** can develop more land. There are possibilities of hydro-electrical development, the utilization of mineral wealth, such as iron ore and coal. Countries like India and China, Indo-China and Ceylon have never had such governments as have placed the well-being of the indigenous people as their main care. The prosperity of these countries was left to individual effort with the result that only such lines were developed which brought profit to the individuals. But today there is a complete change of thought and with political freedom there has come a desire to improve the lot of the common man. Much remains to do to achieve this and without the help of some such organisation as the United Nations Organisation this work is full of difficulty.

Your map also shows 'tongues' of population reaching out from Europe towards North and Central Asia. The first follows the rainfall belt of 20" brought by Atlantic winds. Here land development is taking place under wheat, meat and the cultivation of oil seeds. Hand in hand there has been a steady development of the mineral and forest resources of this area. New towns, roads and railways have been built, schools and hospitals set up and, in a variety of other ways, efforts have been made to enrich human life here.

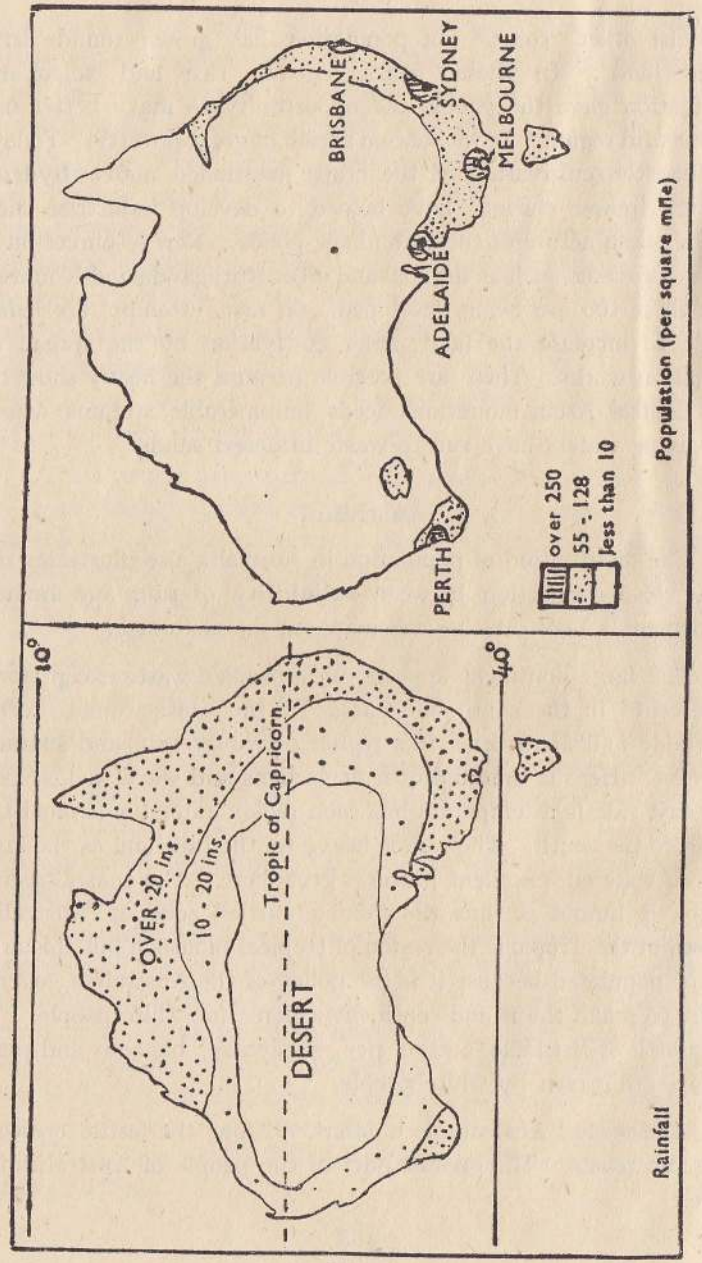
The other 'tongue' of population has grown round 'irrigated land'. In these, fruits, cotton, rice and sugarcane cultivation gave the people the opportunity to make better use of this arid region. It was once a region of great poverty. Today, besides the cultivation of the crops mentioned above **hydro-electric** power stations have helped to develop industries such as the manufacture of cotton and silk goods. New resources have been discovered such as the coal and oil of Karaganda and Kounrad and these too are being developed. In fact, attempts are being made to increase the land under cultivation by the spread of irrigation works. These are possible because the heavy snow on the Central Asian mountains feeds innumerable streams whose life-giving waters have run to waste in desert sands.

Australia.

The distribution of population in Australia also illustrates the very close connection between **reliability** of rain and human settlement. Look at the two maps on the next page.

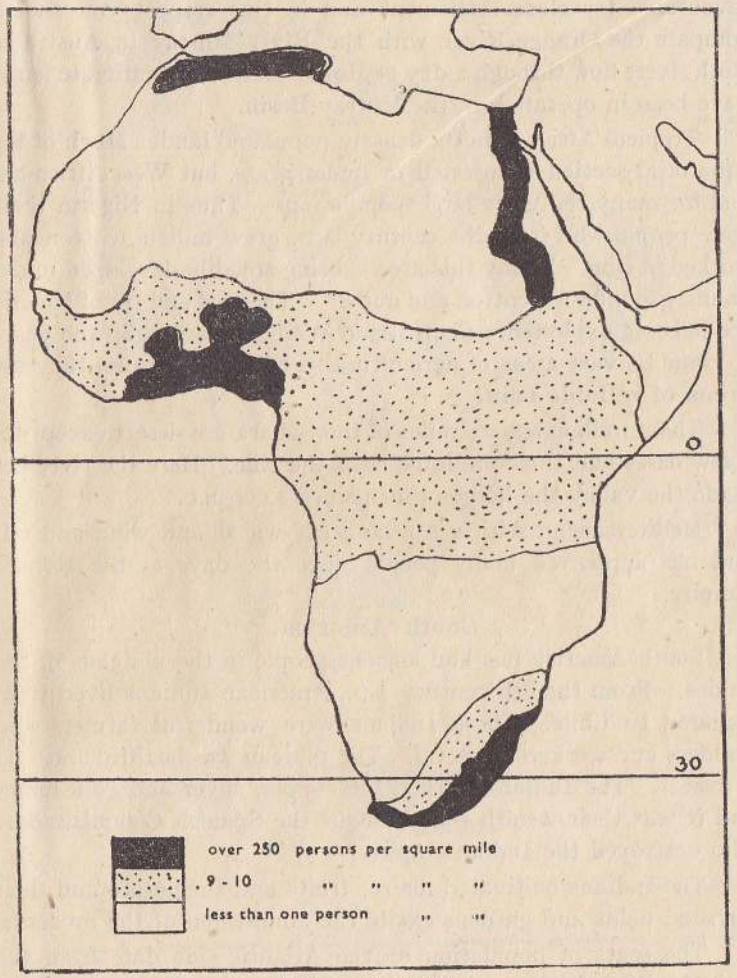
The large continent appears an unpeopled waste except for a 'crescent' in the south and east. In the south round Perth, Adelaide and Melbourne, is a region of winter rain and summer dryness. Here is the land of fruit gardens and wheat fields. On the east side is a temperate monsoon region extending from Brisbane to the south. The rain is heavy on the hills and as the land is well watered, excellent pastures grow here. The coastal region which is humid is thus the 'dairy cattle' zone of Australia. North of the Tropic is the region of tropical monsoon but this area is not populated because it is the policy of the Australian government to make the island-continent a home for white people. To the north of Brisbane, cotton, rice, sugarcane, bananas and pine-apples are grown by white people.

The rest of Australia is a desert. Along the fertile crescent are five towns. The greater part of the people of Australia live here.



Africa.

Africa too shows a very clearly established relationship between settlements and supplies of rain. South Africa is in many ways ilke Australia. She too has a 'fertile crescent' in the south



Africa—Population

and east. In the south is a region of winter rain—a land of fruits—while on the east is a temperate monsoon region. These areas are

well populated but on the leeward side of the hills the rain diminishes and **agriculture** becomes less and less certain. Mining towns such as Johannesberg have flourished because where there is gold man **will** found a home. Irrigation may make some parts favourable for close settlement and in this respect you should compare the Orange River with the River Murray in Australia. Both rivers flow through a **dry region.** In fact, irrigation schemes have been in operation in the Murray Basin.

Tropical Africa is not a densely populated land. Much of the equatorial section is forested or under grass, but West Africa has had for many centuries large populations. Thus in Nigeria there were people who from the century A.D. grew millets, cotton and worked in iron. Today this area is being steadily developed under palms, groundnuts, cotton and millets. The coal and tin of Nigeria too is being exploited. Central and West Africa may in the years to come be vast areas of agricultural production because they are **areas of reliable rain.**

The 2 million square miles of the Sahara are desert except for a few oases and that **one** large oasis the Nile. Here the river has made the valley the home of men since 4,000 B.C.

Mediterranean Africa is a land of 'wheat and wine and oil' and has supported many people since the days of the Roman Empire.

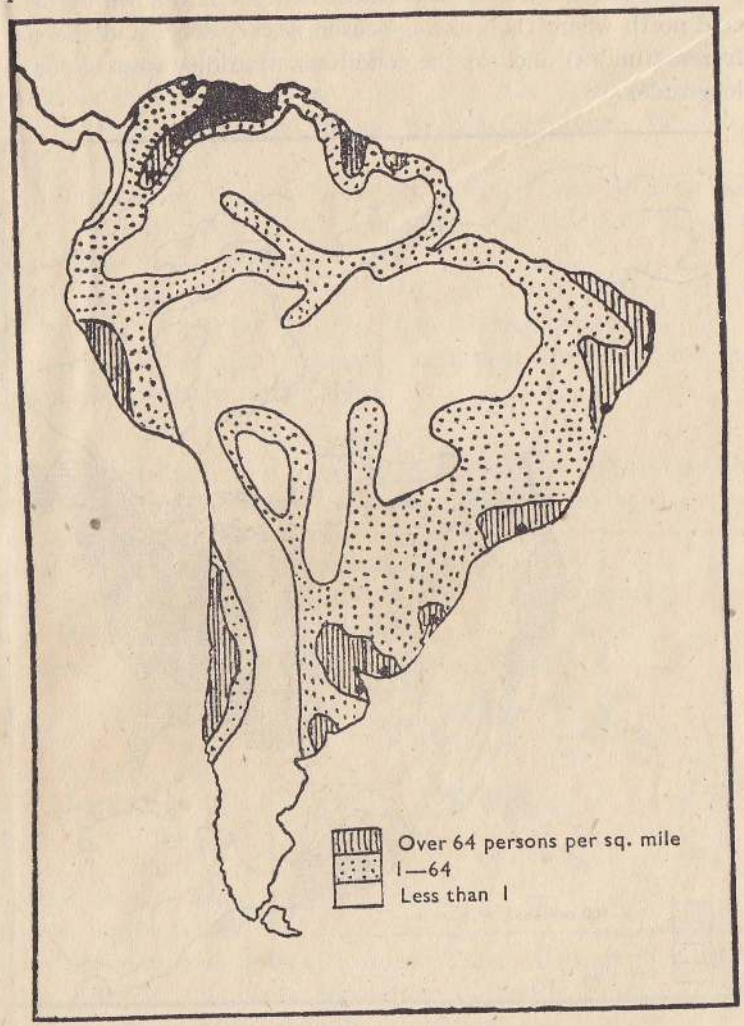
South America.

South America has had ancient people in the plateaus of the Andes. From the 8th century A.D., American Indians lived from Panama to Chile. These Indians were wonderful farmers and builders and workers in metal. The plateau was healthy and rich in metal. The Indians worked the copper, silver and gold mines and it was their wealth that brought the Spanish Conquisitadors who destroyed the Indian empires.

The Indians cultivated maize, fruits and the potato and their terraced fields and gardens excite the admiration of the moderns.

The seats of population on the Atlantic side date from the arrival of South European races. The Spanish, Portuguese and Italians settled down along the coasts from Pernambuco to Bahia Blanca and penetrated inland. The sugarcane and coffee estates,

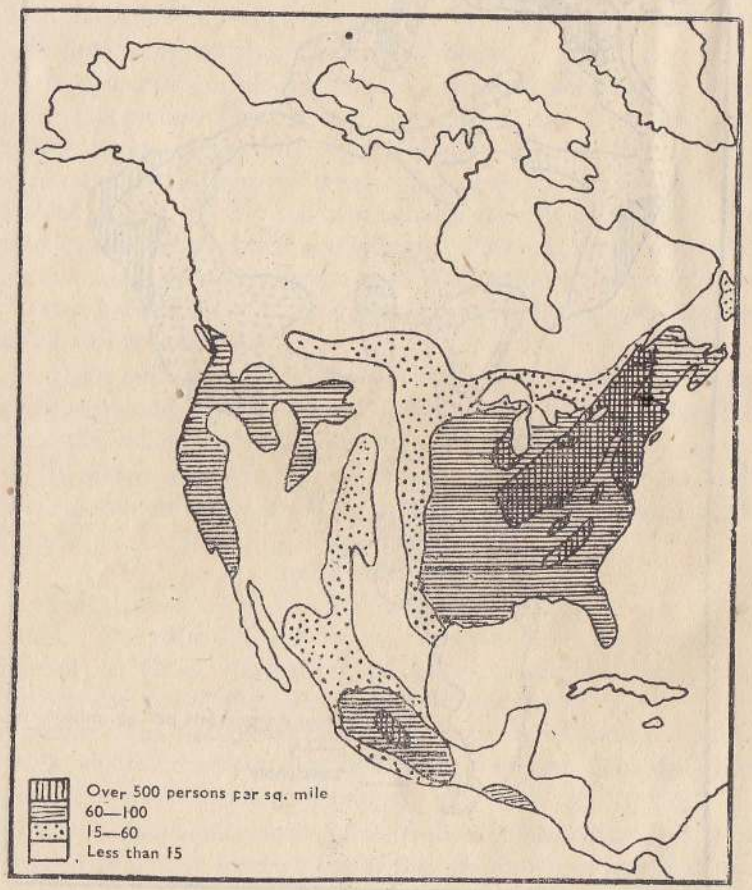
the cattle and grain of the Pampas, account for the groups of population on the east.



Along the north coast too in Venezuela, European peoples have settled down and their prosperity is based on coffee, sugar, bananas and the minerals such as are in this region.

North America.

The limits of human settlement here are laid down by (*a*) the cold north where the growing season is very short and the soil is frozen (tundra) and (*b*) the conditions of aridity west of 100° W. longitude.



In the south-east is a region of very reliable rain so that the great plain of the United States of America is a vast storehouse of agricultural production. It has very large supplies of iron ore,

coal and mineral oil and this combination of mineral and agricultural resources make the United States of America the only rival of Russia as self-contained geographical units.

The region of densest population is found in the industrial region extending from New York along the Mohawk-Hudson Valley—the New England States, westwards through Pittsburg to the Great Lakes.

Along the west coast the region of winter rain is once more a zone of settlement. Fruit and grain cultivation occupy the greater part of the land.

In Tropical America most people are found on the plateau which though dry is far healthier than the wet lowlands.

You thus see that wherever conditions are favourable the human swarms have settled down.

Europe.

The distribution of population in Europe illustrates two features—close packed zones of population in the industrial areas and scattered distribution over rural Europe. Your map illustrates these two features.

First notice a zone of dense population from the east (west of the Ukraine) to the Low Countries and across the North Sea to the British Isles. This is a zone of cities. It is the industrial heart of Europe. There exists another region with 'islands' of dense population in South Europe. These are regions of intensive **fruit** cultivation.

The rest of Europe south of the 60° W. latitude is **rural.** Large areas are under forest or cultivation and only villages and market towns are found here.

EXERCISES

1. Describe the distribution of population in Asia. Account for the scanty population on the plateaus of West and Central Asia.
2. Compare the distribution of Australia, South Africa and South America **south** of the Tropic of Capricorn.
3. Account for the distribution of population in Africa **and** South America **north** of the equator.
4. Compare the distribution of population in Western Europe with that of Eastern North America.
5. Why are (*a*) 'Mediterranean Lands', (*b*) Tropical and Temperate Monsoon lands densely populated?